Analysis of Supply Chain Management Coordination and the Optimization Based on the MC Model

WU Dahong
The College of Business and Management, Shaoxing University, Zhejiang, P.R.China, 312000
wudh2003@163.com

Abstract: Mass Customization, as a new mode of production expense and cost-effective enterprise, has become the mainstream that can meet the needs of individual customers without the of the 21st century manufacturing production. This essay summaries the elementary theory and the method foundation of Mass Customization, with analyses on its characteristics. We will make corresponding discussion on: the ways to carry out the coordination and the optimization of large scale supply chain management, by means of transforming the enterprise interior service flow, and key system regarding selecting and managing your supplier.

Keywords: Mass Customization (MC), supply chain management (SCM), service flow reorganization, Supplier

1. Introduction

Along with the market globalization, economical regionalizing, and the transnational management aggravating daily, the market competition is getting alarmingly intense. Cost and quality although are still the essential condition to success, but already was not the key aspect which subdued. Inter-Corporation competition starts to shift the focus to competing for time and customer demand. Providing custom-made product for the customer to enhance satisfaction is the inevitable trend for modern businesses to pursue the competitive advantage. In the new market environment the enterprise urgently need a new kind of production pattern, hereby arises Mass Customization (MC). In essence, MC can be described as an enterprise’s ability, to supply individual client with demanded quantity and varieties of products, at the speed and production cost equivalent of large scale production. The concept of MC was anticipated by Alvin Toffler in his book “Future Shock” (1970), and was first conceived by Stan Davis. He coined the term “Mass Customization” in his Future Perfect (1987). B. Joseph Pine II documented its place in the continuum of industrial development and mapped out the management implications for firms that decide to adopt it. Mass customization is a new paradigm for industries to provide products and services that best serve customer needs while maintaining near-mass production efficiency. (1993). Moreover, Chinese scholar, Professor Qi Guo-ning (2009) believe that, MC is the production method that combines enterprise, client, supplier, employee, and environment together, fully exploit each and every resources the enterprise has to satisfy individual consumer’s personalized demand. With the support of standard technique, modern design method, advanced information technology and manufacture, this production method has low production cost (to the extent of large scale production) and high quality, as well as efficiently provides goods and services. Through research and study by the Chinese and foreign scholars, the academic circle reached a consensus. It confirms that the MC’s basic principal is by categorising spare parts and the product structure based on product similarity; multiple purpose; standardization of use; and modulation and so on to reduce the product internal complicity. It focuses on exterior diversity that is more appealing to the consumers. By restructuring product process it enables large quantity spare parts production, achieving low cost, high quality custom-made products. MC possesses dual characteristics of large scale production and customization.

2. MC and the supply chain management association, the operation model

2.1 Supply chain management based on content of MC
Merely depending on traditional strategic competition method, it is barely possible to realize MC for
individual enterprise. To achieve MC, we need the supply chain management to implement strategic and operation solution.

Supply chain goes from raw material suppliers, the company, the distributor, the retail merchant and series of links to the end-user, formed in one logical chain structure. From raw material, to semi or fully finished good, then deliver the end product to the user network, consisting of enterprises and departments. It is a process through a series of activities involving planning, obtaining, storing, retailing, and servicing, that creates an engagement between the customer and the supplier, thus enables the enterprise to satisfy the internal and external customer's demand. Supply chain becomes the breakthrough point for enterprise to enhance the efficiency, reduce cost, and to achieve Mass Customization. Through the enhancement in supply chain management, improved the physical and information flow, which in result reduce excessive stock. The reduction in cost and improved efficiency are essential in businesses. This is one kind of effective management pattern which realizes Mass Customization.

The primary coverage of MC supply chain management has following aspect: One is the enterprise internal production operation management: to efficiently use and obey the internal resources; two is the enterprise external purchase link: Establishment of strategic supply chain alliance; three is the customer: To integrate superior information, prompt, and accurately obtain and satisfies the customer the demand.

2.2 Functions of SCM based on MC

Managing supply chain relationships in new environment, the supply chain system based on MC must have the typical characteristics (M. Ghiassi and C. Spera, 2003):

• A centralized strategy but decentralized operation
• A synchronized supply chain management system
• A collaborative partnership among selected suppliers
• A new interoperable, open information system infrastructure
• A ‘broker’ and an intelligent, mobile, agent-based trading system.

