INVENTORY REDUCTION THROUGH LOGISTICS POSTPONEMENT

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Abstract

This study was aimed at discovering an appropriate strategy to minimize inventory days and cost in a fast moving consumer goods company. In 2011, an analysis revealed that inventory days at the Japan-market distribution center were off target. The research proved that push replenishment based on full speculation strategy is the root cause of the inventory problem. Logistics postponement was selected as a solution, resulting in inventory storage relocation and replenishment. By restructuring the supply chain, the central warehouse in Thailand is utilized as the inventory storage location, and replenishment is based on aligned inventory days. Inventory days reduced, with substantial cost saving Logistics costs for the new supply chain structure have no negative impact on the total supply chain cost.

บทคัดย่อ

วัตถุประสงค์ของงานวิจัยนี้ คือการค้นหากลยุทธ์ที่เหมาะสมเพื่อลดจำนวนวันที่ถือครองสินค้าคงคลังและต้นทุนของผู้ผลิตสินค้าอุปโภคบริโภค การวิเคราะห์ในปี 2011 เผยว่าจำนวนวันที่ถือครองสินค้าคงคลังในศูนย์กระจายสินค้าประเทศญี่ปุ่นยังห่างจากเป้าที่ตั้งไว้ นอกจากนี้ผลการวิจัยยังพิสูจน์ว่าการเติมสินค้าโดยวิธีผลักเข้าไป (push replenishment) เป็นสาเหตุของปัญหาสินค้าคงคลังดังนั้นจึงแก้ปัญหาด้วยวิธีการชะลอเวลาทางลอจิสติกส์ (Logistics postponement) ส่งผลให้เกิดการย้ายสถานที่จัดเก็บและเติมสินค้า ทั้งนี้การปรับโครงสร้างโซ่อุปทานโดยการใช้คลังสินค้าในประเทศไทยเป็นศูนย์เก็บสินค้าคงคลัง และการเติมสินค้าขึ้นอยู่กับจำนวนวันที่ถือครองสินค้าคงคลัง เป็นผลให้จำนวนวันที่ถือครองสินค้าคงคลังลดลง ทำให้ประหยัดต้นทุนไปได้มาก นอกจากนี้ยังพบว่า ต้นทุนลอจิสติกส์สำหรับโซ่อุปทานที่ปรับโครงสร้างใหม่ ไม่มีผลทางลบต่อต้นทุนโซ่อุปทานรวม

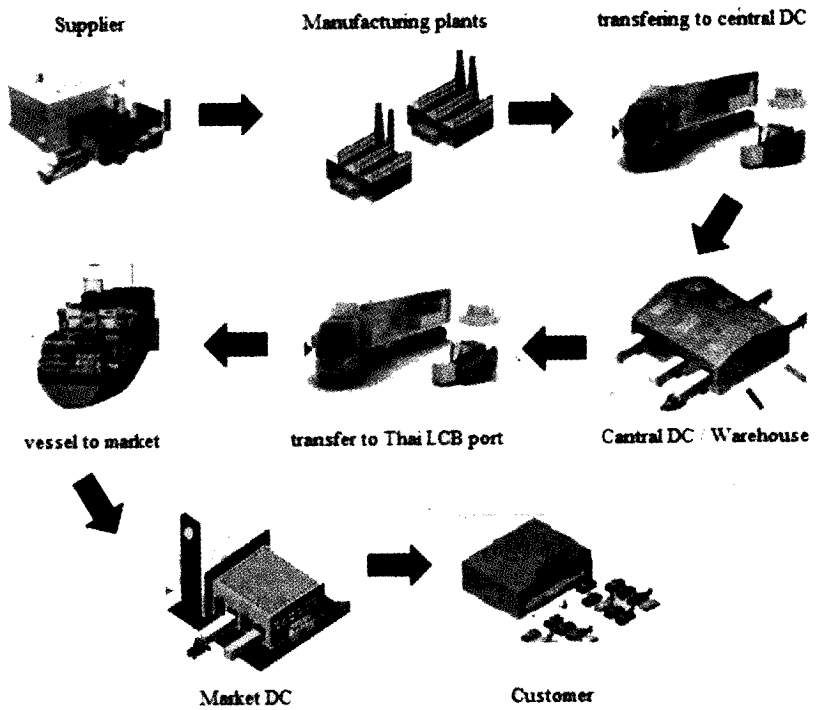
*This is a much reduced version of the research report by Ms. Manakitjongkol, part of her MSc course in supply chain management at Assumption University.

INTRODUCTION

The right level of inventory identifies the effectiveness and efficiency of the supply chain management as well as competitive advantage. It also indicates a firm's financial and economic health. Supply chain activities such as forecast or demand uploading, customer ordering and replenishment pattern, are critical criteria that determine inventory level. Logistics postponement is a strategy that helps reduce the risk of service loss and customer dissatisfaction by providing a flexible implementation plan for the company (Bartels, 2010). It defines the optimal inventory level which prevents sunk cost and inventory obsolescence. It also helps minimize cost by recommending the optimal location for inventory storage.

