BULK PURCHASE LOGISTIC MANAGEMENT FOR PART SUPPLIES OF OVERSEAS 3C PRODUCT FINAL ASSEMBLIES

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ABSTRACT

Many Taiwanese 3C manufacturers establish production plants overseas in order to reduce production costs and access local and regional markets. These companies ship key components made in Taiwan overseas for final assembly in order to safeguard design knowledge. However, they often face the challenges of maintaining consistent quality of materials, procuring parts that meet specifications and making on-time deliveries. First, the as-is logistics model is analyzed and, afterward, the to-be logistics model is proposed to incorporate collaborative manufacturing strategies. Further, the pros and cons of as-is and to-be models are compared to modify outsourcing logistic services and create new service models for global logistic opportunities.

INTRODUCTION

Frequent commercial activities between Taiwan and other countries have increased the demand for global logistic management for part supplies of oversea 3C final assemblies. These logistic processes are reengineered to control transportation and inventory costs and expedite global collaborative manufacturing. This research analyzes the logistic processes that Taiwanese enterprises use to ship parts and semi-finished goods overseas. Quality control and strategic concerns are fundamental to assembling finished goods overseas while maintaining low labor cost and market access. The purpose of developing a bulk purchase global logistics model is to provide Taiwanese 3C manufacturers with components and semi-finished goods on time and to simplify the shipping procedure to reduce inventory. Exploring opportunities for Taiwanese logistic service providers (LSPs) and improving inventory management efficiency through logistic management reengineering underlie this research. This research also addresses the concern of keeping Taiwanese high-tech 3C industry from moving completely abroad by providing innovative global logistic services [1]. Given these challenges on high-tech industry development, most Taiwanese enterprises use a global collaborative manufacturing model which divides the manufacturing processes into technology-intensive (i.e., key component production) and labor-intensive processes (i.e., final assembly). In this paper, the existing (as-is) logistics model is depicted and evaluated, and an improved to-be logistics model is proposed after the supply chain and

logistic flows are reengineered.

Figure 1 illustrates the global logistic reengineering research processes. First, the background and motivation set the boundary of the study and purpose. After selecting the target industry, collecting related data and completing corporate interviews, the as-is logistics model is constructed. Analyzing the pros and cons of the existing logistics model relative to government regulations are crucial to building an improved (to-be) logistics model. Finally, the comparison between as-is and to-be models is discussed for future improvements. The final step is to simulate various policies and scenarios and make suggestions for more profitable bulk purchase logistic management.

