Inbound Freight Consolidation for US Manufacturers at China

By Yi Fang

Introduction

Over the past few years, as one of the most competitive manufacturing platform in the world, China has attracted a large number of original equipment manufacturers (OEMs) from the United States. Many of these companies have adopted supply chain improvement techniques, such as Just-in-Time (JIT), Lean manufacturing and other inventory reduction practices. These approaches require China’s contract manufacturers (CM) to move small shipments on a more frequent basis. Many OEMs are now faced with transportation of large numbers of low-weight, small-quantity shipments from China to the United States. In moving these small shipments, companies often encounter rising freight costs and deteriorating services. Therefore, inbound freight consolidation can offer a huge saving opportunity.

International inbound freight consolidation, the operation of combining several small shipments produced at different locations and different times into one large shipment, is a logistics strategy used to deal with the problem of expensive, unreliable and slow smaller shipments in international inbound transportation. Unlike outbound transportation that involves the distribution of goods from OEMs to customers, inbound transportation covers the goods flow from overseas CMs to OEMs. The savings opportunities in inbound consolidation result from the economies of scale that result in lower transportation costs. On the other hand, because inbound consolidation tries to balance cost savings with customer service levels, it can lead to an increase in the length and
variability of transit time. The challenge is to design an inbound consolidation strategy that capitalizes on its advantages without downgrading customer service levels.

**Consolidation Methods**

Consolidation occurs whenever different items are shipped in the same load. Freight consolidation can be achieved by three methods: spatial, product and/or temporal. (Hall, 1987). The spatial method concerns selecting consolidation points and assigning the product supplying points to the consolidation points. Temporal consolidation refers to aggregating shipments over time. For example, two kinds of temporal consolidation often used are time-based and quantity-based consolidation. Product consolidation concerns grouping different product and/or different transport classification categories into shipments. Under product consolidation, shipments of different items from a single supplier or multiple suppliers are sorted, consolidated, and dispatched to the customer.

**Consolidation Forms**

In practice, there are basically three forms of consolidation as follows: inventory consolidation, vehicle consolidation and terminal consolidation. (Hall, 1987)

- **Inventory Consolidation**: Inventory consolidation is the simplest form of consolidation. Inventory consolidation involves accumulating items that are produced at different times, and transporting them in the same shipment.

- **Vehicle Consolidation**: Vehicle consolidation, as in classic “milk-run”, involves loading and unloading items at different origin and destinations.
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- Terminal Consolidation: Terminal consolidation, illustrated in figure 4, takes items from different origins to a consolidation point where the items are sorted, and dispatched to different destination according to different shipment release policies.

OEM can use the combination of above consolidation methods and shipment release policies to decide best consolidation form for their products and selected contract manufacturing plants, as illustrated in figure 1:

![Diagram of Consolidation and De-consolidation processes](image)

Figure 1: Inbound Consolidation Strategy Options from CMs to OEMs

**Constraints and developments of China’s logistics industry**

Inbound freight consolidation can bring substantial benefits to companies, but also come with risks and uncertainty in their global supply chain. “Transportation goods over a long distance often means switching logistics providers, and integration is not always seamless. The result is a lot of paperwork. Also, different regions have different
regulations- these non-tariff trade barriers all add to logistics costs,” says Udo Jung, a vice president with Boston Consulting Group. Bringing product from China into the United States can be like walking through a minefield. Any misstep can be costly, especially when companies adopt inbound freight consolidation (Smith 2000). All logistics customers now complain about a number of frustrations in moving their goods within and across China. They raised below five major concerns. (Shaw and Wang, 2001): High logistics cost, a lack of reliability in pick up and delivery time, a lack of visibility in the shipment process, and loss, damage or pilferage of goods.

China’s rapid development and burgeoning trade is placing increased pressure on the country’s logistics systems. The government of China has made substantial investment in upgrading the transportation infrastructure over the past decades, however transportation infrastructure remains a bottleneck. Chinese government has made the commitment to modernize and expand its transportation infrastructure. The planned investment in upgrading the transportation infrastructure, especially road, rail, seaport and airport will have huge impact on the inbound consolidation decision:

- With the reliable and convenient transportation network, companies will have more options in selecting the form of inbound consolidation and shipment release policy. The consolidation point will be no longer restricted to major cities in costal areas. Companies will have more choices in consolidation points, such as 2nd tie cities which have both production capacity and access to domestic transportation network and export terminal.
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- The transit time, which is now plagued by bottlenecks in existing transportation network, will be reduced and become reliable. The effective transport networks increase the reliability in pick up and delivery time and transparence in the shipment process. Thus service level and reliability in inbound consolidation can be increased accordingly.

- The growing transportation infrastructure will provide with more freedom in choosing the transport modes. This will increase the coverage of inbound consolidation to different products or suppliers that have different requirements on transit-time, cost and service levels.

- Companies should bear in mind that rapid growing China’s infrastructure will change the optimization of inbound consolidation network. Manager should review and adjust the system from time to time to maximize the benefits of inbound consolidation.

As part of the terms of China’s WTO entry, China agreed to open market sectors and services that were protected from global competition. The opening of the distribution and logistics is expected to spur the development of transportation and logistics services in two ways.

First, WTO entry opened up several transportation and logistics sectors to direct foreign participation. These non-Chinese logistics players serve primarily multinational companies, generally in export- and import- related logistics. They now can extend their service further into China using several transport modes and link these services into their already strong global supply chain networks. Therefore, these foreign logistics service
providers can better service inbound consolidation by developing workable domestics solution for their multinational clients.

Second, it will pave the way for new, often foreign investors to collaborate with incumbents, who own most of the hard assets. Recognizing the antiquated state of the sector, the Chinese government has given it priority for development. As a result, asset-heavy incumbent companies are now actively looking for technical and operational know-how. With the partnerships and cooperative arrangements with leading foreign third-party logistics companies, these incumbents are moving aggressively to upgrade transportation and logistics service. Thus in designing the inbound consolidation solution, those service concerns on existing transport mode can be mitigated.

In order to develop international logistics industry and to promote China as an international logistics center, The China’s government approved a new Shanghai Waigaoqiao Bonded Logistics Park as a first pilot. In 2004, seven other bonded logistics parks are established. With its advantages in logistics facilities, convenient import and export process and preferable fiscal incentives, the bonded logistics park can be an ideal location choice of consolidation terminal in international inbound consolidation.

_A framework for designing inbound consolidation strategies._

Inbound freight consolidation is a complicated and multifaceted operation. Many companies use various combinations of consolidation methods that are depending on the product, the customer, the demand, the origin and destination, and so on. International inbound consolidation from China is further complicated by the fast growing logistics
development in China. Therefore, the framework is recommended as illustrated in figure- 2.

Figure 2. A framework for implementing international inbound consolidation strategy.

Future Research

More works needed to be done in the area of the expansion of international inbound freight consolidation and its collaboration with outbound transportation. This is a further movement toward the collaboration and optimization of the procurement, production and transportation and inventory control in the globalized supply chain network.
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Reference:


