

# Global Strategies for Sourcing Decisions and Supply Chain Management

*Focus on the value proposition.*

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**L**ean globalization: It continues to shake and shape the way we develop and implement strategies for product development, supplier management, production, sales, distribution, and just about every other aspect of our enterprise. How can we adapt to increasing demands for quality, responsiveness, flexibility, innovation, *and lower cost* in the highly competitive global arena? Lean operating strategies and sourcing in low-cost countries (LCCs) such as China can shave cost. Yet sourcing components and other products halfway around the world presents additional challenges. During a recent Foxboro, MA AME workshop on “Best Practices in Global Operating Strategies,” attendees learned strategies for effective global sourcing decisions and management.

The session also focused on how sourcing in China can fit into a

lean globalization strategy. The Foxboro, MA Measurement & Instrument business unit of Invensys PLC, which has been sourcing in China for 23 years, presented their approach to global sourcing. This article will first provide an overview of sourcing in China and then explore how Invensys incorporated China into its lean global operating strategy.

## **Opportunities and Challenges**

China is an attractive potential supplier. Low labor costs, modern factories and infrastructure, availability of skilled employees and design/R&D capabilities (700,000 new engineers and technicians graduating annually), lower utilities costs, and incentives in special economic zones beckon. Chinese companies are developing more value-added business, improving quality management, labor skills, and

### **In Brief**

Strategies for developing and implementing effective global sourcing and supply chain management are offered in this article. Readers will also learn how sourcing in China can fit into a lean globalization strategy, and about the global sourcing approach used by the Foxboro, MA Measurement & Instrument business unit of Invensys PLC.

logistics systems. Many Chinese manufacturers are beginning to adopt lean manufacturing systems.

The Chinese economy has grown sevenfold over the last 20 years and is growing an average of 7.5 – 8 percent annually. Li Liang, a senior partner at CBS Group, Ltd., a firm that helps clients with business solutions for sourcing and selling in China, says, “It is time to not only think outsourcing, but also in-sourcing — source into China, the 1.3 billion-person market. Play offensive to win the battle.” Liang mentions high-tech and consumer products that are unique as particularly good opportunities. Already 482 of the Fortune 500 companies have Chinese operations, prompting suppliers to locate nearby their facilities.

Yet geographical and cultural distance, and other factors, can create challenges to successful sourcing in China. Although China offers low costs, many (such as labor) are increasing. Shipping costs from China to the United States have been rising rapidly. For example, the cost to ship a 40-ft. container from Shanghai to New York rose from an average of \$3500 to \$8000 during the last year and a half. The Chinese currency (RMB) has been increasing in value relative to the dollar and will result in price increases from Chinese suppliers. Logistics problems still arise despite advances in Chinese logistics infrastructure. Add to this the lengthy shipping times and the resulting leadtimes that boost inventory on hand.

Another factor is how responsive and timely a supplier in China will be. Most Chinese workers do not speak English and many of the managers do not speak English or speak it poorly. The time difference poses conference call scheduling problems. Travel to a supplier in

China requires 16–21 hours, so a day and a half is required each way and air tickets are costly.

Cultural factors and government interests are additional hurdles. In some organizations, the management mindset does not encompass a customer satisfaction focus. Add red tape and protectionism into the mix. A driving force in the government is to maintain stability; growth to absorb the expanding population drives many decisions. Working with Chinese suppliers requires time to build trust at all levels.

Consider some basics needed to support a Chinese operation. Material availability can be problematic. Cheap materials are available, but the good-quality materials for export are more expensive. Utilities can be unreliable. The quality of storage, packaging, and handling conditions varies in some cases.

Protection of intellectual property (IP) is a concern for many organizations. The legal system in China still has not developed to support modern commerce, so there is uncertainty on enforcing legal actions for IP issues.

### **The Three Cs**

Shawn He Yuxun, chair of MeetChinaBiz, a networking and business development group that has organized numerous trade visits to China since 2002, advises keeping in mind three critical factors (“the three Cs”) when sourcing in China: complexity, contradiction or inconsistency, and constant change.

- *Complexity.* Resist any temptation to oversimplify your perceptions about doing business in China. Diversity marks various economic sectors, industries, and types of business. China’s

vast land mass spans six time zones. There are 165 cities in China with a population of over one million people. Seven major dialects are among the languages of China. He Yuxun says many people think only about doing business in the lower Yangzi River that includes Shanghai, Beijing, and the Pearl River Delta that includes Guangdong province. Many other areas in China are developing and offer opportunities for the right business.

