

Using Collaborative Transportation Management in Global Supply Chain

Jonah C. Tyan

Taiwan Semiconductor Manufacturing Company, Taiwan

INTRODUCTION

Due to escalating global competition and a decline in profit margins, most multinational corporations pursue global sourcing through a *global supply chain (GSC)* in order to secure market share and improve profits. The practice of e-commerce and the business trend of mass customization force both manufacturers and retailers to shorten cycle time by managing GSCs more effectively. Successful applications of GSCs, such as that by Dell Computer, have been widely discussed and publicized in the supply chain literature. However, the physical distribution of GSC execution is recognized as its weakest link and can result in inefficient and unreliable product delivery. The collaborative integration with global *third party logistics (3PL)* to execute physical distribution dictates the success of any GSC application. This article introduces an application of logistic collaboration, namely *collaborative transportation management (CTM)*, which is a new business model that includes the carrier as a strategic partner for information sharing and collaboration in a supply chain.

BACKGROUND

The key reasons for the globalization trend are overcapacity in highly industrialized countries, significant disadvantages with respect to labor costs, and the emergence of worldwide information networks that connect corporate information systems (Arnold, 1999). An increasing number of firms are combining domestic and international sourcing through GSCs as a means of achieving a sustainable competitive advantage (Bonarth, Handfield, & Das, 1998). A GSC is currently viewed as a strategic weapon in the quest for improved performance and profitability through greater availability, quality, delivery and price advantage (Lee, 2000; Smith, 1999).

The principle and methodology of GSC management are similar to those of traditional *supply chain management (SCM)*, except that multiple countries are taken into consideration. Traditional SCM is the integration of functions from the procurement of raw materials to final customer delivery. The GSC model is more complex than SCM,

as it includes different taxes and duties, differential exchange rates, trade barriers, customs clearance, and a sophisticated international transportation network (Vidal & Goetschalckx, 1997). Most companies establish a virtual integrated enterprise with their suppliers by implementing an e-business model in order to address the information and the finance flow of a GSC. However, the integration of physical distribution in a GSC appears to be the weakest link, due to the high level of investment required when construct in a global distribution network.

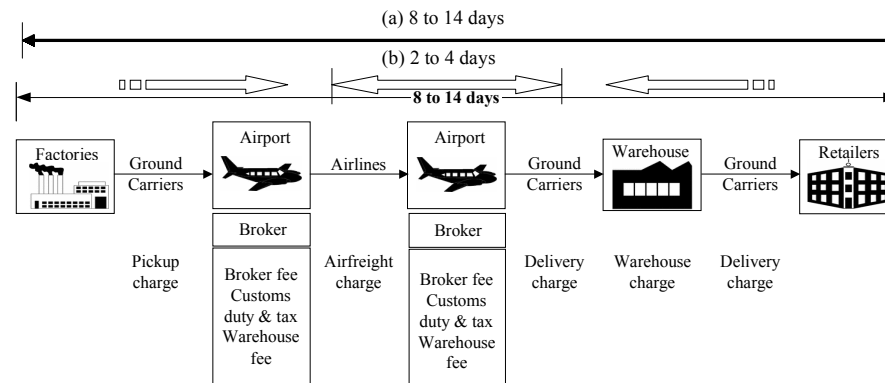
The traditional international shipping practice with extensive consolidation operations (Crainic, 2000) takes 8 to 14 business days, exclusive of manufacturing cycle time. The new economy calls for alliances to be made with 3PL providers in order to manage GSCs effectively by focusing on each player's core competencies (Lieb & Randall, 1999). Most high-tech companies select global door-to-door 3PL providers such as FedEx, UPS, and DHL in order to streamline logistic operations and to reduce delivery cycle times.

