Opportunities for Action in Operations

Avoiding Supply Chain Shipwrecks: Navigating Outsourcing's Rocky Shoals

The Boston Consulting Group

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Caution, outsourcers: Danger ahead. Beware of operational and strategic blockades.

In the run-up to Christmas of 2004, gridlock hit the Los Angeles–Long Beach ports, the entry point for almost half the goods coming into the United States. Nearly 100 cargo ships floated around, cooling their keels and waiting to be unloaded—a process that was taking up to twice as long as usual.

The results of the dock jam were serious and far-reaching. The Sharper Image, for one, claimed that November sales had been adversely affected by reduced inventory resulting from congestion at the ports. Now companies are ordering earlier, carrying more inventory, extending their planning horizons, and shipping needed products and components by air freight.

It's much the same story in Europe. Most of the largest ports, which are operating at close to capacity, are increasingly dealing with congestion, labor shortages, and strained networks. Although Far Eastern ports have been able to expand quickly enough to handle greater shipments, European destination ports, such as Southampton and Felixstowe in the United Kingdom, Rotterdam in the Netherlands, and Antwerp in Belgium are constrained by stringent environmental and planning rules, which allow for only modest expansion, at best.

Unfortunately, the factors responsible for the waterfront tie-ups won't go away for years to come. As more and more companies outsource manufacturing, their

countries' capacity to transport the finished goods is reaching the bursting point. In the United States, rail service between Los Angeles and Chicago is deteriorating rapidly. Last year, port volume was considerably larger than anyone had anticipated. That dynamic is driving costs up dramatically.

Retailers live or die by a very simple creed: Have the products that sell; don't have the products that don't. The companies that supply them are in the same boat. Fast, effective, and efficient supply chains are what float that boat.

Manufacturers that rush to China—and other far-flung countries—in search of low unit-production costs may be walking into a strategic trap. If they don't carefully assess the impact of outsourcing on the final costs of the whole supply chain, they will lose competitive advantage to companies that have done their homework.

Many executives underestimate the magnitude of hidden costs in long supply chains and their impact on profitability. And rarely do they think hard enough about how best to leverage those supply chains to create competitive advantage. Their only salvation is that most of their competitors make the same mistakes. But as breakdowns in loading and transporting become the norm, some companies will be smart enough to use these developments to their advantage.

The Nature of Hidden Costs

Unit production cost (UPC) is only one part of a very complex picture to consider in outsourcing. As supply chains lengthen, they incur hidden direct and indirect costs. Direct costs include shipping, inventory, procurement, and financing. Hidden direct costs

arise from tradeoffs that create inefficiencies in production loads and inventory flows. If you mark down a low-cost product, you lose. If you can't sell a low-cost product because you don't have it, you also lose. Hidden indirect costs include the following:

- The cost of forecasting errors

  —Variations in production loads that result from widely fluctuating demand

  —Excess inventory that must be carried, and the margin losses that result from having to discount it

  —Lost gross margin from inventory that could have been sold if it were available when customers wanted it

- The cost of "flushing" defective inventory from the chain

  —The time lost in identifying the cause of a quality problem, correcting it, and resetting production

  —The costs of removing inventory with quality problems and replacing it with a new product

- The cost of unreliable loading, unloading, and rail transport services

  —Waiting times at ports, which are getting much longer and less predictable

  —The costs of rerouting shipments to other ports; in the case of the U.S. West Coast and Canada, rerouting to the Gulf of Mexico and the East Coast

A Scenario for Comparing Supply Chain Dynamics

How significant can these costs be? One way to get a handle on them is to compare the economics of a typical North American domestic supply chain with those of a supply chain based in China. Such a comparison can become very complex very quickly, so to simplify it we will make a few assumptions:

- A unit price of $10
- A domestic UPC of $4 for a gross margin of $6
- A China UPC of $3 for a gross margin of $7
- An operating margin of $4 for the domestic producer and $5 for the China outsourcer after a steady-state supply-chain cost of $2 per unit for both the domestic and the China-based chain (a conservative estimate for the China-based chain)

We will also assume three states of supply chain sophistication, reflecting different flow patterns for information on customer demand:

- In a *nonintegrated* supply chain, each upstream step gets its information on demand from its customer on the next step down
- In a *semi-integrated* supply chain, each step gets its information on customer demand from two key steps along the chain
- In an *integrated* supply chain, each step has full visibility into the final customer demand

We apply these levels of sophistication to a wholly domestic supply chain and to a chain with China at

one end and Chicago at the other. In our first comparison, the domestic chain has an overall cycle time of 6 weeks and sets its production run at one month of average demand. The China-based chain has an overall cycle time of 11 weeks and also sets its production run at one month of average demand. Information flows for both chains are nonintegrated, and weekly demand is allowed to fluctuate randomly plus or minus 30 percent—about average weekly demand.

