The Value Research on Information Sharing in Supply Chain Management

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Abstract: In supply chains, information sharing is the key of improving the performance of Supply Chain Management (SCM). The existing literatures have mainly studied the importance and necessity of information sharing. The paper tries to study the value of information sharing in supply chains from relatively complete perspectives, which has not been referred before.

Keywords: Information sharing; Supply Chain Management; Value Research

1 Introduction

The existing literatures about information sharing in supply chains have mainly studied the importance and necessity of information sharing, and the technical framework to achieve information sharing, and information sharing incentives. Little study is on the value of information sharing, so the paper will further study the value of information sharing in supply chain management (SCM).

2 The importance of information sharing in SCM

The supply chain, through the cooperation between node enterprises, realizes the efficient flow of logistics, information flow, and capital flow in the whole chain to play a strong competitive advantage. Information sharing is the key of improving the overall competitiveness of the supply chain.

Information sharing is the aggregator to coordinate the supply chain, only through which we can manage and coordinate various links and various stages of the supply chain better. The information sharing among the members of the supply chain is very important for improving the performance of the whole supply chain. The importance of information sharing in SCM is shown as following five aspects:

1) Information sharing promotes the effective forecast.

Every enterprise needs to forecast and according to the projections of future sales sends orders to his suppliers. Different enterprises have different basics and get different results. Information sharing makes supply chain enterprises forecast corporately, and such forecasts can be repeated. All participants discuss the future market conditions, through cooperation achieving consensus forecast. This means that all the components in the supply chain sharing information can reduce the "bullwhip effect".

2) Information sharing can support the rapid reaction in supply chains.

Information sharing can make all the supply chain partners to work together. Through the information query and analysis about inventory, procurement, production and sales, enterprises can grasp customers needs in the shortest possible time, and understand the inventory and production conditions in the supply chain, so as to shorten delivery times, and to improve product quality and variety, and to reduce procurement costs, production costs, inventory costs and out-of-stock costs and to increase customer satisfaction. They could easily cope with the rapid changes in customer demand.

3) Information sharing is conducive for enterprises to achieve accurate management, reduce costs and improve resource utilization.

Reducing costs is an important part of business, which is an important means to improve efficiency. For supply chain enterprises, the profits of a supply chain are the incomes from the customers deducted the supply chain costs. The lower the supply chain costs, the more corporate profits it has. SCM means continuously reducing costs and improving efficiency, that is, SCM is constantly to optimize and improve resource utilization. Available data indicate that the implementation of enterprise SCM can
reduce 40-50% of the loss disposed by the price, lower inventories 10-15%, and bring about 20% of the cost savings.

(4) Information sharing helps enterprises improve delivery reliability, shorter delivery time, and improve service quality.

Through strengthening SCM, enterprises can greatly shorten the time to meet consumer demand, obtaining a competitive advantage which can not be replicated. Now in China, there are more and more product varieties and increasingly rapid changes in consumer demand. Therefore, in this changing world, of course, cost is an important competitive advantage, but rapid response to consumer demand, thereby effectively meeting consumer demand, is the fundamental competitiveness. The implementation of SCM can improve the delivery reliability to 99-99.9%, and shorten delivery time 10-20%.

(5) Information sharing will remove the uncertainty of SCM, effectively weakening bullwhip effect.

Using information network technology, supply chain partners can realize information sharing on supply, production, sales, inventory, demand and forecast, so that the storage, analysis and transmission of production and market information can be accurate and rapid. The information flows in SCM no longer subject to time and space limitations, and may be gradually enlarged when running along customers, retailers, distributors, manufacturers and suppliers. And the trend analysis and forecast of future needs can help enterprises manage supply and demand relations better, understand the customer needs at any time, and understand the movement of products, information, logistics, capital flow throughout the supply chain better, so SCM has less uncertainty. Centralizing customer needs can be effective to reduce the information uncertainty throughout the supply chain, so as to effectively reduce the bullwhip effect, reduce the supply chain inventory levels, eliminate the blind production of manufacturers and finally improve supply chain management efficiency.