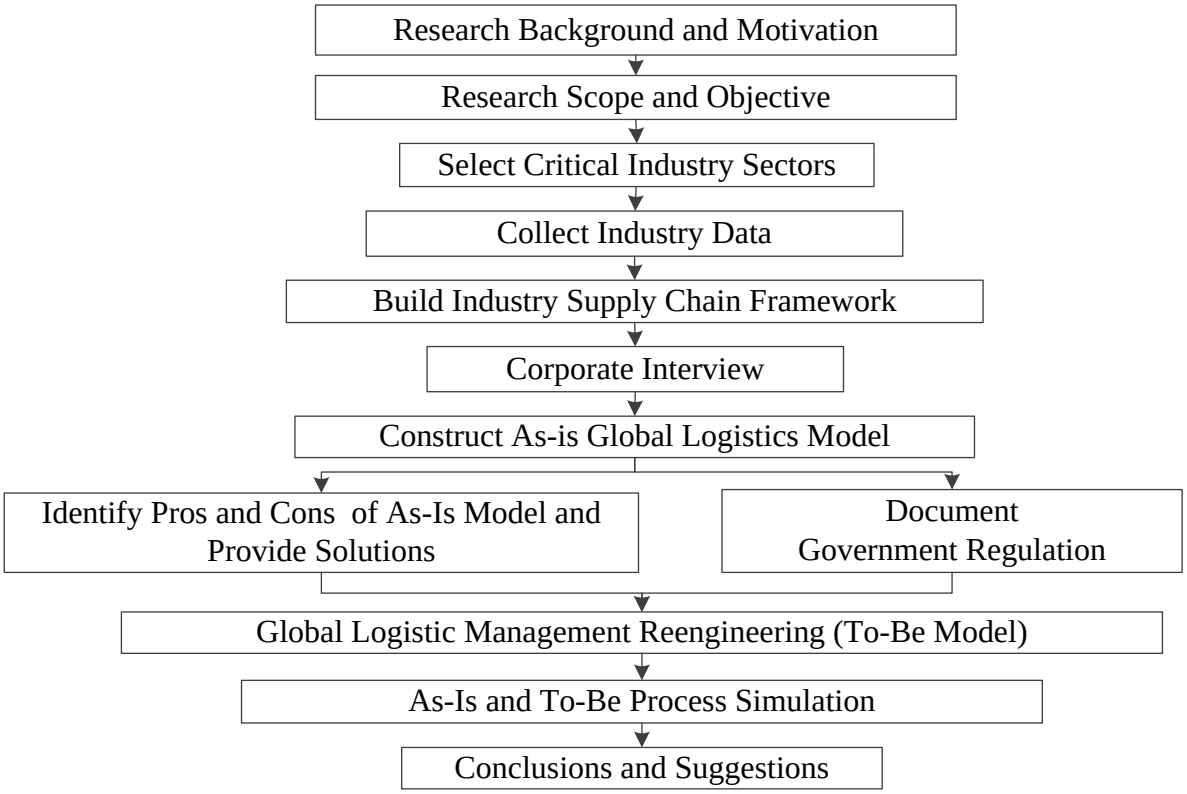

Figure 1 Global logistic reengineering research process

EXISTING GLOBAL LOGISTICS MODELS FOR THE 3C SUPPLY CHAIN

Short development cycles, original equipment manufacturing (OEM) and original design manufacturing (ODM) are known competitive advantages of many Taiwanese enterprises. Most of these companies are professional electronic manufacturing service (EMS) providers for midstream 3C and peripheral component supplies. Reducing production costs, shortening time-to-global markets and simplifying management processes are achieved by establishing headquarters in Taiwan and manufacturing facilities in regions with lower labor costs, such as mainland China. Therefore, logistic integration and information transmission affects operating efficiency directly. First, customers place orders with a Taiwanese 3C company sales office. After receiving the orders, the headquarter places material orders with global suppliers via telephone, fax or email regardless of order quantities. Suppliers ship key parts to specific hubs or vender managed inventory (VMI) hubs, sometimes to manufacturing plants directly per shipping instructions on purchase orders [2]. Currently, Taiwanese 3C manufacturers control the

volume of key parts and the frequency of shipments from hubs to manufacturing plants for final assembly. Due to information non-transparency, these manufacturers and their LSPs are only able to collect partial shipping status and updates. Figure 2 demonstrates the as-is global logistics model for Taiwanese 3C companies' current operations. The deficiencies of the existing model are listed as follows and indicated in Figure 2 [3] [4] [5].

1. Unable to reach economies of scale with individual small order quantities.
2. No integrated information system is used.
3. Difficult to get real-time shipping status since several logistic service providers are used and shipments are at different stages of processing.
4. Slow customs clearance process causes deliveries delays.