Concrete looking, the importance of supply chain management to the function of Mass Customization can be summarized as below: Firstly, provide solution for problems arising from punctual delivery and low cost, such as commodity purchases strategy problems, product allocation agility and flexibility questions. As a result it safeguards MC’s advantage of being flexible and timely. Secondly, the existence of Vendor Managed Inventory (VMI) and Jointly Managed Inventory (JMI) that is under the supply chain management. By utilize strategies from stock management, such as the multistage stock optimization and control, is able to allow supply chain cooperative enterprise to reduce the quantity of general spare part and the module stock level massively. Lastly is by integrating and sharing the information within supply chain management. This will reduce risks arising from incomplete / asymmetry information; strengthens mutual support between co-operative enterprises; thus significantly enhances MC industrial ability to compete and adapt.

3. Synchronization and optimization of MC supply chain management

MC itself is a production method formulated to adapt the fast changing and intensely competitive market environment. The supply managerial goal being able to let the business dynamically fit into this uncertain external environment; and strengthens its flexibility and the agility, at the same time achieves cost reduction.

3.1 Internal supply link coordination and optimization based on the MC enterprise

3.1.1 Technical Coordination using Enterprise Resource Planning (ERP) systems within the enterprise supply chain

Rationally integrating functions of the enterprise is an important aspect for the supply chain coordination and optimization. Internally we focus on: the integration of information flow within enterprises; the integration of businesses around the core functions of the implementation of integrated logistics management; and integration of internal supply chain management of suppliers and customers.
Thus achieve the formation of integrated supply chain. This refers to ERP's basic idea that the operations of the enterprise as a process closely connected to the supply chain. On top of that, other companies can use ERP system to support implementation of the program materials. ERP applications enable enterprises to reduce the market response time, lower inventory levels and reduce waste, companies can also consider the synchronization of demand management; synchronize the user's needs and plans with suppliers’ material, making reduction on non-value-added services. At same time, enterprises can also use extensive information network to gain a great profit.

3.1.2 Implement advanced technology to optimize internal production logistics system
The main activities of supply chain within the production cycle are logistic activities. Therefore, production coordination and logistics within the enterprise supply chain optimization is an important part of management. Simplification of existing products, standardization is a preliminary step in the implementation of mass customization. On top of that it is also the necessary condition for integration of internal resources to implement a precondition of supply chain management. Optimization of the internal supply chain include: Use of group technology, take species compression methods to improve the quality of the process specification; reduce duplication; simplify the production lead time to make parts management more standardized; and compromises contradiction arises from in all aspects of production.

3.1.3 Supply Chain Management Business Process Reengineering
In the custom-house supply chain management, different departments involve themselves differently in logistics and value-added activities. These departments being the internal customers and suppliers from the internal supply chain business processes. Break the traditional "vertical" form of organization, replaced by more efficient "horizontal" organizational structure. Re-design the enterprise's internal supply business process to combine the supply part into business process as a whole, by introducing the unified command to coordinate the leadership. According to customized production feature, we put the needs of our customers as the center, unify purchase, design, production, distribution, and coordinated all aspects of logistics, ensure supply chain processes within the enterprise follow natural order of the steps. The work is continuous, to complete the reconfiguration internal resources. In addition, Enterprises according to their own standards can choose from SCOR a standard workflow module to build their supply chain.

3.2 MC-based model of Supplier Selection and Optimization

3.2.1 Supplier Selection Model Based on MC
For businesses, supplier selection in the business development strategy should not be overlooked. Correctly handle and develop relationships with suppliers, treat procurement and suppliers, as an integral part of their supply chain activities, to speed up the overall flow of the materials and information transfer within supply chain to shorten the production cycle, reduce costs , while the fastest speed to meet customer needs.

3.2.1.1 General principles for supplier selection
(1) The principle of core competence. The Supply chain partners must have their own core competencies available to be used, and make their core competencies combine to improve the whole supply chain efficiency, and thus bring considerable contribution to the enterprise. These contributions include the timely and accurate market information, fast and efficient logistics, high-quality services, lower costs, faster research and development of new products.

(2) Unified principle idea. The formation of the relationship between supply chain partners should have the same corporate values and strategic thinking. If the gap between values and strategic thinking is material, cooperation is likely to end with failure. Both of which would greatly affect the compatibility of co-operation.

(3) Streamlining principles. The entire supply chain node enterprises should not be too many; the choice of partners should ensure quality over quantity. Supply chain being too long may cause information distortion, increase the cost and risk.