3 The value analysis of information sharing in SCM

3.1 The value analysis of information sharing on supply chain cost optimization

3.1.1 Information sharing and supply chain inventory costs optimization

On the basis of information sharing, joint inventory management puts greater emphasis on the mutually beneficial cooperation between the two sides. In the model of joint inventory management, inventory management is no longer an independent operation process. Each stock managers of various levels (suppliers, manufacturers, distributors) will mutually coordinate between adjacent nodes to identify their real needs and demands, which making the inventory management between two adjacent nodes in supply chains in line with the demand expectation. Its model is shown as Figure 1.
From the cost accounting perspective, under the joint stock management model based on information sharing, compared with traditional stock models, the information in supply chains no longer subjects to time and space limitations, and customers, retailers, distributors, manufacturers and suppliers will all weaken the "bullwhip effect". And the trend analysis can predict the future demands to manage supply and demand relations better, at any time to understand the needs of customers, and fully to understand the movement of products, information, logistics and capital flow in the entire supply chain.

3.1.2 Information sharing and production costs optimization

The supply chain information sharing systems, established on the EDI (electronic data interchange) / Internet, provide platforms for supply chains to exchange information between enterprises to ensure that procurement, production and sales in supply chains run in phase. Through this platform, the transmission of information, especially the sales information, is no longer a linear or layer by layer transfer process, but a leaping transfer process and a multi-sources information feedback process, so supply chain enterprises will have the real-time, accurate and comprehensive demand information. And this new enterprise cooperation model and the inter-organizational information sharing system provide consistent demand information for all the enterprises in supply chains, and promote the information integration, exchanges and communication between enterprises. Therefore, under such conditions, supply chain manufacturers make production plans more precisely and feasibly, which is conducive to the establishment of synchronous production plans in the supply chain, and substantially cut the production costs. The leaping information transfer process is as shown in Figure 2:

![Figure 2 The leaping information transfer process in information sharing system](image)

Seen from Figure 2, when achieving information sharing in supply chains, for the upstream enterprises, the production capacity information also plays an independent role in production capacity analysis, for example, through thin and rough ability balances between production plans and "input-output" plans, the ability and willingness of the upstream enterprises to accept orders are reflected in production plans. At the same time, the production progress information of upstream and downstream enterprises are all taken as the basis for preparing production rolling plan, which keeps their production activities in the same pace. For downstream enterprises, information sharing can make the supply chain provide comprehensive, stable supply information for enterprises, and can also help collaborators track, feedback and coordinate the progresses of each manufacturers. Regardless of whether the upstream enterprises delivery goods on time, the downstream enterprises can receive relevant information in advance and take corresponding production measures to ensure the completion of customer orders in time, timely delivering goods. Seen from quality cost management in the production process, with product information sharing among node enterprises and the development and consolidation of trust relations, product quality testing costs significantly reduce, from the initial comprehensive case-by-case examination to product sampling, finally to exemption from check, which will not only help to reduce the lead time, but also save large quality testing costs.

3.1.3 Information sharing and transaction costs optimization

An effective information sharing system will reduce information searching costs, the cost of information distortion, and the cost of performance for enterprises in the supply chain.

(1) Supply chains, under information sharing environment, improved information search technology, changed the traditional manual search to computer automatical search, realized the real-time information
retrieval, improved the timeliness of the information, and expanded the space for effective information search. The geographical limits of traditional information search were broken, and information search tentacles were extended to any place of the world, expanding the scope of the resources optimization and reducing the cost to confirm the reliability of the information. In this way, the information searching costs will be significantly reduced, the cost constraints to access to information will be greatly reduced, and the delay accessing to information is almost disappeared.

(2) In the supply chain, there exist principal-agent relationships between enterprises in the form of orders. On the one hand, information transmission in orders form will cause information distortion, particularly the degree of orders change is often greater than that of sales change, and the distorted trend expands with the information moves to upstream, which is known as the "bullwhip effect". On the other hand, in the supply chain, as producers and retailers own asymmetric information, it is easy to produce Game behaviors. Under information sharing, retailers will share their information about inventory, production and delivery plans with other collaborators, so manufacturers will clearly understand the needs of retailers and customers, which reduces their concerns about orders and, to some extent, prevents their participation in the game and the "gamble" tendency. Some retailers even, before the advent of the strong season, help customers make orders, and deliver customer demand information timely to producers in order to design its production and arrange production progress better. Therefore, the cost, which is brought about by the distorted information due to the short-term demand game, can be overcome by the information sharing of participants in the supply chain.

