



Strategic Selection of Push-Pull Supply Chain

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Abstract

The selection of pull strategy or push strategy for specific products depends on not only the change of demand, but also the importance of scale economy for production and distribution. In fact, almost no complete pull strategy or complete push strategy is adopted from begin to end in practice, and in most cases, the combined push-pull strategy is adopted in a marketing process. This paper will probe into the combined push-pull supply chain strategy.

Keywords: Supply chain, Push strategy, Pull strategy

1. Concepts of push supply chain and pull supply chain

The design and operation of effective supply chain are very important to every enterprise. To the design of supply chain, generally speaking, the corresponding supply chain should be selected according to the characters of products, and functional product adopts efficiency supply chain and innovational product adopts reactive supply chain. The partition of efficiency supply chain and reactive supply chain is based on the function of supply chain. As viewed from the operation of enterprise, it is called supply chain push strategy to adopt efficiency supply chain flow operation for the enterprise and it is called supply chain pull strategy to adopt reactive supply chain flow operation for the enterprise.

1.1 Push supply chain

Push supply chain takes manufacturers as core enterprises, sells commodities to consumers designedly according to the production and repertory of products, which drive roots from the production of manufacturers in the upper of supply chain. Its mode is seen in Figure 1. In this operation mode, various nodes on the supply chain are loose, pursue decreasing costs of physical functions, and belong to a sort of representation of supply chain in the seller's market. Because the changes of consumers' demand can not be known, so the repertory costs of this operation mode are high and the reaction is slow to the changes of market.

1.2 Pull supply chain

Pull supply chain takes consumers as cores, notices the changes of consumers' demand, and organizes production according to consumers' demand. Its mode is seen in Figure 2. In this operation mode, various nodes on the supply chain have higher integrative degrees. Sometimes, to fulfill the demand of consumer difference, it will further increase costs of supply chain and it belongs to a sort of representation of supply chain in the buyer's market. This operation mode has higher requirements for the total diathesis of supply chain, and as viewed from the developmental tendency, pull supply chain is the main direction for the development of operation mode for supply chain. Respective flow diagram of push supply chain and pull supply chain is seen in Figure 3.

2. Characteristics of push strategy and pull strategy

In practice, it is few to completely adopt push strategy or pull strategy, because though single push strategy or pull strategy has respective advantages, but they have limitations too.

2.1 Characteristics and limitations of push supply chain

In a push supply chain, the decisions about production and distribution are made according to the results of long-term forecast. Exactly speaking, manufacturer forecasts demands according to the order forms from shopkeepers. In fact, the changes of order forms obtained from shopkeepers and repertory are bigger than the changes of consumers' actual demands, which is usually called bullwhip effect, and this phenomenon will make the plan and management of enterprise become difficult. For example, manufacturer doesn't know how to confirm his production ability, and if it is confirmed according to maximal demands, that means manufacturer must assume expensive costs of resource leaving unused in most

cases, and if the production ability is confirmed by average demand, he needs look for expensive complementary resources in pinnacle term of demand. In the same way, the confirmation of transportation ability also faces thus problems: which one should be the standard, maximal demand or average demand? Therefore, in a push supply chain, some situations such as the increase of transportation cost aroused by urgent production conversion, higher repertory level and ascending production cost always occur.

Pull supply chain needs long time to make reactions for the change of market, which will induce a series of bad reactions, for example, in the pinnacle term of demand, because it is difficult to fulfill consumers' demand, the service level will be descended, or when some product demands disappear, it will make supply chain produce large numbers of repertory even products out of season (David, 1999, p.112).

2.2 Characteristics and qualifications needed of pull supply chain

In pull supply chain, the production and distribution are drove by demand, and in this way, the production and distribution will assort with consumers' demands but not forecast demands. In a real pull supply chain, enterprises need not too much repertory, and they only need make reactions to order forms.

Pull supply chain has following advantages. (1) It can reduce advance term through better forecasting the arrivals of shopkeepers' order forms. (2) Because of reduced advance term, the shopkeepers' repertory can reduce correspondingly. (3) Because reduced advance terms are shortened and the changes of system are reduced, the changes faced by manufactures will lessen. (4) Because the changes are reduced, the repertory level of manufacturer will be reduced. (5) In a pull supply chain, the repertory of system can be reduced obviously, so the resource utilization rate will be enhanced. Certainly pull supply chain also has limitations which extrusive representation is that because the pull system can not make plan in a long advance time, so the scale predominance of production and transportation can not be embodied (David, 1999, p.113).

Though pull supply chain possesses many advantages, but to obtain success, there are two relative conditions needed. The first one is that there must have quick information transfer mechanism which can transfer consumers' demand information (such as data in sales places) to different enterprises participating in the supply chain timely. The second one is that the advance term must be reduced through various approaches. If the advance term can not be reduced with demand information, the pull system is difficult to be realized.

3. Strategic selection of push supply chain and pull supply chain

To a specific product, what supply chain strategies should be adopted? Should enterprise adopt pull strategy or push strategy? The above discussions mainly start from the changes of market demand and consider how the supply chain deals with the operation problem of uncertain demand. In actual management process of supply chain, we should consider not only uncertain problems from demand party, but also the importance of enterprise's production and distribution of scale economy.

