The Roles of Distributor in the Supply Chain – Push-pull Boundary

T. W. NG

Faculty of Business, City University of Hong Kong, Hong Kong

Tel: 852-2788-8558 E-mail: tikwng@cityu.edu.hk

William CHUNG (Corresponding author)

Faculty of Business, City University of Hong Kong, Hong Kong

Tel: 852-2788-7057 E-mail: william.chung@cityu.edu.hk

This work described in this paper was substantially supported by a grant from City University of Hong Kong (Project No. 9220043). We also would like to thank Mrs. Beryl Hung Man Yi, Founder and Chief Executive Officer, Mobicon Group Limited, for the early discussions on this research work and a large number of excellent suggestions and background information about the electronic industry of Hong Kong.

Abstract

The purpose of this paper is to study the roles of the distributor in the supply chain and to explore its positive contributions. We find that the distributor should act as a push and pull boundary (also called decoupling point) of the supply chain. The definition of decoupling point is needed to be enhanced when the concept of the decoupling point is applied to an industry, like the electronics industry, due to the fact that several decoupling points along a supply chain are possible. The distributor, as a decoupling point, needs to resolve the overstock risk pooled from the upstream parties due to the economies of scale in the production process. On the other hand, the distributor needs to provide fast delivery service with small order quantities and to satisfy the high availability requirement from its downstream parties by providing postponement services to her partners in the supply chain.

Keywords: Distributor, Decoupling point, Postponement, Electronics industry

1. Introduction

While competition exists not only on the organizations but also on the supply chains, organizations are seldom worked alone and will form a lot of strategic partners or align with their suppliers so as to empower synergy. They will focus on their core competency and outsource the other business process or form partnership with each other. The main idea is to make sure that every party of the supply chain is more efficient and effective than its competitors of other supply chains. The performance of the supply chain is determined by the achievement of the collaboration of every party: "not until the last customer is paying satisfactory, every organization in the supply chain is not earning profit." With this understanding, every organization in the supply chain has to move out all the obstacles between them and find out a win-win scenario which emphasis a partnership relationship.

However, we found that most of research works concerning SCM put the emphasis on the aspect of responding to customer demands by a responsive strategy in correspondence to the front line demand (also called real demand), for example, Dell's Virtual Integration Model (Magretta, 1998), Benetton and Zara's Quick Response Model (Dapiran, 1992; Christopher et al, 2004) and the Vendor Managed Inventory System between P&G and Wal-Mart (Vergin & Barr, 1999; Waller et al, 1999). Actually, the prime goal for these practices is to meet the customers' value without sacrificing on inventory cost (Ketzenberg et al, 2000), to shorten the lead time (Lampel & Mintzberg, 1996; Pagh & Cooper, 1998), and to alleviate the bullwhip effect (Lee et al, 1997). Consequently, how to improve manufacturer-retailer relationships becomes a hot topic since Kumar (1996).

It seems that the collaboration between manufacturer and retailer is the vital solution to manage demand uncertainty for having a good supply chain performance. However, what is the role of distributor in the supply chain? Is it the element of multiplying the bullwhip effect and hindering the transmission of real demand information? Are there any positive contributions provided by the distributor to the supply chain? Can the collaboration between distributor and manufacturer (or retailer) improve the supply chain performance? We use this paper to study the roles of the distributor in the supply chain and to explore its positive contributions. An example company (a distributor of electronics components) is used to illustrate the values and functions of the distributor to the supply chain and its upstream and downstream supply chain parties.

2. Decoupling point (push-pull boundary)

Stock sometimes has to be held owing to the business nature. A typical example in the electronics industry is that silicon and germanium which are used in semiconductor manufacture have to be produced in their most economical batch quantity. It would not be economically feasible to reduce and/or tailor the production batch quantity to fit the downstream demand with small order size. Therefore, the location of stock holding becomes a strategic decision and absolutely critical to the success of this type of supply chain.

In the case of the electronics industry, the distributor (our example company which is located in Hong Kong) naturally becomes the location of stock holding and therefore acts as the push-pull boundary where the process is expected to change from large quantity process to small batch flow. That is, the push-pull boundary separates the part of the supply chain that responds directly to the customer from the part of the supply chain that uses a strategic stock to buffer against the variability in the demand of the supply chain. Downstream from the push-pull boundary all products are pulled by the customer, that is, they are market driven while upstream from the push-pull boundary the supply chain is forecast driven.

On the downside of the push-pull boundary is a highly variable demand with a large variety of products and upstream from the push-pull boundary the demand is smoothed with the variety reduced. This indicates that the point of supply chain differentiation is at the push-pull boundary and the stock held at the push-pull boundary is playing a strategic role to act as a buffer between variable demand and a level production schedule. In other words, the push-pull boundary is the point at which strategic stock is often held as a buffer between fluctuating customer orders (and/or product variety) and smooth production output.

From the above observations, a straightforward concept has been developed for the meaning of push-pull boundary. In fact, we can find a similar concept of 'decoupling point' discussed in Hoekstra and Romme (1992). The concept of decoupling point was summarized by the following three functions.

Function 1: It separates the 'part of the organization oriented towards customer orders from the part of the organization based on planning'.

Function 2: It separates the customer-order part of the activities from the activities that are based on forecasting and planning. The customer order penetrates as far as the decoupling point, and from there the goods ordered are supplied to the customer.

Function 3: It coincides with a main stock point while downstream from it there are no stocks.

For Function 3, it should be understood that the main stock point is the "strategy" inventory point as discussed in Christopher and Towill (2001). Hence, Function 3 is modified to Function 3* shown below.

Function 3*: It coincides with a main "strategy" stock point while downstream from it there are no "strategy" stocks.

Therefore, the upstream of the decoupling point is where the push strategy is used and activities are based on a *forecast-driven* planning. It is the "push" area of the push-pull boundary. On the other hand, the downstream of the decoupling point is where the "pull" strategy is used and activities are based on *order-driven*. The decoupling point is the last major strategic stock point. Figure 1 shows the concept of decoupling point.