(3) In the absence of information sharing, due to the asymmetric information and action, supply chain enterprises often operate by self-interest, which will sometimes bring losses to manufacturers. When achieving information sharing among enterprises in supply chains, the supply chain will become an information chain. Then, supply chain members can access the full information required for production and operation to eliminate the phenomenon of asymmetric information between enterprises, which weakens the motives to use asymmetric information to obtain profits, thus greatly reduces the occurrence possibility of opportunism and improves transaction efficiency transparency. This not only increases the numbers of suppliers, which enables the market compete fully, but also avoids compliance costs arising from excessive "price wars".

3.2 Benefit analysis of information sharing in SCM

In the supply chain, information sharing benefits are usually divided into tangible benefits and intangible benefits.

3.2.1 Tangible benefits

(1) Production-related benefits. In the circumstances of information sharing, enterprises can implement concurrent engineering, computer integrated manufacturing (CIMS) and other advanced production modes, optimize decision-making, and completely solve the various uncertainty resulting from the bad links of production processes.

(2) Sales-related benefits. Information sharing can greatly reduce the links of marketing to shorten the length of the supply chain (such as Dell), and increase opportunities for customer transactions, thus reducing the cost of the entire sales system. At the same time, enterprises can create a comprehensive customer databases and divide customers into ABC grades, which makes enterprises’ marketing more targeted, reduces bad debts losses, and thereby reduces costs. In addition, the application of information technologies will promote the sales, increase market share, reduce capital occupation, and speed up the flow of funds.

(3) Inventory-related benefits. Information sharing can effectively reduce inventories, inventory holding costs, storage costs and out-of-stock costs, and inventory occupation capitals. In particular, the current realization of VMI (Vendor Managed Inventory) reduces inventory costs more (such as Wal-Mart and Procter & Gamble).

(4) Technology/design-related benefits. Enterprises can achieve common learning through information sharing and fully cooperate in the process of research and development, which will reduce research and development time and costs. In the design, the smooth information is conducive for enterprises to improve their products based on actual customers demand. Particularly, now some suppliers join in the
design (such as automobile manufacturing industry), you can rule out the problems in product design requirements, establish design standards and lower costs.

(5) Reduce transaction costs. The realization of information sharing makes the entire supply chain constitute a business alliance, which greatly reduces the cost of transactions between enterprises (shown as Figure 3).

![Figure 3 Transaction costs](image)

Before implementing information sharing, when supply chain enterprises do deals with other node enterprises, their purchasing department and sales department have to spend a lot of human, financial, material costs, and transaction contracts often change, which needs re-negotiating. With the support of information technology, enterprises will establish a good partnership, avoiding various costs resulting from negotiations, contracts, supervision and bounds.

(6) Reduce management costs. The application of information technology improves working efficiency and realizes paperless office. Business-to-business and corporate internal communication become more fluent; office costs are saved; the enterprise management got promoted.

3.2.2 Intangible benefits

(1) Strengthen the coordination of the whole supply chain, increase the organization's capacity to respond and adapt to environmental changes, improve the competitiveness of supply chain enterprises and reduce the decision-making errors and accidents.

(2) Provide for decision-makers timely and accurate inventory, orders, financial, planning, personnel management information which reflects the conditions of various enterprises in the entire supply chain, which makes sure that decision-makers make unified, rapid and accurate decisions and in turn helps to improve the efficiency of enterprises.

(3) Standardize and normalize enterprise management, and improve the management efficiency and level of managers so that they can have more time to engage in research and analytical work, while reducing corporate human resources expenditure. Information sharing can reduce the uncertainty in supply chains, reduce bullwhip effect, reduce operating risks, and lower the risk of loss.

4 Conclusions

SCM attracts extensive attention as a modern enterprise management mode suitable for variable market. Information sharing in a supply chain is an important section in SCM. Full information sharing is the key factor of a successful supply chain. The existing literatures have mainly studied the importance and necessity of information sharing. The paper tries to study the value of information sharing in supply chains from relatively complete perspectives, which has not been referred before.
References