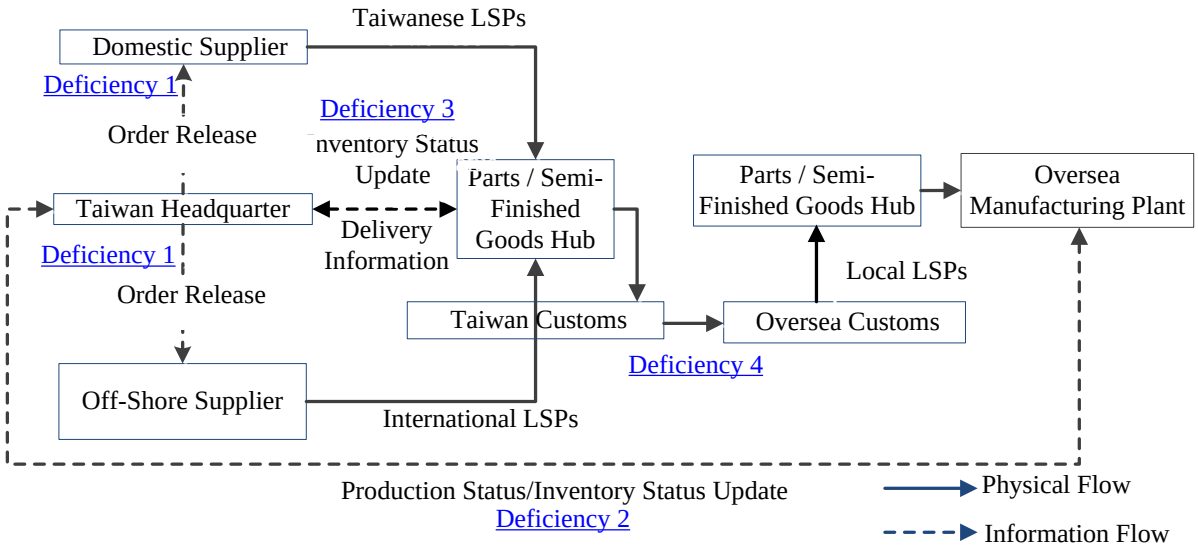

Figure 2 As-is logistic operating model

TO-BE GLOBAL LOGISTICS MODEL FOR THE 3C SUPPLY CHAIN

Improving and eliminating problems that Taiwanese 3C and peripheral companies face requires reengineering of the global logistic business and operation processes. Thus, collective bulk procurement, 4th party logistic (4PL) services, and authorized economic operator (AEO) certification are identified as the three key strategies for improvement. Collective bulk procurement requires aggregating 3C manufacturers with the same key parts demand to place bulk orders with suppliers for better unit price and delivery schedules. 4PL service providers are authorized to integrate order information, negotiate ordering price and delivery schedules with suppliers and self-manage shipping processes, including trunk and container loading, customs brokerage services, and air/ocean/land freight, until the shipments arrive at the oversea manufacturing plants. Furthermore, Taiwan customs house gives preferential treatment to enterprises with AEO certification, and security accredited AEOs receive minimum inspection for import and export goods during customs clearance [6] [7].

Bulk procurement made by 4PL service providers are emphasized for to-be models. The target clients are 3C companies with the same key parts demand. With the same key parts demand, 3C manufacturers are able to reach economies of scale and collective bulk procurements can be used to resolve small order quantity issues. Collective 3C enterprises, suppliers, and LSPs can log into the global information platform built by 4PL service providers and share real-time delivery information to avoid information

inconsistency [8]. Government's assistance is essential for successful to-be models. Well-designed logistic centers combine ocean freight, air freight and tax preference will attract oversea investors and encourage Taiwanese LSPs to provide value-added services. Training programs developed by government strengthen 4PL services involvement which supports the alliance formation between Taiwanese LSPs and oversea LSPs for agile global logistics. AEO certification is promoted by Taiwan government for rapid customs processing and supply chain security. The to-be models and the steps taken for implementation are shown in Figure 3 and Figure 4 [2].