(See Figure 1. The concept of decoupling point)

In fact, cost and productivity performance are important for upstream operations when price is the dominant order winner, whereas downstream operations need to measure the means of flexibility and delivery lead times for competing on design, flexibility, and delivery speed. According to the study of Order-Penetration-Point (OPP) in Olhager (2003), the trade-off between (i) maximum manufacturing efficiency that dominate the pre-OPP operations and (ii) minimum inventory investment that dominates the post-OPP operations, while at the same time maintaining a high and consistent level of customer service becomes a vital strategy decision. Obviously, OPP is a type of push and pull boundary where is the most favorable strategy position to hold the stock for further differentiation activities due to the risk and uncertainty costs tied to the differentiation of goods. Bucklin (1965) discussed that differentiation could occur in the product itself and /or the geographical dispersion of inventories.

In the electronics industry, the stock of electronic component held in the push-pull boundary is still in its "neutral" form which is critical for form postponement activities for further differentiation. Moreover, the electronic products are also having the benefits of commonality that could supply to different industries further downstream. Furthermore, Hong Kong, with its geographical advantage to serve the Pearl River Delta area, naturally becomes a stocking place for electronic component.

3. The industry and the example company

In order to have a better picture to understand the role of distributor in the supply chain, we choose the electronics industry in Hong Kong since it is facing the problems of volatility demand, short product life cycle and fluctuation of supply price. In fact, the success of Hong Kong's electronics companies lays great emphasis on the quick response on customers' need by monitoring the product trends. Thus, a proper supply chain strategy should be a responsive one which might rise a question of bypassing the distributor to achieve quick response. However, the fact is that Hong Kong (and the Pearl River Delta area) is an important trading hub for electronic parts and components in the Asia-Pacific area. Apart from Chinese products, many items from Japan, Taiwan, the US and South Korea are re-exported via Hong Kong by distributors. From the study of HKTDC (2006), Hong Kong's electronics industry accounted for 48% of Hong Kong's total exports in 2005 and is the largest export category of Hong Kong. This feature of having many distributors in such an industry is a great topic for us to research and generate some knowledge both beneficial for the industry and academic.

Actually, the Pearl River Delta region is crowded with manufacturing plants. They come from different industries such as electronics, toys, watches, etc. Most of them need some electronics components to fabricate their products such as electronic toys, digital watches and consumer electronics. As China becomes the world factory, the Pearl River Delta area is one of the main manufacturing areas of China. This situation forms the centralization of industries in one main area and creates a need for some electronics distributors to re-distribute the electronics components so as to satisfy the different needs arising from different industries. Thus, Hong Kong, because of its location advantage, becomes the electronics distribution center to support the whole Pearl River Delta area as well as the other Asian area.

All the above factors enable Hong Kong to become the place postponement position to serve the downstream player. Moreover, inventories from upstream players are thus 'pooling' in this area for other postponement activities to enhance the supply chain performance.

The example distributor: a distributor in the Pearl River Delta area

After knowing the general picture of the Hong Kong's electronics industry, we choose an electronics distributor, Mobicon Group Limited (Mobicon), as an example to illustrate the distributors' roles in the supply chain. The reason why we use Mobicon as our example study is that it is the first listed electronics distributor company in Hong Kong. In order to study the supply chain practices of Mobicon, we will make use of the concept of push-pull boundary to study how a distributor should do in an efficiency way to benefit the supply chain. Figure 2 is an illustration of the relationship between Mobicon and its immediate upstream and downstream partners.

The upstream suppliers of Mobicon comprise of ***Manufacturers*** and ***Principals*** (like Motorola and National Semiconductor), and some of the principal's ***Agent***s. While on the downstream side, its customer consists of ***Retailers***, ***Traders/Distributors***, and ***Manufacturers***. The relationships among them are quite complicated. For instance, it is clear that the upstream suppliers of Mobicon are major IC components manufacturers who gain the benefits mainly from the push strategy. On the other hand, its downstream parties are influenced by the demand pull force because they are further close to the consumers that lead them to face the volatile demand. Consequently, Mobicon becomes the main risk pooling point to support the downstream retailers, distributors and manufacturers. However, this is not the end of the supply chain because the downstream distributors will also supply the manufacturers further downstream.

The role played by Mobicon as a distributor in the supply chain is to solve the conflict of interest between its upstream and downstream players. It is because on the one hand, its suppliers would like to gain the economic of scale from push strategy that requires a large order size and a long lead time (normally longer than 4 weeks) while its customers desire to get some flexibility to face the uncertainty demand so that they favor a comparatively small order size but shorter lead time (normally shorter than 2 weeks).

(See Figure 2. The upstream and downstream partners of Mobicon)

4. The decoupling points and the example distributor

The concept of decoupling point is mainly based on an organization that can directly manufacture the products and deliver to the customers. The idea is simple and straightforward within an organization. However, if the concept is applied to an industry like the Hong Kong electronics industry, the decoupling point concept is not that simple to apply. For example, Mobicon could only achieve the first two functions of the concept of the decoupling point defined by Hoekstra and Romme (1992). That is Mobicon could be a decoupling point that (1) separates ~~(1)~~ the 'part of the organization oriented towards customer orders from the part of the organization based on planning', and (2) separates the customer-order part of the activities from the activities that are based on forecasting and planning. The customer order penetrates as far as the decoupling point, and from there the goods ordered are supplied to the

customer. It should be a point that coincides with a main "strategy" stock point but the downstream still has "strategy" stocks! It is because the downstream of Mobicon is composed of different players. Obviously, in the case of retailer, there may be no "strategy" stock. That is, Mobicon cannot achieve Function 3* as a decoupling point in a supply chain. However, for the downstream distributors and manufacturers, there should be "strategy" stock at a much lower level since it is already 'buffered' by Mobicon. It is due to the fact that the distributors of Mobicon would also sell the products to further downstream manufactures. Furthermore, Mobicon would sell the products to manufacturers and these manufacturers would also have their own distributors to deliver their own products. Consequently, it is not easy to apply the concept of decoupling point defined by Hoekstra and Romme (1992) to an industry because there may be more than one decoupling point for "push" upstream activities and "pull" downstream activities along the supply chain. In fact, it can be observed that the supply chain's risk can be diluted from different decoupling points along the supply chain. On the other hand, this enables the customer order could penetrate into a deeper side of the supply chain from downstream decoupling points to upstream decoupling points.