The typical benefits of a global *door-to-door delivery* service are shorter delivery cycle times, more reliable transit times, less complex customs clearance procedures, and real-time global tracking and tracing systems (Christopher, 1998). While the unit transportation cost is higher than that of traditional consolidated airfreight service, the total logistics cost is lower as a result of inventory and cycle time reduction throughout the GSC. The success of these integrated 3PL providers is determined by its global transportation network, warehousing network, and information network. Figure 1 depicts the international distribution cycle time by traditional consolidated airfreight model and a door-to-door service provided by a global 3PL provider can compress the distribution cycle from 8 to 14 days to 2 to 4 days.

DESCRIPTION OF COLLABORATIVE TRANSPORTATION MANAGEMENT

The level of collaboration amongst all players in the chain, determines the success of a GSC. Classic supply chain collaboration is found in retailer-supplier partnership programs (Tyan & Wee, 2003) such as quick response,

Figure 1. International distribution cycle time of (a) a traditional international consolidated airfreight model and (b) a global door-to-door service model



continuous replenishment policy, and vendor managed inventory, which aim to reduce inventory and provide a quick response to consumer demand. The most recent developments in collaborative planning, forecasting, and replenishment (CPFR) is designed to further improve the retailer-supplier relationship. However, the carrier relationship with supply chain players was not considered until the introduction of CTM, which extends the supply chain collaboration to physical distribution partners (Strozniak, 2003).

CPFR, developed by the Voluntary Interindustry Commerce Standards Association (VICS), is a nine-step business process model permitting value chain partners to coordinate sales forecasting and replenishment processes in order to reduce the variance between supply and demand (Aichlymayr, 2000). Under CPFR, each party share information and compares calculations. Manufacturers and retailers exchange forecasts, including point of sale, on-hand and delivery data. They review the data and collaborate to resolve forecasting discrepancies. A VICS subcommittee recently initiated a new shipper-carrier partnership strategy, known as CTM, in order to reduce cycle times and inventory carrying costs for the retailer and its suppliers, while increasing asset utilization for motor carriers (Cooke, 2000; Tirschwell, 2004).

CTM Business Model

CTM is a new process for carriers, involving them in five key business activities: the creation of a joint business plan, order forecasting, order generation, freight order confirmation, and carrier payment processes (Browning & White, 2000). The CTM business model was proposed by VICS and consists of 14 steps. The CTM process can be further divided into three distinct phases: planning, forecasting, and execution, as shown in Figure 2.

The planning phase makes up steps 1 and 2. In step 1, the trading partners establish a collaborative agreement to define the relationship in terms of freight shipment, exception handling, and key performance indicators. Step 2 involves aggregative planning to determine resource and equipment requirements by matching the planned shipment. The forecasting phase includes steps 3 to 5. By sharing order and shipment forecasts in step 3, the carrier gains an insight into the planned volume changes and adjusts equipment requirements accordingly. Any exceptions caused by the manufacturer, distributor, or carrier are generated in step 4 and resolved collaboratively in step 5. Unlike the traditional 1- to 2-day advance notice of potential shipments, the carrier has ample time to handle the revised volume—1 to 4 weeks, depending on the forecasting horizon.

The execution phase consists of four stages: shipment tenders, distribution, payment, and a review in order to manage the entire distribution cycle. The shipment tenders stage covers steps 6 to 8 of the CTM. Step 6 is the creation of order/shipment tenders, based on the revised order forecast. Any exceptions based on the latest equipment availability or pickup and delivery requirements, are identified in step 7 and resolved collaboratively in step 8. The distribution stage—steps 9 through 11—involves the physical distribution and shipment status visibility. Step 9 is the creation of the final shipment contracts outlined in the collaborative tender acceptance and shipment terms. Shipment status is continually updated throughout the distribution cycle and any exception is identified during step 10. Step 11 is the resolution of delivery exceptions. The payment stage is covered by steps 12 and 13. Step 10 ensures that invoicing discrepancies between carriers and shippers are greatly reduced by the exchange of shipment attributes, such as weight, freight class, and destination. Any payment exceptions

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