The ABC Company is a leading FMCG manufacturer, operating in scores of countries with scores of manufacturing plants, including Japan, China, India, Vietnam, and Thailand. The Thai manufacturing plant produces, among others, hair care products, which are the biggest in volume and sales. Figure 1 demonstrates the ABC supply chain.

Figure 1: Supply chain mapping



After production, the finished goods are transferred by truck to ABC's central warehouse or the Thailand distribution center. The central warehouse, located in the same industrial estate, is the storage facility for common SKUs produced and sold to more than one market country. The excess stock after allocation to meet each market require-

ment is kept in this location. It is also used to hold stock under quality inspection for unique SKUs, which are produced for specific market countries. After quality assurance, the stock is loaded into a container and sent to Lamchabang port, loaded onto a vessel and shipped to ABC's appropriate market distribution center.

Company analysis showed that in 2011, 49 out of 115 hair care SKUs selling to Japan had inventory days over the aligned target at 5,597 days, worth 7.39 million USD. 5,600 days (94%) of total inventory was driven by those 49 SKUs inventory days over target. Replenishment practice was found to be the root cause of this problem. Company planners used push replenishment based on full speculation strategy to prevent supply interruption, which resulted in excess inventory, obsolescent stock and sunk cost at the Japan market distribution center. This study, therefore aims to evaluate the logistics postponement strategy to improve inventory level and reduce the cost of these 49 SKUs.

REVIEW OF RELATED LITERATURE

Inventory day (days supply of inventory)

Johnson (1999) provided the calculation method for inventory day, to minimize the risk of holding too much stock and inventory obsolescence. The formula is:

$$\text{Inventory Days Supply} = \frac{\text{Inventory currently on hand (in unit)}}{\text{Known requirement} + \text{Forecasting demand (in unit) / Day}}$$

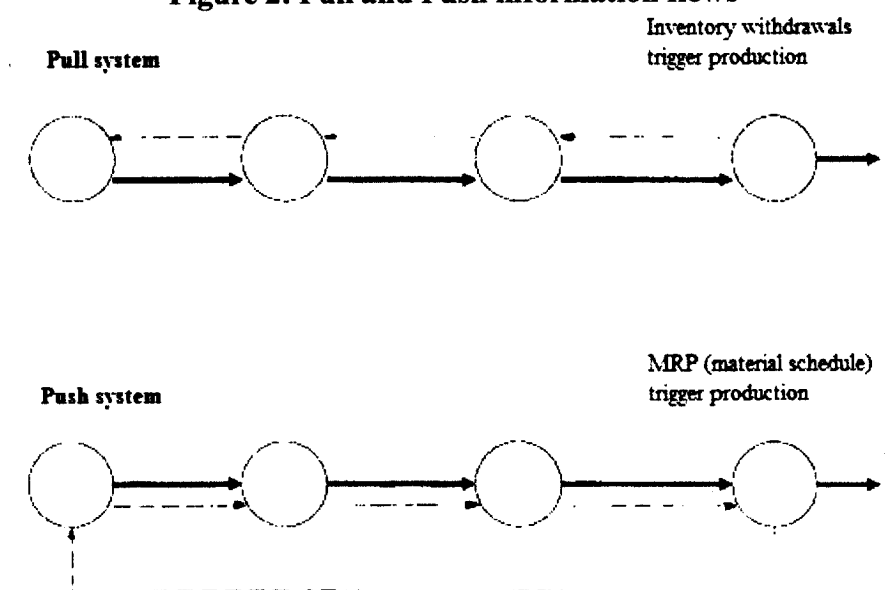
Inventory days supply is the number of days that the current stock will last without any additional quantity received from any source, when taking into account all demand elements, known requirements, and forecasting demand divided by day unit. The more flexible the supply chain, the smaller the inventory day needed.

Push versus pull

Next is a literature review of three supply chain strategies: push, pull, and hybrid. Chopra and Lariviere (2005) explained that push strategy, or pushing a product driven by forecast, was not considered an appropriate practice for inventory control. The pull concept has become the right strategy for many industries as supply chain activities are driven by actual demand. However, actual customer orders which normally require long lead times are necessary to start demand-driven activities. Thus the optimal practice adopted by many companies has shifted toward a hybrid "push-pull strategy". Karmarkar (1991) said that in the 1970's, USA introduced push manufacturing systems. However, Japan's Toyota was recognized as having a successful pull system (Van Hoek, 2001). Therefore both push and pull systems, and hybrids, are examined in this research.

The characteristics of push and pull systems can be defined by the point at which activities are started, with or without an actual demand requirement. For a pull system, the production is triggered by the decrease of stock or stock withdrawal due to customer orders. An inventory level below a safety stock target will generate the need for replenishment and then stimulate need in production and material ordering. Production for a push system happens prior to the acknowledgement of actual demand or availability of material. The features which distinguish push and pull systems are shown in the information flows below, Figure 2.