Hoekstra and Romme (1992) defined five different positions of decoupling point to describe all possible product-market situations in the control concept for an organization (see Appendix for the details). Since we study a distributor in a supply chain for an industry, we modify these five decoupling points for an industry as follows.

Decoupling Point 1 (DP 1) 'Make and ship to stock'. Products are manufactured and distributed to stock points which are spread out and located close to the retailers.

Decoupling Point 2 (DP 2) 'Available to stock' (central stock). End products are held in stock at the end of the production process of the upstream manufacturers and from there are sent directly to many retailers who are scattered geographically.

Decoupling point 3 (DP 3) 'Assemble to order' (assembly for some specific manufacturers). Only system elements or subsystems are held in stock in the distributor's centers, and the final assembly takes place on the basis of a specific manufacturer order as value-added processes to the manufacturers.

Decoupling point 4 (DP 4) 'Available to order'. Only raw materials and components are kept in stock: each order for a customer, like other distributor, is a specific project.

Decoupling point 5 (DP 5) 'Purchase and make to order'. No stocks are kept at all: purchasing takes place on the basis of the specific customer order; furthermore, the whole project is carried out for the one specific customer.

Note that DP 1 and DP 5 do not need to be changed since they represent manufacturers and retailers respectively. The above decoupling points are shown in Figure 3 to describe the service functions in different situations.

Obviously, Mobicon provides valued-added services along the supply chain: "Available to stock" at DP 2, "Assemble to stock" at DP 3, and "Available to order" at DP 4 by means of postponement. Because the upstream of Mobicon pushes a lot of risk to it (the decoupling points), Mobicon has to manage well to dilute such risk for the downstream activities so as to minimize the whole chain's risk. Moreover, the concept of no "strategy" stock after the decoupling point cannot be applied to the downstream of Mobicon since there should be more than one decoupling point downstream. The supply chain practice that Mobicon uses to achieve "no strategy stock downstream" is the concept of postponement. It enables Mobicon to exert its strategy of 'risk dilute' and 'collaborative forecasting and planning' by which strategic stocks will not be ended up too far from the downstream supply chain and simultaneously the lead time can be shortened.

(See Figure 3: Decoupling Points and functions of distributors in a supply chain.)

5. Postponement – how Mobicon serves the electronics supply chain

With the strategic placing of the decoupling point in the supply chain, the strategy of postponement could be used. The aim of postponement is to increase the efficiency of the supply chain by moving product differentiation (at the decoupling point) closer to the end user. It is because the risk and uncertainty costs are tied to the differentiation of goods and differentiation could occur in the product itself and /or the geographical dispersion of inventories (Bucklin, 1965). Postponing the decoupling point reduces the risk of stock-out for long lead time at the distributor and of holding too much stock of products that are not required. One of the leading practitioners of strategic postponement is the clothing retailer and manufacturer, Benetton. Another example is Hewlett Packard which redesigned their printer supply chain to overcome the problem of variability in demand in order to move the product differentiation point to the distribution centers which can be viewed as the decoupling point.

Bucklin (1965) proposed that such product differentiation can be classified into three types: time, place, and form. Based on these three types of postponement, we discuss how Mobicon, as a distributor, serves the electronics supply chain as follows.

The first one is 'Time', which delays activities until orders are received. Mobicon is at this point where upstream of it prepares a buffer of inventory while capturing the downstream signal of demand from customer orders. This

postponement allows mass customization of customer's order, which facilitates all the flows in the total chain that balance the long lead time and quick response to orders. In fact, it is the function of DP 4 in the previous section. Mobicon acts as the distribution point and keeps components in stock to serve the different downstream players, like manufacturers. This delay of activities could enable the supply chain to capture the real demand easily so as to eliminate the inaccuracy of demand forecast. Activities are order-driven so that obsolescence is minimized.

The second one is 'Place', which delays the movement of goods or services until orders are received. Due to the location properties of the areas around the Pearl River Delta (crowed with manufacturing plants), the role of Mobicon is to ensure the flexibility of the whole chain where inventory is pooling in a single point, like a trading hub. In fact, it is the function of DP 2. Mobicon acts as a central stock point to serve different downstream players, like retailers and OEM. The risk of obsolescence is pooled at this DP 2. That is, Mobicon functions the supply chain by continuously trading off between availability for the delivery requirement and throughput time. Actually, it is a balance of not losing orders from not fulfilling the delivery obligation but has to invest a lot of money in stocks.

In this situation, Zinn (1990) attributes inventory savings through postponement to two factors. The first is the size of the assortment and the variation in demand for finished products, which can be supplied from a limited number of modules. The second is the demand for modules, which is negatively related, allowing for effective risk pooling of generic modules. When modules used in the final manufacturing are interchangeable with a product's inventory, the levels and risk of obsolete inventories are lower (van Hoek, 2001).

The third one is 'Form', which delays activities that determine final form of a product until demand is known. This is a critical strategic function to the supply chain provided by Mobicon. The mass production of semiconductor is manufactured in the natural form while the later part of differentiation like programming is done by Mobicon to ensure the whole benefit of mass production upstream and customization is exploited. It is the function of DP 3 provided Mobicon taking the final assembly on the basis of a specific order. Mobicon has to serve the downstream manufacturers from different industries which may have different requirement on the products needed. So, semi-final form of components is stored in Mobicon and waiting for the final assembly to satisfy the different requirements from manufacturers.