- *Contradiction or inconsistency.* Doing business in China can be unpredictable, resulting from inconsistent enforcement of rules, regulations, and laws. He Yuxun uses intellectual property as an example. He says China has the best IP laws in the world and many people to enforce them, and yet they are not enforced.
- *Constant change.* The pace of change — economic shifts, infrastructure construction, legal/regulatory, etc. — in China is extremely rapid.

### **Consider Your Company's Business Plan, Other Factors**

Three industry experts provided advice for sourcing in China at the workshop: Kenneth McGuire, president of Manufacturing Excellence Action Coalition; Jack Antounian, a senior partner with Macresco Edge LLC; and Li Liang. Four common points emerged from the presentations: 1) Management should thoroughly evaluate whether sourcing in China fits into the company’s business plan; 2) selectively decide which products/components should be sourced in China; 3) select the right supplier; and 4) invest time and resources in supplier management.

How does sourcing in China fit into your company's business plan? Consider that labor costs in China are increasing rapidly and that labor is only one component of the cost of a product or component. Antounian says, "You need to look at the short term and long term and develop a holistic solution." McGuire suggests companies should focus on developing the right value proposition by blending product innovation and supply chain management. After evaluating factors such as innovation, cycle time, and costs McGuire says, "If the value proposition is wrong, making stuff 8000 miles further away is a temporary fix at best!"

Not all products or components are suitable candidates for sourcing in China. McGuire suggests that high-volume, low-mix and low-complexity products have good potential. He provided examples: commodities, products produced in large quantities, globally-standard products, mature products with open market channels, and Big Box mass-merchandise products sold on price. Antounian adds

that sourcing in China is best suited for goods that have a labor content 25 percent or greater. McGuire also provided examples of products that are not a good fit for sourcing in China: performance- or time-critical products, niche market products, low-quantity market-specific items, innovative startup or service-sensitive products, items with required customer proximity, and fashion cycle goods with short product life cycles. Total Cost of Ownership (TCO) analysis will benefit sourcing decisions. (See Figure 1, "Total Cost of Ownership.")

### **Supplier Selection and Management**

How to select the right supplier? Liang provides the following advice for selecting suppliers in China.

- Meet the owner and only give your business to the supplier if your business will be important to the owner. You need some one on the ground (acting on your behalf) who will meet face-

to-face with suppliers to explain your criteria and provide an independent assessment. A lot of time and effort will be invested in managing the suppliers.

- Price should not be the number one criterion.
- Select suppliers who are eager to improve quality and serious about building a quality factory. Do not trust ISO certificates; verify quality by evaluating the supplier's current quality control system.
- Make sure the supplier understands that your quality and service standards are not negotiable.
- Consider the IP issue. Contracting with one supplier for a complete product enables the supplier to duplicate the product.
- The supplier's location and related infrastructure/transportation should be considered, along with the available labor pool — especially skilled workers, engineers, and management.

An effective supplier management program is required. Antounian suggests that a "knowledgeable and capable team of passionate experts" be assembled to work with suppliers. McGuire adds, "One or two trips per year will not do it; you will need a minimum of four or five trips per year." McGuire also stresses that you need to standardize your process before transferring it to China.

Getting conformance to design can be a lengthy, challenging process. Chinese managers can be intimidated by Americans and may say "yes" even when they will not deliver or produce at the required quality. Liang suggested various strategies for manufacturing in-process quality control:

- Insist on a raw material quality certificate; be careful about the legitimacy of the paper.

### **Total Cost of Ownership (TCO)**

In the context of sourcing decisions, Total Cost of Ownership (TCO) is a methodology that is used to insure that all the costs associated with sourcing alternatives are considered. Typically most companies include piece-part cost and many companies include total landed costs in the decision-making process, but they may fail to consider costs such as inventory carrying costs, cost of poor quality, or remote supplier management costs. When the sourcing alternatives being considered are all local, these other costs tend to be similar. When global sourcing alternatives are considered, there can be a wider disparity in these costs and it is important to include them in the decision-making process.