Figure 2: Pull and Push information flows



Source: Karmarkar (1991)

----------▶ represents information flow on inventory withdrawal

——————▶ represents information flow on material schedule

The information flow in a pull system will move against the material scheduling and production direction (bold arrows). The dotted arrows represent the flow of inventory withdrawal or actual customer orders, being the factor that triggers material ordering and production. The direction of the flows in the pull system is normally from the end of the chain to the beginning (from the actual customer order to production). In the push system, the material flow happens independently of the information flow. The material scheduling and production flow (bold arrows) happens regardless of the information of actual customer orders (dotted arrows). Thus, the production is triggered by the material schedule with no consideration of inventory withdrawal information.

Hybrid push-pull systems

Many systems require a combination of push and pull systems to smoothly operate sup-

ply chain activities (Karmarkar, 1991). The replenishment release was normally driven by actual customer order withdrawal or a pull system. However the forecast number is still needed for production MOQ and material ordering scheduling. The inconsistency in production scheduling, demand uncertainty and the longer waiting time for actual customer ordering, make it difficult to conclude all supply chain activities in the pull strategy. A push system will be needed for efficient production and material ordering. In contrast, the pure use of a push system will impact inventory levels and create unproductive cost. Therefore, the right concept is to keep the push strategy for some activities, for example MRP material ordering. Then use the pull system to hold up the production of finished goods as late as possible but ensure that the waiting time can still be offset with the production and transportation lead time. The combination of push and pull strategies can be successful by separating the activities based on information and lead time. The processes need a long lead time and if it is difficult to access actual demand will be driven by the push strategy. The remaining activities that are predictable and can be achieved in a short reliable lead time will be assigned to the pull system. Common practice for using a mixed push-pull strategy is to reserve raw material, or work-in-process material, by pushing the purchasing activity which normally involves a longer lead time. Then pull the final production or assemble to final product when the customer order arrives. The combination of push-pull strategy helps create flexibility to the supply chain without the need to invest more cost in changing the whole MRP system. The right adjustment of this hybrid push-pull can be extended to fit specific supply chains which will promote efficient control of activities, cost saving, and inventory (Karmarkar, 1991)

Postponement strategy

Postponement is a concept introduced in the 1920s. Its foundation is that there are risks and costs attached to the customization of finished products during the manufacturing and logistics processes. To reduce those risks, delay or postpone such operations to the latest point where actual customer requirements are confirmed (Pagh & Cooper, 1998). Four generic supply chain strategies were described by Pagh & Cooper (1998) which are explained by the postponement/speculation matrix in Figure 3. The postponement/speculation matrix separates four supply chain strategies according to their manufacturing and logistics characteristics, based on decentralization versus centralization concepts, and make to stock versus make to order strategies. Each strategy has its own characteristics designed to match different type of manufacturing. The four postponement/speculation strategies are shown in the following matrix.

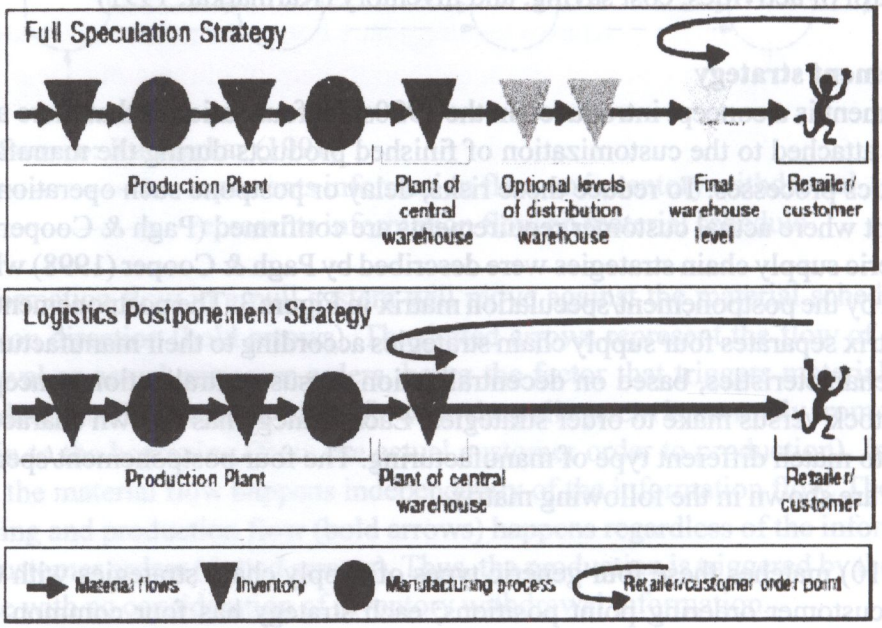
Dong (2010) matches these four generic types of supply chain strategies with the four different customer ordering point positions; each strategy has four common components: material flow, inventory, manufacturing process, and customer ordering point. Of the four types, only two are relevant to this research, as shown in Figure 4.