In postponed manufacturing, customization of products can be separated from speculative manufacturing of basic materials. The separation frees primary manufacturing to focus on large economic runs of standard products or generic components and modules. The decoupling point specifies the position in the chain where the customization occurs (van Hoek, 2001).

With the understanding of the postponement practices, the example of Mobicon can be used to generalize the concept of decoupling points for an industry, like the Hong Kong electronics industry in the Pearl River Delta area. In this example, distributor could act as a decoupling point to form a push-pull boundary in the supply chain. The prime objective of this decoupling point is to pool all the risk from upstream to the decoupling point. The risk is then diluted for the next downstream parties of the supply chain. In an industry like the Hong Kong electronics industry, it is common to have several similar decoupling points, like Mobicon. Figure 4 shows the different possible service positions of Mobicon in the supply chain with indication of the use of postponement practices. Figure 4 also presents some possible examples of downstream parties of the supply chain in which we can see how Mobicon serves the whole supply chain in different service positions. For Service Position 1, the immediate downstream supply chain party is retailers. Correspondingly, we have distributors and manufacturers as the downstream parties for Service Position 2 and 3 respectively. In addition, Figure 4 illustrates how the decoupling points are matched with the service positions of Mobicon by means of different forms of postponement.

In short, the strategic position of Mobicon as a distributor in the electronics supply chain is to combine the benefits of push and pull by placing itself on the middle part of the chain. By supporting the push strategy, its upstream partners can minimize cost. In addition, allowing pull strategy in the downstream, its downstream parties could reduce the overstock risk without scarifying the customer service level. However, being a decoupling point of the supply chain, Mobicon is putting itself in a risk pool because the minimum reasonable inventory (MRI) must be set and maintained at a higher level. We use the next section to discuss how Mobicon dilute these risks.

(See Figure 4: Matching the Decoupling Points with the Service Positions of Mobicon in the Supply Chain)

6. Risk diluting and demand management in Mobicon

The challenge for Mobicon is to bring the components (or products) on hand and then forward them to the market as soon as possible. On the other hand, Mobicon needs to influence the market demand by creating more demand on its products.

In order to dilute the risk, Mobicon has developed a strong global network of sales and overseas local services by means of Satellite Development Strategy (SDS), which emphasizes service specialization for different customer segments served by different expertise satellite companies. SDS enables Mobicon much more understand the most updated market trends deeply and broadly. The customer segments in Mobicon are formed by dividing all customers into the category of Telecom, RF Clock & Watch, Lighting & Power Supply, MP3 & Gift Products and Consumer Electronics. In fact, the SDS allows Mobicon to expend its sales channel safely and effectively and therefore it can grow in a rapid manner to increase its distribution channels by partnering with more and more sales agents.

Before being a satellite partner, the sale agent normally is a top agent of a niche market. Hence, by SDS, Mobicon has formed a huge customer database composed of different niche markets. Obviously, potential obsolete stocks can be shifted to different niche markets and therefore the upstream risk pooled at Mobicon can be diluted. That is, the huge customer database also implies that Mobicon have large catalogue of electronics products and therefore it does not need to rely so heavily on specific products. If a particular product is not selling well or there are supply problems, there will be substitute profitable products to smooth overall business performance. Figure 5 shows the flow of upstream electronics components from Mobicon to different niche markets.

In addition, with using the technique of revenue management to manage the demand downstream, Mobicon could also boost profit and ease the tension of the pooled risk upstream. Actually, revenue management has been applied very successfully in the airline, hotel and rental car industries, and now Dell, Nikon, Sharp, etc, are adopting this skill. This is because normally companies use price as a tool to influence customer demand and revenue management techniques are the best solution when products are perishable (e.g. short product life cycle of electronics products), system capacity is fixed (e.g. supply uncertainty in the electronics industry) and market base is segmented (e.g. sensitivity on price or service). Revenue management integrates pricing and inventory strategies to influence market demand. The objective of revenue management can be described as "selling the right inventory unit to the right type of customer, at the right time, and for the right price." To achieve this objective, Mobicon segments its customers into different industries, different sensitivities on price and service for providing customized prices. Moreover, since in most case the supply of electronics components are not stable, the price of the limited inventory would be set to different levels according to the customers' urgency.

(See Figure 5. Flow of Material Supply from Mobicon to other industries)

7. Small Order Service and collaborative forecast and planning

In the electronics industry, the normal order size is around US$400. Purchasers are usually accumulating the orders and wait until the minimum batch size to form a purchasing order (PO). This kind of practice is a well-known factor lengthening the lead time for consolidating the orders. However, time is a critical successful factor in the electronics industry facing the volatile demand. Moreover, this practice is also one of causes of the bullwhip effects. Mobicon's innovative strategy of Small Order Service (SOS) could alleviate the above difficulties faced by the industry. The practice of it is to lower the order size to US$60, and most important of all, Mobicon can offer a next day delivery service. This combination of small order quantity requirement and fast delivery facilitates the whole chain and provides a lot of flexibility for its downstream customers. Actually, this is an innovative idea since the distributor would normally expect a larger quantity order size from its customers to minimize the logistic cost. But this approach is quite opposite to the traditional concept by offering a small order service. The main drawback of SOS is the higher logistic cost. To resolve this drawback, Mobicon maintains its own truck capacity level lower than the current usage and outsource the excess to third party logistics (3PL) companies. The outsource contract of the 3PL companies is based on the fixed rate of monthly frequency and weight of the goods. A monthly lump sum is stated on the signed contract with the flexibility of adding extra loadings by extra payment. In this way, Mobicon can make sure its trucks are in full load most of the time to minimize cost while maintaining a service level satisfactory to its customer. The question is why Mobicon would like to provide SOS by paying extra logistic cost. We use the next section to discuss how SOS can be beneficial for the upstream partners by means of collaborative forecast and planning.