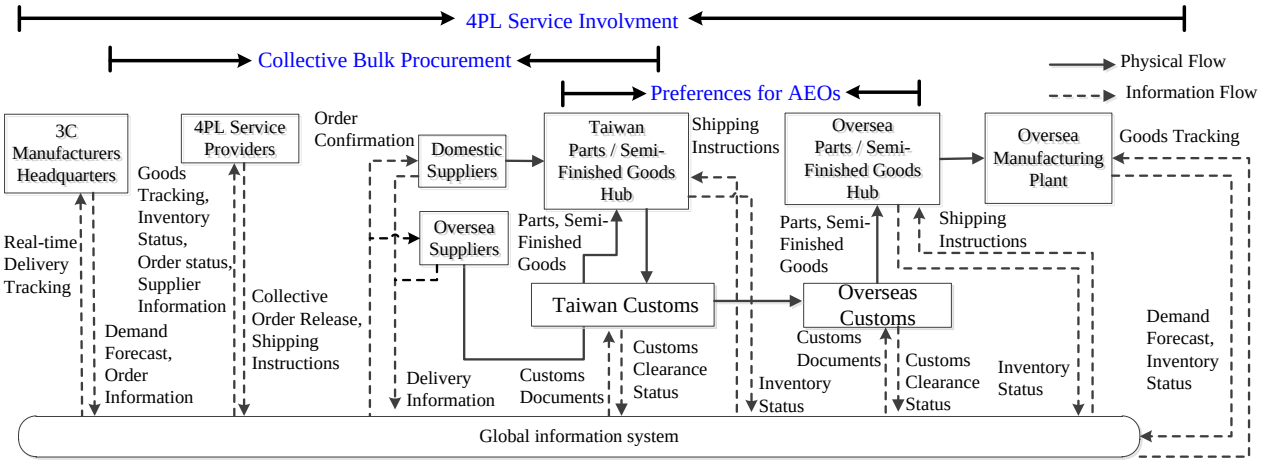

Figure 3 The to-be logistic information and physical flows

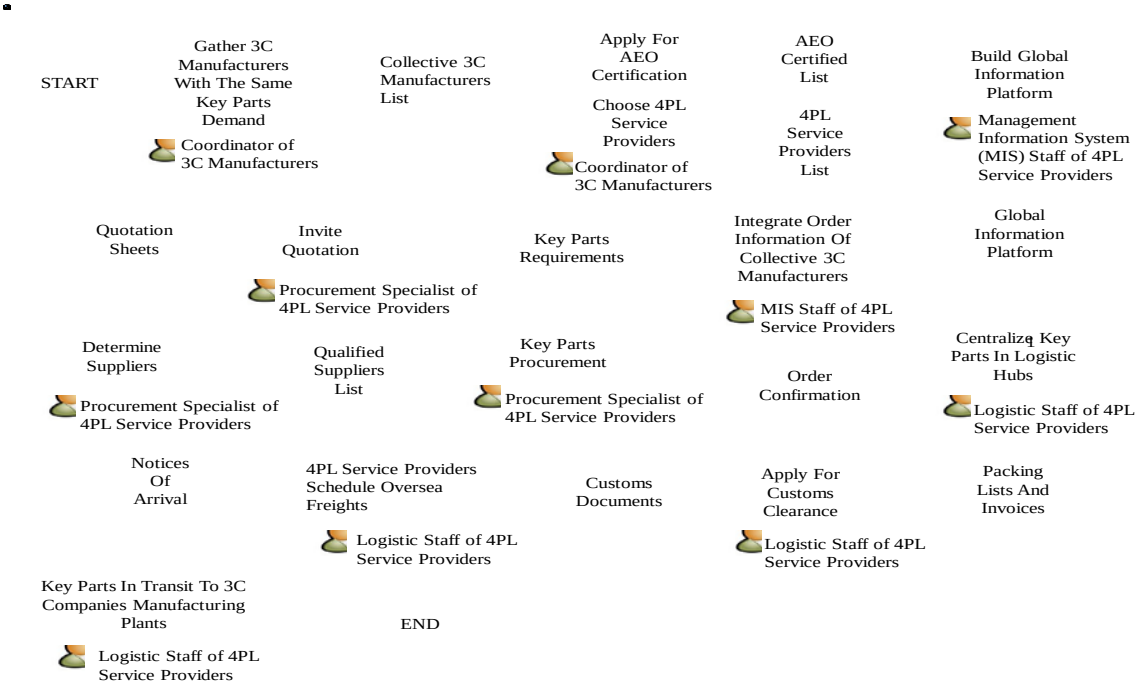

Figure 4 The behavior model of the to-be logistic processes

BENEFITS FOR IMPROVED GLOBAL LOGISTIC BULK PROCUREMENT

The proposed to-be models are designed to improve production lead-time, increase inventory turnover rate, control procurement and transportation cost, maintain consistent quality and the competitive advantages of 3C manufacturers. The comparisons of operating processes between as-is and the to-be models are shown in Table 1 and the four benefits of the to-be models are explained as follows:

1. Shorten the lead time and increase inventory turnover rate by implementing the improved global logistic business and operation models.
2. Control procurement and transportation costs by using bulk procurement.
3. Maintain consistent quality of final products by providing high quality components.
4. Maintain competitive advantages by manufacturing critical components domestically and assembling final goods overseas.

Table 1 Comparisons of operating processes between as-is and the to-be models

Operating Process	As-Is Model	To-Be Model
Material Procurement	Individual 3C manufacturer places orders with suppliers regardless of economies of scale.	4PL service provides integrate order information and place bulk orders with suppliers to reach economies of scale.
Transit	Individual 3C manufacturer centralizes key parts in Taiwan and makes oversea shipments according to order demand.	4PL service providers centralize key parts in Taiwan and arrange scheduled oversea freight shipments.
Information Integration	3C manufacturers, suppliers and LSPs communicate with each other via email, phone or fax and update order status manually.	All parties involved gain access to a global information platform which provides real-time information.
The Role of LSPs	LPSs are only responsible for logistic services.	4PL service providers are authorized to negotiate price, procure key parts and manage shipping processes.

Using collective bulk procurement, better delivery schedules and ordering price are gained and consolidated routings are arranged for large delivery quantities. As the result, transportation lead time is reduced, and the shorter lead time lowers inventory holding, which results in higher inventory turnover rate. Procurement economies of scale also contribute to production cost control as well. In addition, 3C companies are better enabled to maintain consistent quality of final assemblies by executing global logistic business and operation models. Taiwanese 3C companies are encouraged to manufacture critical components domestically since there is greater efficiency in the supply chain. In summary, collective bulk procurement contributes to procurement and transportation cost control, and implementing to-be models not only improves production lead-time and inventory turnover rate but expedites global collaborative manufacturing.

CONCLUSION

In order to maintain consistent quality of 3C finial assemblies and competitive advantages of 3C manufacturers, global logistic management reengineering is conducted to ensure critical component production remaining in Taiwan and final assembly overseas. The improved global logistics model is constructed to resolve the long transportation lead times and small quantity freight delivery problems.

The benefits of bulk procurement for 3C components and semi-finished goods are devised to accelerate global logistic management reengineering for domestic part supplies of oversea 3C product final assemblies.

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