Figure 3: Postponement/speculation matrix and strategies

		Logistics	
		Speculation *Decentralized inventories*	**Postponement** *Centralized inventories and direct distribution*
Manufacturing	**Speculation** *Make to inventory*	**The full speculation strategy**	**The logistics postponement strategy**
	Postponement *Make to order*	**The manufacturing postponement strategy**	**The full postponement strategy**

Source: Pagh and Cooper (1998)

Figure 4: Different customer ordering points in different strategies



Source: Dong (2010)

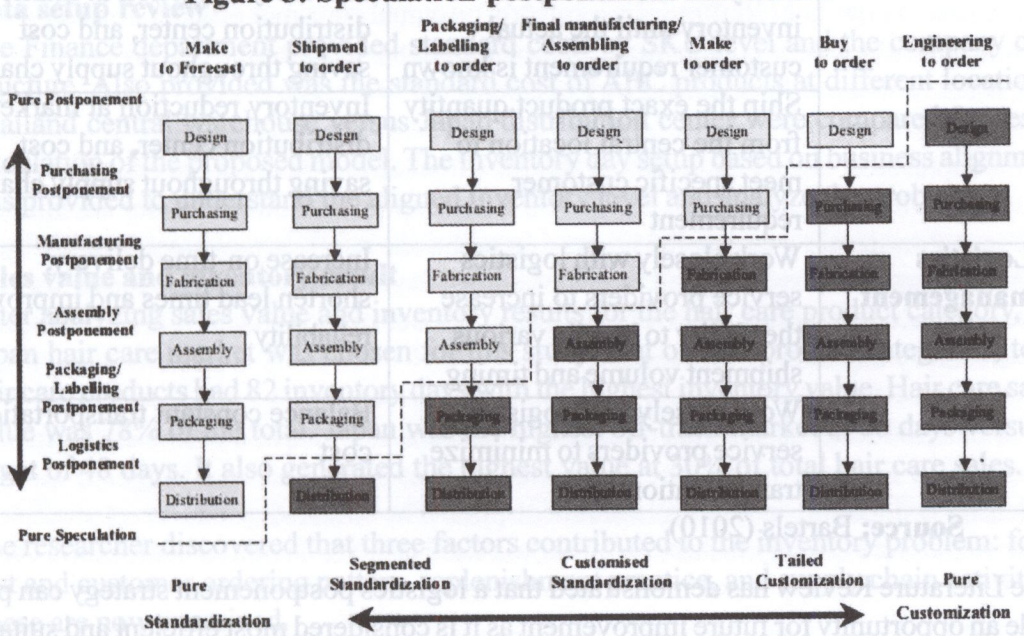
Full speculation strategy

This strategy is traditionally used by most companies where both manufacturing and logistics processes are driven by pure forecasts. The customer ordering point is positioned at the end distribution center or the nearest warehouse to the customer. This method is suitable for standardized products with highly predictable requirements. Most of the mass products which use economy of scale production use full speculation for the supply chain as the majority of inventory is being pushed and kept at the end distribution center to ensure availability. An outstanding advantage of this strategy is the benefit of high service rates and economies of scale. However, excess inventory and potential obsolescence are the downsides.

Logistics postponement strategy

This practice combines manufacturing speculation together with the delay of logistics. The ordering point or the point at which actual customer requirement is known is placed at a central distribution center or between the manufacturing and logistics activities. In other words, the manufacturing is done based on forecast but the logistics will be driven by customer requirement. The advantages of using this strategy are inventory cost reduction, on-time delivery, constant transportation cost, and manufacturing cost optimization through economies of scale. Nevertheless, the transportation cost per shipment might increase as the shipment size will be smaller and more frequent. Pagh and Cooper (1998), and Yang and Burns (2003), defined postponement and speculation strategies in seven stages, as in Figure 5.

Figure 5: Speculation-postponement continuum



Source: Yang and Burns (2003)

The additional types of supply chain strategies mentioned by Yang and Burns (2003) in Figure 5 are packing/labeling postponement, assembly postponement, and purchasing postponement, based on the different postponed activities in the chain. The forecast-driven and demand-driven activities of each postponement type are separated by the dotted line. It also illustrates that the different degrees of postponement and speculation strategies are associated with various positions of the customer ordering points. The postponement/speculation matrix result proved to be the most compatible and applicable strategy for mass production with high economy of scale in production.

Logistics postponement: transport and storage

Yang, Yang, and Wijngaard (2005) studied the impact of postponement on transport. They defined logistics postponement as a combination of time and place postponement. The concept is to organize the inventory storage away from the customer until the requirement is known, to minimize inventory cost but still maintain service commitment. The finished product will be centralized or stored at the centralized location and replenished to the customer on time with the right quantity. Bartels (2010) emphasized the value of the logistics postponement concept, its characteristics, and the actions needed in order to successfully implement and optimize the benefits, as summarized in Table 1.