8. SOS and collaborative forecast and planning

Success of the electronics industry greatly relies on the abilities to respond to needs and monitor changing trends. The trade off between cost of production, lead-time of supply and volatility of demand within the sector continues to act as a focus for improved responsiveness and developed relationships. Therefore, the positioning of Mobicon at this decoupling point is critical for the success of the total chain. The technique that Mobicon used is the SOS which acts as a tool to achieve collaborative forecast and planning.

According to Seifert (2003), collaboration is an important element for the 21st century corporations to succeed. A well-known global consultant Michael Hammer, who wrote 'Reengineering the Corporation' and several follow-up

books, including 'The Agenda', says, "Knock down your outer walls, collaborate whenever you can." He goes on to say that "the walls between the supplier and the customer equal costs and the higher the wall, the higher the costs." Another person, Jack Welch who wrote "Straight from the Gut" emphasis collaboration both internally and externally which gave the success he and GE have enjoyed over the last twenty years.

Competition becomes fiercer and fiercer. The past years we can see the bankruptcy of Kmart, the closing of Service Merchandise, and the announcement of Toy 'R' Us closing Kids 'R' Us stores. However, if Cisco had stayed closer to its customers so as to understand the demand for its products was declining in early 2001, Cisco would have slowed down production and not built inventory for anticipated sales, which ultimately resulted in an inventory write-down of US$2.5 billion, see Seifert (2003).

In fact, the foremost goal of a company is to ensure the long-term maximization of profit or market value. And collaboration can generate competitive advantages that will lead to the achievement of this goal. Firstly, by looking at the overall cost leadership aspect of competitive advantages, it can help a company to generate higher margins from the same market prices or allows it to set lower selling prices with the same margin. Both can lead to a competitive advantage over rival companies. Collaboration in this field can enable the reducing of production cost, inventory cost, transport cost and promotion cost. Moreover, collaboration can achieve differentiation by increasing product availability through reduced out-of-stocks, improving product quality through identifying weak points in the supply chain and increasing product variety by identifying new gaps in the market. Furthermore, collaboration can achieve focus strategy by paving the way to more precise forecast for certain target groups and markets. This in turn permits competing on broader front and penetrating new niches with an expanded product range. Also, this can generate new customers who had not bought any of the existing products on the market. Alternatively, customers may be won over from a competitor because their needs are better satisfied.

Then, let us look at the SOS and see how it can achieve collaborative forecast and planning. Some customers, especially from manufacturers, normally require small amount of components to design their prototype in the R&D stage. Without SOS, they need to order minimal quantity set by their distributors. It implies that the manufacturer needs to invest unnecessary amount of components for R&D activities. However, because of SOS, customers do not need to invest so much on the designing stage of the new products. They can purchase a number of products or components in small order in the initial design and planning phase. Moreover, the SOS is accompanied by the every day delivery to shorten the lead time. In this stage, Mobicon even develop products with their customers since the product is in the designing time. They pay attention to product design because they understand that nearly 90% of product costs, including shipping and packaging, are set during a product's early design phase. And one of the biggest drivers of high costs is complexity that is introduces during the product design stage. For instance, the batteries of Motorola had been specifying for its cellular phones. As the engineers introduced new products, they kept introducing new and improved batteries, which may have had some increment value from a technical standpoint but added unnecessary complexity to the product line. Had the designers been measured on the concept known as "creative simplicity", they might have worked hard to reuse battery types from one new product introduction to the next.

This collaborative planning in the early stage can also achieve a collaborative forecast as Mobicon knows early about the demand from its downstream customers (manufacturers) and can pass this information to its upstream suppliers. In most case, upstream parties are passive towards customer demand. They are lead by the market demand and struggle to follow it in their operation for survive. However, SCM professionals are people who take the challenge to manage the demand and try to play an active role to influence demand. Thus, the implementation of small order service can let the customers reduce the cost in the planning stage by collaboration, and with the close collaboration, they can generate the forecast at a very early stage of product development. With this forecast, Mobicon can have enough time to make sure the actual demand and pass this information to the upstream supplier to prepare for the coming demand.

This innovative SOS strategy makes the collaborative planning and forecast to be achievable that results in total cost leadership, differentiation and focus. A principle in business is that you cut costs to survive, but you innovate to prosper. Use supply chain management to drive innovation and create value so as to get strategic advantage.

9. Discussion

In summary, the performance of the companies at the decoupling points (or the location of the push-pull boundary) is one of the critical factors for the success of a supply chain. It is important that the supply chain's risk can be pooled in these decoupling points. We use Mobicon, the example distributor, to discuss how the risks pooled and how a distributor handles such risks. To handle the conflict of economies of scale and quick response to market demand, postponement is employed. Depending upon the positions of decoupling points, the distributor can use

different form of postponement to dilute the risks. Moreover, we also found that Mobicon aligns partners from the upstream and downstream in a collaborative way to improve the performance of the supply chain. By using the SOS strategy, the collaborative planning and forecast can be achieved, which enable the chain to achieve total cost leadership, differentiation and focus. We also found that the technology involved is not a great impact. The most crucial point is the operation strategy of SOS to link up those players that added a remarkable value for the whole chain.

From this study and the example distributor, we also note that the distributor is not only a part of the marketing channel. In general, she also plays a critical role by standing on the point where those forecast-driven activities and order-driven activities meet. It is here the distributor employs SCM techniques, such as postponement, to turn the "PUSH" into "PULL" successfully. Moreover, it is here the distributor uses collaborative tools to transfer more demand data to its upstream players by using some appropriate strategy, like SOS in our example, to achieve collaborative forecast and planning. Although it cannot act as the information decoupling point (Mason-Jonees and Towill, 1999) - the point in the information pipeline to which the marketplace order data penetrates without modification, and is here where market driven and forecast driven information flows meet; the distributor still could provide more accurate demand data for the reference of the upstream players.