3.2.1.2 Supplier Selection Method
Vendor Selection methods fall into three categories.
(1) Qualitative selection. Qualitative selection is generally based on past experience, or professional judgments to choose suppliers, including intuitive judgments, tendering and consultation selection. This method is visual, simple, but particularly subjective.

(2) Quantitative selection. This is based on one individual factor or certain types of indicators that make a specific numerical analysis, according to the results to select suppliers. Common ones are the cost of procurement and ABC cost. This method is strongly objective, but requires extensive calculation.

(3) The combination of qualitative and quantitative selection method. Qualitative and quantitative methods are the choice of analytic hierarchy process (AHP), Artificial Neural Network (ANN) and data envelopment analysis (DEA). Supplier selection is a factor that contains qualitative and quantitative factors of multi-objective evaluation, the evaluation should be combined with manufacturer selection criteria, the supplier's conditions and other factors, combine qualitative and quantitative methods, so that supplier selection result is objective and fair.

3.2.1.3 Supplier selection procedure
Basic steps of MC-based supplier selection in supply chain: first, to analyze market demand. Determine candidate suppliers for certain products and features from market suppliers. This step is vital, and in the past, companies often ignore the link. This is because in the procurement of supplies companies often purchase some of the products that possess excessive features, which resulted in unnecessary costs, leading to increased procurement costs. Using value engineering, enterprises can look to a function not only satisfy the demands of the necessary supplies, but also can cost less. The supplier that has such material or product is satisfied for the candidate suppliers. Secondly, we have to establish evaluation criteria and indicators. These are the key data we collect from the candidate suppliers to investigate, analyze, and organize into information as complete, accurate as possible. Third, select the appropriate evaluation method to evaluate candidate suppliers, which is the most important and most critical part. Finally, evaluation of the results is verified to determine the appropriate suppliers.

3.2.2 Establishment of strategic alliances in Supply Chain
To implement an effective vendor management, enterprise must through information system combine supply chain organizations to achieve a close collaborative relationship, as well as provide sufficient capacity to respond quickly based on market (Chopra, 2001) to establish supply chain strategic alliances. Supply chain strategic alliance is the basis of mutual trust. By removing supply chain duplication and ineffective work activities, both parties achieve effective, integrated operation. Generally believed that to successfully import the strategic alliance into supply chain, we need to focus on the following steps (Hewitt, 1994):
(1) Confirm cooperation intentions: that is, while outlining the main framework for strategic cooperation, propose realistic implementation steps of co-operation
(2) Formation of alliances: strategic alliance decision-making, in order to select effective partners, clarifies strategies and tactics on various matters;
(3) Establishment of the League: Choose partners and build supply chain partnerships;
(4) Implementation and maintenance of the Alliance: conduct effective assessment on the results of the supply chain alliance and timely adjust supply chain alliance management mechanisms.

3.2.3 Mass Customization enterprises and coordinated management of supplier relationships
Suppliers of mass customization must be able to satisfy individualized requirements of enterprises for production or services. However, enterprises often can not fully understand the supplier's production technology and service capabilities, etc., resulting in asymmetry information, to cause a supply chain gap between the upstream and downstream. In addition, in every aspect of logistics services the establishment of credit system faces many challenges. Therefore, enterprises in the following ways to strengthen the management of suppliers:
(1) Establish a good information platform, e-commerce through the establishment of suitable models to increase timely information sharing via two-way interactive opportunities.
(2) Establish a reasonable supplier evaluation mechanism. Fully aware of the suppliers of information provided by suppliers to keep abreast of product quality requirements and support capabilities.
(3) Supply structure optimizing. Customization enterprises should classify and apply differentiated management style towards various suppliers. Most of the effort should be focused on suppliers of with
strong influence over our business sustainability and growth, and continuously explore potential supplier of this category. For management of suppliers of standard parts on the other hand, can be effectively managed by taking advantage of market allocation of resources

(4) Strengthen the involvement of suppliers and depth of cooperation with partner companies. Certain procurement activities can be outsourced to the main contractor, contractor or third-party Company, to achieve the best design and quality.

4. Conclusion

Mass Customization takes the advantage of the mass production mode and customization mode. It's a new way business competition. It will not only identify and realize the needs of individual customers, but also seek efficiency and low cost. In order to enhance the competition, profitability and the survival, mass Customization must be in coordination with supply chain management. It is a serious issue to consider and put into practice for Chinese enterprises, which is at the stage of growth.

References