Table 1: Logistics postponement characteristics, action needed, and benefits

Characteristics	Actions needed	Benefits
Place and time management	Retain finished products at a central location	Reduce risk of placing inventory in wrong timing and quantity
	Delay the movement of inventory until the actual customer requirement is known	Inventory reduction at market distribution center, and cost saving throughout supply chain
	Ship the exact product quantity from the central location to meet specific customer requirement	Inventory reduction at market distribution center, and cost saving throughout supply chain
Logistics management	Work closely with logistics service providers to increase the ability to handle various shipment volume and timing	Increase on-time delivery, shorten lead times and improve reliability
	Work closely with logistics service providers to minimize transportation cost	Balance constant transportation cost

Source: Bartels (2010)

The Literature Review has demonstrated that a logistics postponement strategy can provide an opportunity for future improvement as it is considered most efficient and suitable for a fast moving consumer goods company.

RESEARCH METHODOLOGY

The methodology has six stages. Data Collection consisted of in-depth interviews with four employees in Thailand and three in Japan, plus product cost data from the Finance Department. Also, Document Review of monthly figures for production, replenishment, customer orders, and inventory days, for the whole of 2011. Data analysis was used to integrate analytical information to understand the ABC situation in terms of inventory and sales value of the hair care product category and its selling countries. Gap finding concludes the result from data analysis and reflects current as-is practice at ABC Company. Then the researcher recommends a proposed model and solution to the inventory problem, based on the literature review. This section also contains a to-be scenario which is the expected result after implementation.

Document review

The researcher collected monthly supply chain activities; production, replenishment, customer orders, and inventory day levels in 2011. These data were used to calculate day supply forward coverage or inventory day for 115 SKUs selling to Japan. More importantly, the document review was intended to understand the pattern of the replenishment process from ABC Thailand to Japan versus actual customer requirement and aligned inventory level. The information was in line with the in-depth interviews with the Thai and Japanese planners. Sales values by product category and by country were reviewed with inventory day result in 2011.

Data setup review

The Finance department provided standard costs by SKU level and the company cost structure. Also provided was the standard cost of ABC products at different locations: Thailand central warehouse versus Japan distribution center were compared for result calculation of the proposed model. The inventory day setup based on business alignment was provided to understand the aligned inventory level and analyze the problem.

Sales value and inventory result

After analyzing sales value and inventory results for the hair care product category, the Japan hair care market was chosen for this study. Out of four product categories, total hair care products had 82 inventory days with the highest inventory value. Hair care sales value was 78% of the total. Japan was the highest off-track market at 60 days versus a target of 48 days. It also generated the highest value at 30% of total hair care sales.

The researcher discovered that three factors contributed to the inventory problem: forecast and customer ordering pattern, replenishment practice, and supply chain activities. These are now examined.

Forecasting and customer ordering pattern

ABC received production requirements through weekly forecasts and daily customer orders. The forecast was reflected via a computerized system on a weekly basis. It triggered production and replenishment activities. While actual customer orders from Japan customers can happen every day, it might or might not equal the forecast. Most of the time, ABC has to react to demand fluctuation as actual customer orders from Japan are not equal to the forecast; therefore ABC Thai planners accelerated the material ordering and advanced production plan to support customer requirements. In the Japan market, an order can be placed at will to ensure the highest customer satisfaction. The order timing and quantity might or might not equal the forecast.

Replenishment practice

Supply chain activities in both countries involve a Thailand manufacturing plant and Japan distribution center; production at a manufacturing plant, shipment from Thailand to Japan, leftover stock at Thailand central warehouse, shipment to Japanese customers, the leftover stock at Japan distribution center and inventory days. To please Japanese customers, Thai planners used push replenishment regardless of aligned inventory level based on full speculation strategy, to prevent supply shortage

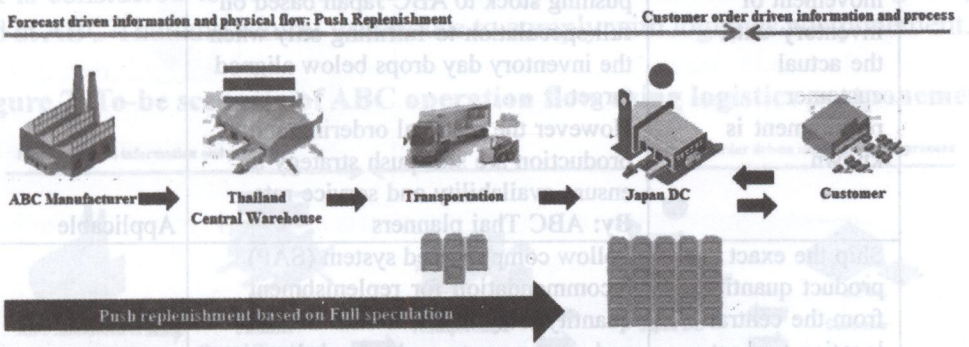
From the records, approximately 98% of stock produced in Thailand was shipped to Japan immediately after production. The remaining 2% was left at the Thailand central warehouse due to quality problems, product damage, or trade sample purposes. That 98% percent was shipped using push replenishment scenario (pushing stock to end distribution center without confirmed information on actual customer orders). The company's replenishment practice is considered as push replenishment based on full speculation, and is the root cause for the inventory problem.

At the Japan side, the actual inventory day for a total of 115 SKUs at the end of 2011 was equal to 5,982 days. Ideally, all 115 SKUs at the Japan distribution center should have had inventory levels equal to 2,149 days. In addition, 5,597 days were generated by 49 SKUs having stock over aligned target inventory days. At this point, the researcher discovered that based on the push replenishment, 49 out of 115 SKUs were the root cause for inventory day being over target.

After detailed study of the data collected, the researcher identified ABC's current as-is scenario. In Figure 6 below, the production plan at ABC Thailand triggered material ordering, production, and a replenishment plan. The finished goods from production were transferred directly to ABC's central warehouse or the Thailand distribution center and then entirely shipped out to the market distribution center in Japan. Until this stage, all supply chain activities were implemented, forecast-driven, and the replenishment was done based on push strategy. The majority of the finished products were being held in the

Japan distribution center waiting for order placements from customers. From this point on, the supply chain activities generated were actual-customer driven. Thus, the ABC inventory storage location was positioned at ABC's Japan distribution center where most stock was being kept waiting for actual demand, and thus called 'full speculation strategy'. As a result of the current scenario, ABC's Japan distribution center ended up with sunk cost from the 49 SKUs having inventory obsolescence equal to 5,597 inventory days.

Figure 6: As-is scenario of ABC operation flow using full speculation



Source: Author

Proposed Model and Solution

Given the current situation, and literature reviews of the two fundamental approaches; make-to-stock (MTS) and make-to-order (MTO), MTO was not the right strategy as it was suitable for customized products which focus on speed, flexibility and responsiveness. However, ABC products are standardized FMCG that focus on pricing, high productivity and cost reduction. Therefore, make-to-stock (MTS) based on logistics postponement strategy was selected as the most appropriate supply chain strategy.

Replenishment and logistics activities driven by actual customer ordering, allows ABC Company to manage inventory day at the Japan distribution center and improve replenishment practice. Regarding logistics postponement, the movement of inventory through logistics activities from Thailand is delayed until information on actual customer requirement is definite. Table 2 displays a detailed analysis of logistics postponement characteristics, action needed, and persons in charge of each activity, with applicability checks.

This strategy needs cooperation among ABC's cross functional team. The proposed model enables inventory reduction at ABC's Japan distribution center because only aligned stock is replenished to fulfill target inventory day. Moreover, it can help minimize the costs throughout ABC's supply chain by changing the storage location from the Japan end distribution center to the Thailand central warehouse.

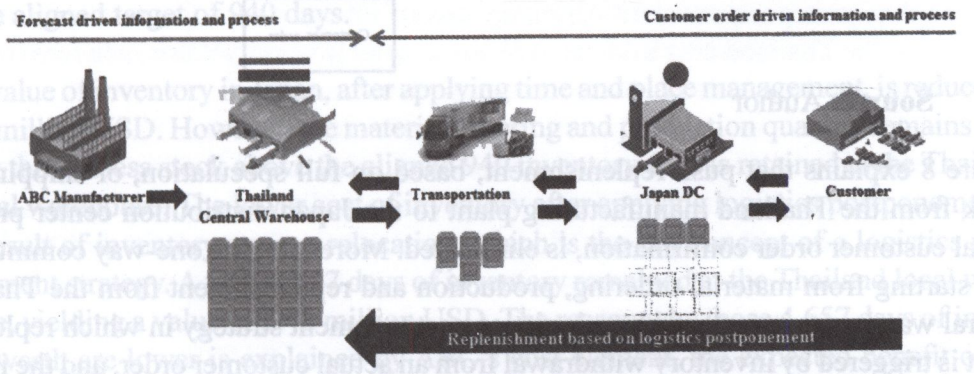
Table 2: Postponement characteristics, actions needed and applicability check

Characteristics and activites		Actions needed for ABC Company	Is Logistics postponement applicable for ABC Company?
Place and time management	Retain finished goods at a central location	Utilize its central warehouse, Thailand distribution center, to keep excess stock which is above the target inventory day. **By:** ABC Planning manager and ABC Warehouse manager	Applicable
	Delay the movement of inventory until the actual customer requirement is known	Change replenishment practice from pushing stock to ABC Japan based on full speculation to fulfilling only when the inventory day drops below aligned target. However the material ordering and production are still push strategy to ensure availability and service rate. **By:** ABC Thai planners	Applicable
	Ship the exact product quantity from the central location to meet specific customer requirement	Follow computerized system (SAP) recommendation for replenishment quantity. Stay in touch with market and customers to understand the shipment trend. **By:** ABC Thai planners and ABC Japanese planners	Applicable
Logistics management	Work closely with logistics service providers to increase the ability to handle various shipment volume and timing	Work closely with carriers to evaluate the capability and capacity to handle flexible shipment and timing. **By:** ABC Planning department and Cross border Logistics team	Applicable
	Work closely with logistics service providers to minimize transportation cost	Provide long term requirement for containers to carriers. Stabilized volume and full truck load (FTL) approach can be achieved through combined shipment with other ABC product categories; skin care and color & professional care. Frequent shipment can also promote balanced transportation cost. **By:** ABC Planning department and Cross border Logistics team	Applicable