Other areas of the role of distributors have not discussed. When directly dealing with the retailers, the manufacturer could better understand the real demand and therefore lower the inventory level. However, the manufacturer does not have good customer base in term of wide variety, which is quite important for business as it will facilitate the economic of scale of sales and after sales service because the channel of distributors can be enlarged in a faster way. Moreover, in the aspect of development of customer base, manufacturers could fully utilize the relationships between distributors and their customers to enhance collaboration. Although manufacturers could rely on their brand name to attract customers, it could only retain those high loyalty customers. The case of Disneyland in Hong Kong is a good example to illustrate this. Even though Disneyland is a very famous brand name, it cannot get the market share from the local theme park, Ocean Park, because Ocean Park keeps a very close collaboration with its distributors (travel agents). In this case, Ocean park gets the benefits from its distributors' relationship with its customers and the widely spread of distributors could enable Ocean Park to cover a larger range of customers. The situation is even favorable to Ocean Park when it works with its distributors in high travel seasons that absorb most of the visitors traveling in Hong Kong.

10. Conclusion and further research

This paper discusses the positive contributions of distributors to a supply chain in an industry. Distributors can improve the effectiveness and efficiency of the supply chain by moving the decoupling point further from the manufacturer and more close to the downstream players.

We believe that we should not simply take the distributor away from the supply chain studies in order to facilitate quick response and alleviate the bullwhip effect. We need to further and fully exploit the benefits from economics of scale and flexibility to the supply chain provided by the distributor. To achieve this, we need to study more how the distributor strategically acts as an efficient decoupling point (push-pull boundary).

Empirically, we can use the 3 forms of postponement as the operational performance measurement of a distributor in a supply chain. The development of the corresponding measuring instrument can be one of our further research topics. On the other hand, since this paper is based on one distributor of the electronics supply chain, the results of this paper cannot be generalized for all distributors and/or all industries. Further research should include more than one distributor and/or from different industries.

References

Bucklin, L.P. (1965). Postponement, speculation and the structure of distribution channels. *Journal of Marketing Research*, 2, 26-32

Christopher, M., Lowson, R., & Peck, H. (2004). Creating agile supply chain in the fashion industry. *International Journal of Retail & Distribution Management*, 32, 367-376.

Christopher, M., & Towill, D. R. (2001). An integrated model for the design of agile supply chains. *International Journal of Physical Distribution & Logistics Management*, 31, 235-246.

Dapiran, P. (1992). Benetton-Global logistics in action. *International Journal of Physical Distribution & Logistics Management*, 22, 7-11.

HKTDC (2006). *Hong Kong's Electronics Industry*. Hong Kong Trade Development Council, Hong Kong.

Hoekstra, S., & Romme, J. (1992). *Integral logistic structures: developing customer-oriented goods flow*. McGraw-Hill, Maidenhead.

Olhager, J. (2003). Strategic positioning of the order penetration point. *International journal of production economics*, 85, .319-329.

Ketzenberg, M., Metters, R., & Vargas, V. (2000). Inventory policy for dense retail outlets. *Journal of Operations Management*, 18, 303-316.

Kumar, N. (1996). The power of trust in manufacturer-retailer relationships. *Harvard Business Review*, November-December, 92-106.

Lampel, J., & Mintzberg, H. (1996). Customizing Customization. *Sloan Management Review*, Fall, 21-30.

Lee, H. L., Padmanabhan, V., & Whang, S. (1997). The bullwhip effect in supply chains. *Sloan Management Review*, Spring, 93-102.

Magretta, J. (1998). The power of virtual integration: An interview with Dell Computer's Michael Dell. *Harvard Business Review*, March-April, 73-84.

Mason-Jones, R., & Towill, D. R. (1999). Using the information decoupling point to improve supply chain performance. *International Journal of Logistics Management*, 10, 13-26.

Pagh, J. D., & Cooper, M. C. (1998). Supply chain postponement and speculation strategies: how to choose the right strategy. *Journal of Business Logistics*, 19, 13-33.

Seifert, D. (2003). *Collaborative Planning, Forecasting, and Replenishment*. AMACOM, American Management Association, USA.

van Hoek, R.I. (2001). The rediscovery of postponement a literature review and direction for research. *Journal of Operations Management*, 19, 161-184.

Vergin, R. C., & Barr, K. (1999). Building competitiveness in grocery supply through continuous replenishment planning. *Industrial marketing Management*, 28, 145-153.

Waller, M., Johnson, M. E., & Davis, T. (1999). Vendor-managed inventory in the retail supply chain. *Journal of Business Logistics*, 20, 183-203.

Zinn, W. (1990). Developing heuristics to estimate the impact of postponement on safety stock. *The International Journal of Logistics Management,* 1, 11-16.

Mobicon Group Limited. [Online] Available: http://www.mobicon.com/html/mobicon.htm