Figure 4 gives a frame model of supply chain strategy which can definitely suit for product and industry. The vertical axis represents uncertain information of consumers' demand, and the top means higher uncertainty of demand. The horizontal axis represents the importance of scale economy for production and distribution. The left extension represents more obvious scale economy of distribution and production. In same other conditions, if the uncertainty of demand is higher, we should adopt pull strategy which manages supply chain according to actual demand, on the contrary, if the uncertainty of demand is lower, we should adopt push strategy which manages supply chain according to long-term demand forecast.

In the same way, when other conditions are same, the scale benefit has important functions to reduce costs, and if the values of combined demand are higher, we should adopt push strategy and manage supply chain according to long-term demand forecast, and if scale economy is not important and the combined demand can not reduce costs, we should adopt pull strategy.

Figure 4 partitions one area into two parts through two-dimensional variables. Area IV represents that the uncertainty of demand is low, but the products having nature of scale economy such as beer, fine dried noodles, food fat and so on in the commodity industry all belong to this sort. The demand of these products is very stable, so enterprises can manage repertory according to long-term forecast, also can reduce transportation costs through full load transportation, which is very important to cost control for the whole supply chain. At this time, it is not fit to adopt pull strategy and traditional push strategy is fitter.

Area III represents the product possesses low demand uncertainty, which indicates it is a push supply chain, and its importance of scale economy is low too, so it also can be thought a pull supply chain. Many rapidly flowing books or CDs belong to this sort. Whether to adopt push strategy or pull strategy is decided by whether the cost and demand are confirmed, so we should seriously analyze the situation according to concrete conditions (in this article, we don't do this.)

Area I represents industries or products such as computer which has higher uncertainty and unimportant scale economy of production, installation and distribution. To these products or industry, in theory we should adopt pull supply chain strategy.

In practice, almost no complete pull strategy or complete push strategy is adopted from begin to end. So the combined push-pull strategy is put forward. For example, the lower of the supply chain, i.e. the direction facing consumers should enhance responses to the greatest extent, because consumers or your clients don't care how the whole supply chain operate and they only care about your response speed after their order forms produce. So as viewed from operation of supply chain, we should try to enhance responses and reduce costs to the greatest extent or complete response speed by reasonable costs, which requests the party of supply chain organizes production and distribution according to low costs, high efficiency and requirement of scale economy, enhances responses according to consumers' requirement to the greatest extent, and forms a sort of combined strategy of supply strategy which adopts push strategy first then pull strategy or adopts pull strategy then push strategy.

4. Selection of combined push-pull strategy

In the combined push-pull strategy, some layers of supply chain such as several initial layers are managed by push strategy and other layers adopt pull strategy. The meeting of push and pull is called push-pull borderline which is seen in Figure 5.

Still taking computer in area I (in Figure 4) as an example, though the demand of these products has higher uncertainty, the scale benefit is not very extrusive and we should adopt pull strategy in theory, but in fact computer manufacturer doesn't adopt pull strategy completely. Taking Dell as an example, the installation Dell computer is implemented according to consumers' final orders, at this time, it implements typical push strategy. That is to say, the push part of supply chain begins before the installation and the pull part of supply chain begins after the installation and according to actual demands of consumers, which is a sort of combined supply chain strategy with former push later pull, and the push-pull borderline is the starting point of installation.

Another form of combined push-pull strategy is to adopt combined supply chain strategy with former pull and later push. Area ④ (in Figure 4) represents those products and industries which have higher uncertainty and very obvious scale benefits in the process of production and transportation. The furniture industry is the most typical example for this situation. In fact, the products offered by furniture manufacturer are almost same in the aspect of material, but the differences in the aspects of shape, color and conformation are very obvious, so the demand uncertainty is very high. On the other hand, because of big volume of furniture, the transportation costs are very high. So it is necessary to distinguish production and distribution strategies. As viewed from production, because high demand uncertainty, enterprise can not implement product plan according to long-term demand forecast, so the pull strategy should be adopted for production. And because of big volume and high transportation costs of furniture, so the characters of scale economy must be fully considered for distribution strategy, and the transportation costs are reduced through large scale transportation. In fact, many furniture manufacturers have adopted this sort of strategy. That is to say, the furniture manufacturers begin to produce furniture when they receive consumers' orders, and when the productions are finished, they will deliver these products and other products which need to be transported to that region to the shopkeepers' shops and consumers. Therefore, the supply chain strategy of furniture manufacturers can be summarized to adopt pull strategy to produce furniture according to actual demand and adopt push strategy to transport furniture according to fixed time table, and it is a combined supply chain strategy with former pull and later push.

In a word, when enterprises design supply chain, they should not only consider the characteristics of product and market demand, but also consider the importance of scale economy for their own production and distribution. Only through comprehensive considerations, enterprises can select push supply chain strategy, pull supply chain strategy or combined push-pull supply chain strategy fitting for the developments of enterprises.