Source: Bartels (2010)

It can be concluded that logistics postponement is applicable. Figure 7 below explains the projected to-be scenario after using logistics postponement. The production plan and material ordering processes at ABC Thailand is kept as an as-is scenario on both timing and quantity, or still be driven by forecast. However, the finished goods which are transferred directly to ABC central warehouse or Thailand distribution center are retained there. Only the required quantity to fulfill aligned inventory day is shipped out to the ABC end distribution center or the Japan market. In other words, excess stock is held in Thailand waiting for stock withdrawal from order placements from Japan customers, which is considered to be a demand-driven approach. The inventory storage is positioned at ABC Thailand central warehouse to comply with logistics postponement.

Figure 7: To-be scenario of ABC operation flow using logistics postponement



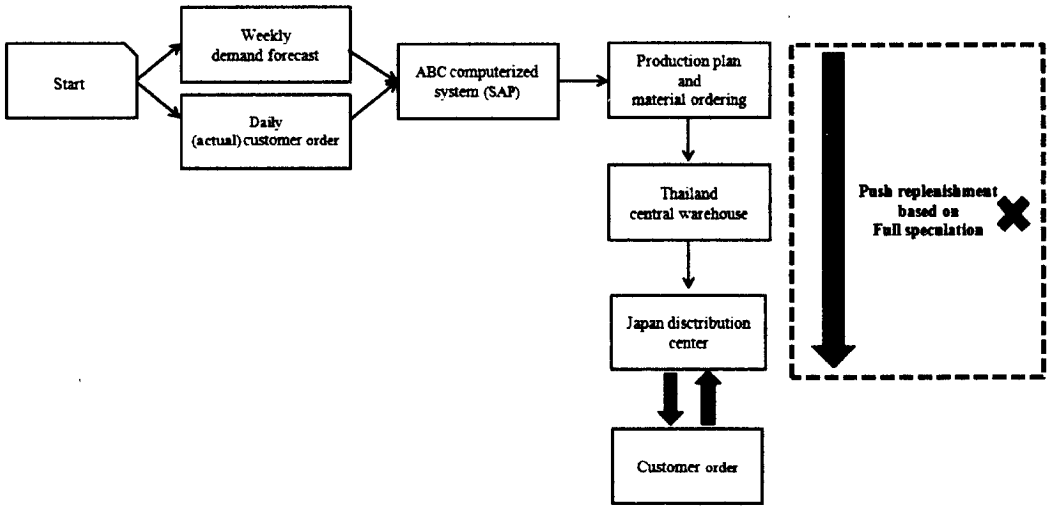
Source: Author

PRESENTATION AND DISCUSSION OF RESULTS

Applying logistics postponement strategy

ABC Company employs three main activities required for place and time management under the logistics postponement concept. Firstly, it utilizes the central warehouse in Thailand to retain the excess finished goods over aligned inventory levels. Then ABC planners delay the inventory replenishment until the customer requirement is known. More importantly, only the essential amount of stock is shipped to the Japan distribution center to align with inventory day setup. Figure 8 below shows the current operation and information flow for ABC Company supply chain, and the restructuring point for inventory storage location and replenishment activities.

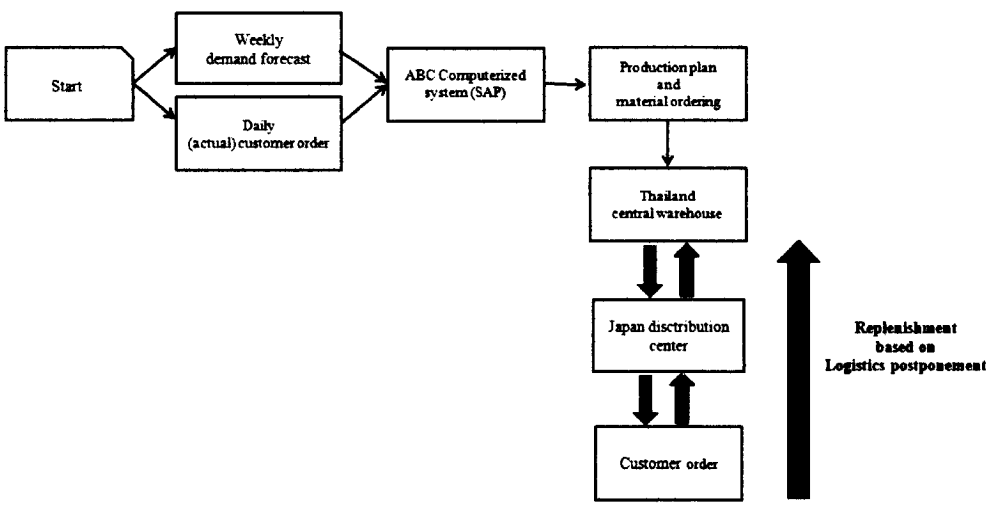
Figure 8: Restructuring ABC operation flow



Source: Author

Figure 8 explains that push replenishment, based on full speculation, or shipping the stock from the Thailand manufacturing plant to the Japan distribution center prior to actual customer order confirmation, is eliminated. Moreover, the one-way communication starting from material ordering, production and replenishment from the Thailand central warehouse is replaced by a logistics postponement strategy in which replenishment is triggered by inventory withdrawal from an actual customer order, and the inventory storage location is placed where the lower storage cost is. The new operation flow for ABC Company after applying time and place management is presented in Figure 9.