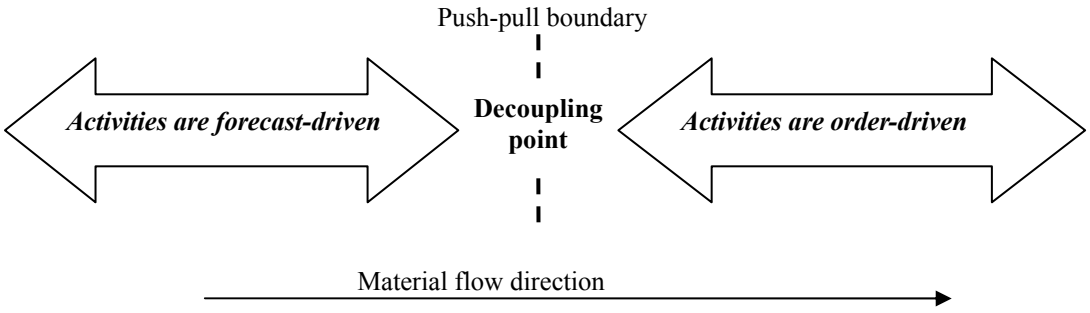

Figure 1. The concept of decoupling point

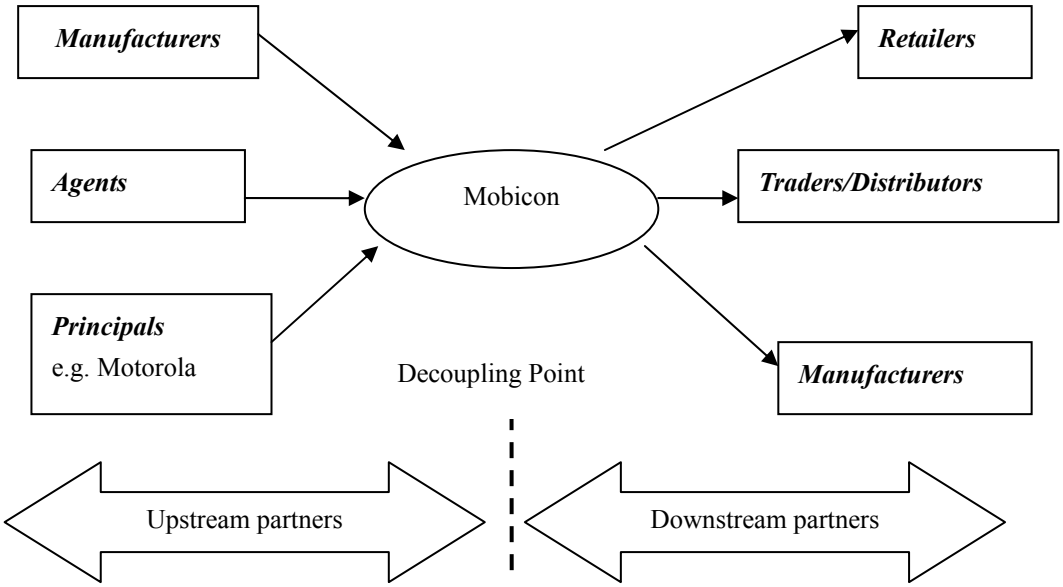

Figure 2. The upstream and downstream partners of Mobicon

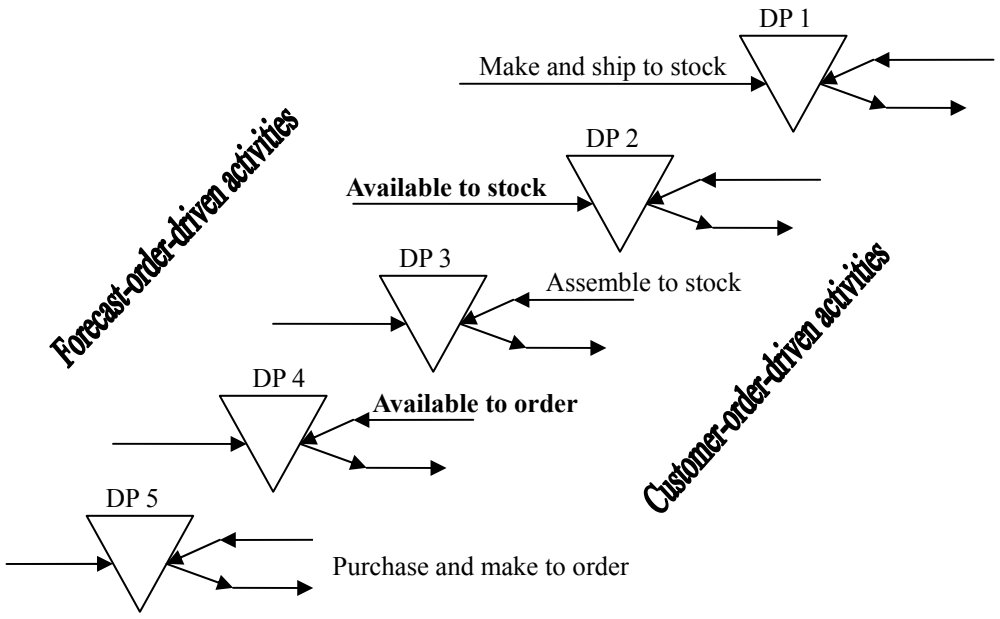

Figure 3. Decoupling Points and functions of distributors in a supply chain.