When the two supply chains are subjected to this demand profile, retail inventory fluctuates between being overstocked and out of stock. When it is overstocked, we discount the excess inventory in order to move it. When it is understocked, we count as a cost of doing business the lost opportunity of not obtaining the gross margin from the goods that weren't available. The results: The domestic chain experiences volatility, which adds supply chain costs. The operating margin averages $0.77 as opposed to our assumed steady-state operating margin of $4. The China-based chain experiences even greater volatility because of its longer cycle times and nonintegrated information flows. Even with a lower UPC, it ends up with an operating margin of $1.02 as opposed to the assumed steady-state operating margin of $5. Because of its lower UPC, the China-based chain still has the advantage.

The China-based chain is likely to move quickly to a semi-integrated state of sophistication as the difficulties of managing the nonintegrated chain become apparent. In doing so, it will improve its operating margin to $1.21 per unit. At that point, the management of the China-based chain is likely to cut price—by, say, a dollar per unit—to gain share from the domestic chain. It believes that the move will reduce its gross margin from $7 to $6 and its operating margin from $5 to $4.

If the domestic chain matches the price cut to hold its share, it will see its operating margin turn into a loss of $0.16 per unit; the operating margin of the China-based chain will decline, to $0.28, but the chain will still be profitable. The reality is likely to be somewhere in between, but the China-based chain will still have the advantage through a combination of low UPC and semi-integrated information flows.

But now our scenario takes an interesting turn. The domestic supply chain can neutralize the China supply chain's advantage if it integrates its information flows and cuts end-to-end cycle times by half (still a big *if* for many companies). With that enhanced responsiveness, the domestic chain will see its operating margin increase from a loss of $0.16 per unit to a profit of $2.19 per unit. Now *it* has the advantage. However, the competitive dynamic might continue with the China-based chain becoming integrated and also cutting its cycle times in half. In that case, the advantage returns to the China-based chain because of its lower UPC.

Back to the Real World

Unfortunately, the world we live in isn't evolving in a way that would permit these improvements for the China-based chain. As noted, the surface freight situation in North America and Europe is seriously challenged. Backlogs at ports and on railroads are at all-time highs. With freight volumes increasing faster than the ports can handle them, the situation will only worsen. Some Asian ships are too big to go through the Panama Canal to less busy ports on the East Coast of the United States. Even some of those that can fit through the canal must offload and reload containers to meet the canal's pilot-visibility rules. (The offloaded containers are sent by rail

across the isthmus, to be reloaded on the other side!) And while shifting to East Coast ports might improve the predictability of shipping times, it certainly won't shorten them.

Because of the problems on the U.S. West Coast and in Europe, the cycle times of the China supply chains are going up, not down. If they increase from 11 weeks to 18, the China-based chain in our scenario will suffer a decline in operating margin to a $0.70 loss per unit, while the enhanced domestic chain will still be realizing a profit of $2.19 per unit.

But that's not all. The cycle times of surface shipments (from China to Chicago, for example) are not only increasing—they are also becoming more variable. If the surface time of 18 weeks can randomly vary 6 weeks either way, the semi-integrated China-based chain will see its operating-margin loss grow to $1.43. Thus, a domestic supply chain with integrated information flows and fast cycle times can outperform a China-based chain, despite China's low UPC.

Safely Navigating the Shoals of Outsourcing

Clearly, sourcing from China makes sense for many companies. But for others it may not. All companies should carefully weigh the likely benefits of outsourcing against the actual and potential costs and risks involved. Outsourcing from halfway around the globe can often be a valuable option, but it doesn't always work out that way. We recommend that companies considering outsourcing—as well as those already engaged in it—take the following steps:

- Make sure that they fully understand the dynamics of any China-based supply chains with which they do business

- Integrate—at least partly—the flow of information within their existing chain

- As quickly as possible, reduce the quantity they require for minimum production orders, and reduce cycle times

- Conduct detailed examinations of their own and their suppliers' buying practices, as well as supplier relationships at all levels of the supply chain, in order to identify areas where hidden costs could arise and to prevent their occurrence

- Segment their demand chain on the basis of order predictability and demand volatility

- Use the long and unreliable supply chains of competitors that do depend on China against them by delivering what their customers want when they want it

If you do decide to source from or manufacture in China, explore alternatives that will minimize adverse supply-chain effects, including options that might appear costly but may in fact reduce overall costs. These include

- air freight

- point-to-point shipping

- better relationships with domestic means of transportation, particularly railways, whose capacity is increasingly constrained

Whether you are operating from Europe or the United States, getting this right is not going to be

easy. The problem is severe; you can be sure that someone out there is trying to resolve it. That someone should be you.

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