Figure 9: New ABC operation flow using logistics postponement



Source: Author

After restructuring, the replenishment at ABC Company is based on the aligned inventory level. The information flow is two-way communication where replenishment activity is triggered by actual customer ordering. A customer places an order to the Japan distribution center which causes stock withdrawal. Subsequently, the stock level at the customer distribution center falls below the aligned inventory day and stimulates the need for replenishment to the Thailand central warehouse via the computerized system. As a result, the planners create a replenishment plan in line with the agreed inventory level to achieve a healthy level of safety stock. The new structure and operation determine the new inventory storage location which is moved from the Japan distribution center to the Thailand central warehouse. By this, extra inventory beyond aligned inventory day is held locally until additional customer demand arises. The result from restructuring is that inventory days at the Japan distribution center are reduced from 5,597 days to the aligned target of 940 days.

The value of inventory in Japan, after applying time and place management, is reduced to 2.56 million USD. However, the material ordering and production quantity remains constant; thus excess stock above the aligned 940 inventory days is retained at the Thailand central warehouse. The lower cost of inventory after applying logistics postponement is the result of inventory storage relocation, which is the key concept of a logistics postponement strategy. A total 4,657 days of inventory remained at the Thailand local warehouse, yielding a value of 2.40 million USD. The reason why those 4,657 days of inventory worth are lower is explained by ABC's cost element, the expected benefit of the proposed model, and standard cost setup by SKU.

Logistics management

To manage logistics activity effectively to conform to logistics postponement strategy requirements, the ABC Company needs to work closely with its logistics service providers. Highly flexible freight carriers are required to handle various and more frequent shipments due to the stock fulfillment being triggered by actual inventory withdrawal and not by forecasting. This requirement can be achieved as ABC Company has contracts with leading carriers. These offer flexible vessel schedules and cutoff times. The carriers travel to two destination ports in Japans several. Total transportation times ranged from 11 to 16 days. As a result, each can provide an equally effective service for ABC shipments.

Another activity is to ensure that the changes in inventory storage relocation and logistics activities will not cause increases in three cost components (administration, transport, inventory holding). Firstly, the administration cost of ABC is 30% lower in Thailand, compared to Japan. Next, the transportation cost assessment evaluated container requirements for both as-is and to-be scenarios.

Total container requirement per month was 55 containers. Using information for container requirement based on the logistics postponement, production for the 49 SKUs is still the same at 1,916,326 cases, but the quantity shipped to Japan is 1,597,176 cases only, to fulfill the aligned inventory level. The monthly number of containers is reduced to 47 containers which can still achieve full truck load (FTL) and stabilize transportation cost. The other 8 containers will be kept in Thailand to prevent inventory obsolescence or remnant stock which causes over-days supply, and to control inventory days at the Japan distribution center. Furthermore, to ensure FTL in case of demand fluctuation in hair care products, ABC can mix loads with other product categories which are also shipped to Japan weekly.

Lastly, a study of inventory holding cost is needed to ensure no possible drawbacks from applying logistics postponement. Comparisons of inventory holding cost percentages reveals that the Thailand cost is lower at 5% of its total inventory value, whereas the cost in Japan is 16% due to costly storage space and labor.

In conclusion, the changes in inventory storage relocation and logistics activities after logistics postponement implementation do not cause additional cost to the ABC supply chain. This is proved by the lower administration cost in Thailand, the full truck load practice that can be achieved after applying logistics postponement, as well as the lesser inventory holding cost in Thailand.

Result comparison of inventory days and value

The result from applying logistics postponement here is most remarkable. The inventory days at the Japan distribution center reduce from 5,597 to 940 days, within the target caused by relocating inventory storage to the Thailand central warehouse and eliminating inventory obsolescence at the market distribution center. Despite that, total production and inventory quantity remains the same, and the inventory value decreased significantly. ABC Company can save 2.43 million USD annually and enhance its competitive advantage.

CONCLUSION

Logistics postponement strategy implementation benefits the ABC Company by introducing the most suitable supply chain strategy that helps minimize inventory at the market distribution center and reduce cost. To successfully adopt the concept, ABC Company needs strategic decision and management for its inventory storage location, replenishment practice, and logistics service providers. The collaboration and communication between cross functions are extremely important, to maintain customer satisfaction when replacing full speculation with logistics postponement.

The comparison of the result after applying logistics postponement justifies the proposed solution. This is proved by the savings the ABC Company can gain by restructuring its supply chain strategy based on postponement. Inventory day at the Japan distribution center reduce, with considerable cost saving.

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