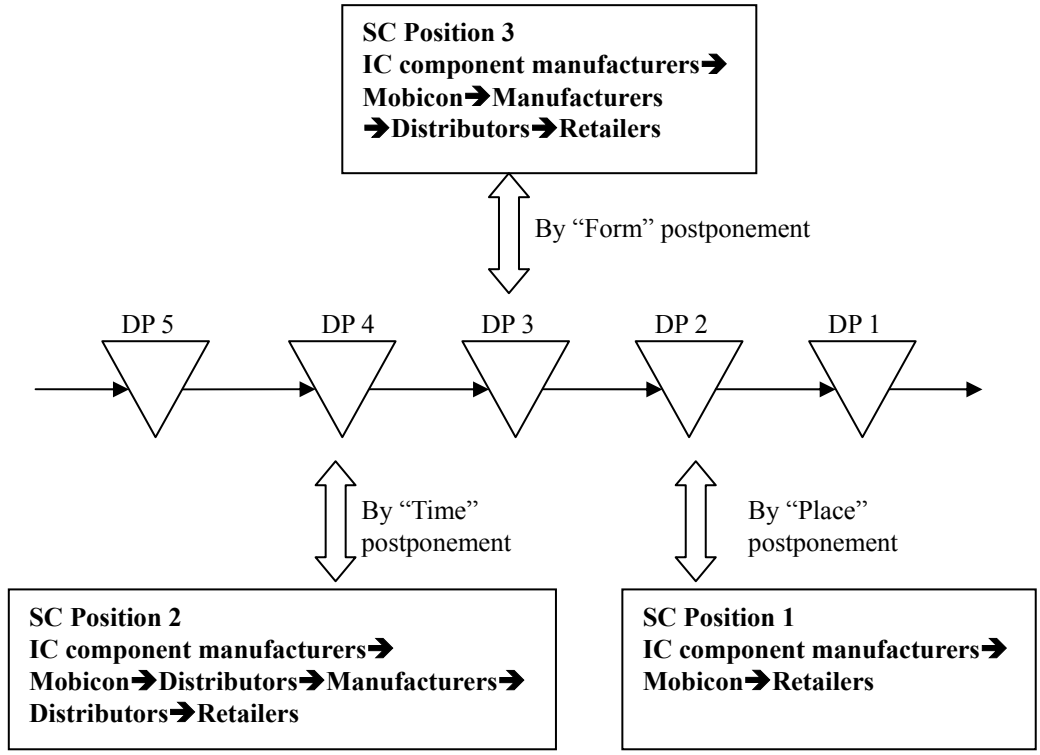

Figure 4. Matching the Decoupling Points with the Service Positions of Mobicon in the Supply Chain

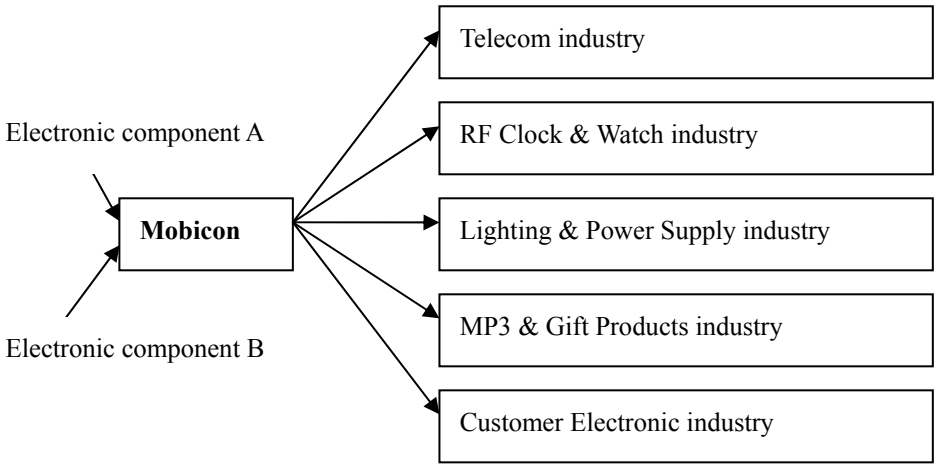

Figure 5. Flow of Material Supply from Mobicon to other industries

Appendix

Five decoupling points described in Hoekstra and Romme (1992, page 1-8):
Decoupling point 1 (DP 1) 'Make and ship to stock'. Products are manufactured and distributed to stock points which are spread out and located close to the customer.
Decoupling Point 2 (DP 2) 'Make to stock' (central stock). End products are held in stock at the end of the production process and from there are sent directly to many customers who are scattered geographically.
Decoupling point 3 (DP 3) 'Assemble to order' (assembly for one specific customer). Only system elements or subsystems are held in stock in the manufacturing centre, and the final assembly takes place on the basis of a specific customer order.
Decoupling point 4 (DP 4) 'Make to order'. Only raw materials and components are kept in stock: each order for a customer is a specific project.
Decoupling point 5 (DP 5) 'Purchase and make to order'. No stocks are kept at all: purchasing takes place on the basis of the specific customer order; furthermore, the whole project is carried out for the one specific customer.
Those decoupling points are indicated in Figure 7 below to describe all possible product-market situations in the control concept.

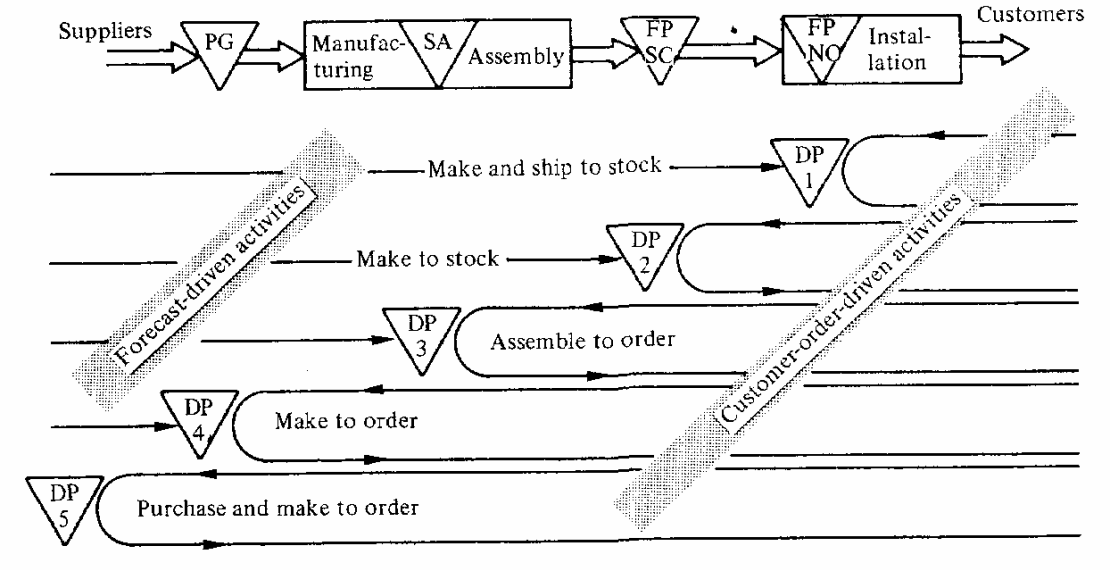

Figure 7. How far does a customer order penetrate? (Source: Hoekstra and Romme, 1992, page 7)