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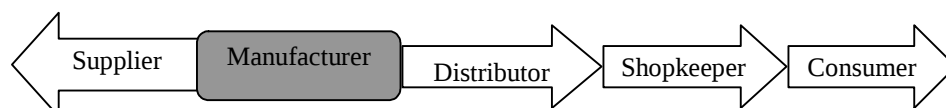


Figure 1. Push Supply Chain Diagram (Cha, 2003, p.161)

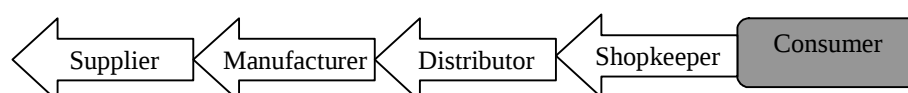


Figure 2. Pull Supply Chain Diagram (Cha, 2003, p.161)

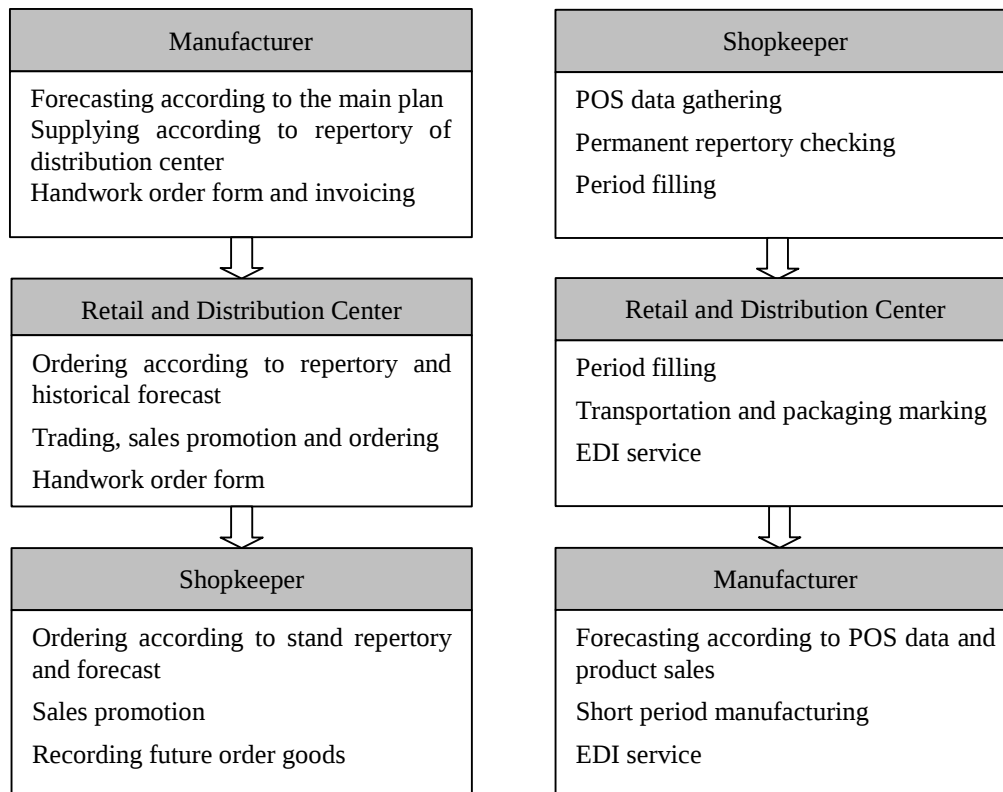


Figure 3. Push Supply Chain and Pull Supply Chain Flow Diagram (Liu, 2005, p.27)

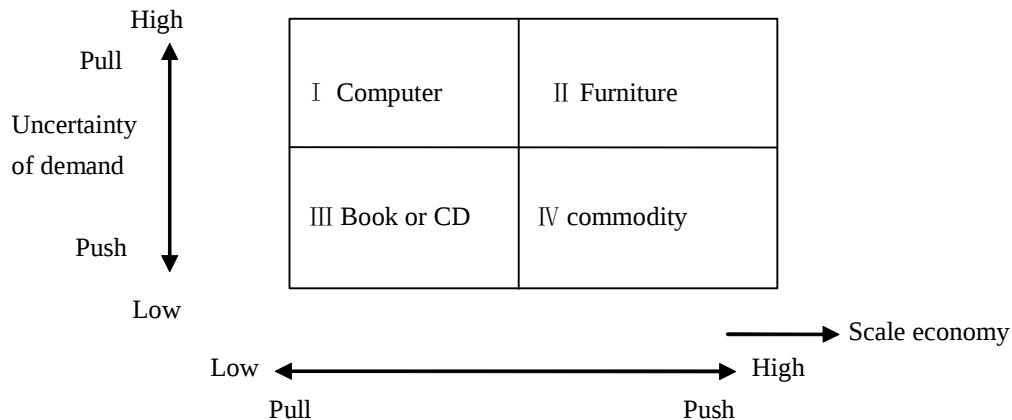


Figure 4. Push-Pull Strategy of Supply Chain (David, 1999, p.115)