**Figure 1.**

- Your sourcing management team must frequently visit the factory site (unannounced visits if possible)
- Request complete quality and inspection records for each shipment; check random samples.
- Hire your own local sourcing management.
- Train your local sourcing management in order to build technical and management competence.
- Use frequent, close communication with your overseas sourcing personnel so they will become part of your team.

Be aware of the “Guanxi” (relationship or connection) system in China. The importance of relationships and connections is deeper than in Western countries. The Guanxi system developed as a way to get things done outside of the formal state economic system. Although its importance has gradually lessened, buyers still should pay attention to Chinese partners’ needs.

### **Global Operating Strategies: Invensys Process Systems, Foxboro, MA**

During the workshop a plant tour was conducted at the Foxboro Measurement & Instrument business unit of Invensys Process Systems, a division of London-based Invensys PLC. The Foxboro business unit is a supplier of instruments, systems, and services for industrial process automation. This includes intelligent field instrumentation, automation systems, and advanced software applications, plus comprehensive engineering, maintenance, and training. The facility produces a broad range of Foxboro-brand intelligent and conventional instruments that measure, indicate, record, and control process variables such as flow, pressure, temperature, liquid level,

pH, and chemical composition.

Manufacturing at the century-old Foxboro facility is a 365-employee, three-shift operation. During the past ten years lean and six sigma have been implemented to continuously improve processes within the plant. Recent accomplishments due to lean/six sigma include increased output per employee, reduction of quality defects by 42 percent, and completely eliminating lost-time injuries over the past 15 months. The workforce at Foxboro is very experienced; most employees have worked at the plant for more than 25 years, and employee turnover is low.

The business unit includes plants located in France, Germany, Mexico, and China. These plants and the Foxboro plant serve major markets throughout the world. The plant in China is located in Shanghai and has been a part of the business for 23 years (Invensys was one of the first Western companies to open a plant in China).

The Foxboro plant tour and discussion that followed illustrated several points reviewed earlier in the article. Invensys provides an excellent example of using TCO to decide where products or components should be sourced.

John Biagioni, general manager of manufacturing, measurements, and instrumentation, Invensys Process Systems, and Scott Gauvin, a senior partner at Macresco Edge LLC., presented a TCO model used by Invensys in sourcing decisions. The piece part cost, total landed cost, and total cost of ownership are considered. The piece part cost is part of the total landed cost, and the total landed cost is part of the total cost of ownership. Additional costs, such as inventory, poor quality, and remote supplier management, are used in the evaluation as well.

Biagioni and Gauvin provided the following approach for evaluat-

ing low-cost sourcing options using TCO analysis:

- Break down the cost into piece part, landed cost, and total cost of ownership to understand the total cost of ownership.
- Identify the risks of moving to an LCC.
- Calculate one-time costs and recurring costs.
- Understand the true cost (“clean sheet”) for your product.

Piece part costs include labor, overhead, and material costs. Total landed cost is defined as: the total cost of a landed shipment — including purchase price, freight, insurance, and other costs up to the port of destination. In some instances, it may also include the customs duties and other taxes levied on the shipment.<sup>1</sup>

Additional costs included in the total cost of ownership are usually difficult to estimate but since they can be significant, the effort is worthwhile. Some overhead costs will not go away, but will be spread over other items.

Biagioni also pointed out that the turnover of personnel is faster in China than in the United States, so you really need a standardized process to maintain quality. Another factor to consider: Inventory will be higher for products that need to be shipped by water from China to the United States. Factor in the safety stock needed to protect against increases in demand during the longer lead-time, and for any disruptions in supply. Shipments from China tend to be less frequent, increasing inventory requirements. If items are sourced in China and sold in the United States, reverse logistics costs may increase for service, warranty, and disposal. Add the costs of travel and the time personnel need to travel and spend with suppliers. Several one-time costs are incurred

in the sourcing transfer. First the process needs to be documented. If the product is already being produced in the United States, and personnel will be laid off after the transfer, there will be separation and severance costs. Tally the cost of any projected inventory buildup. Initial yields after the transfer may be lower than normal, another cost. Costs are incurred in transplanting processes, equipment, and infrastructure; these costs include capital investments, travel and expenses for staff, freight and duties, and the impact on productivity.

Biagioni and Gauvin also cited risk factor cost. Invensys identified various risks that the company would be exposed to if it sourced in China. They include: general inflation in China as well as rising labor, energy, and fuel costs; potential disruptions in business due to health, pandemic, or infrastructure problems; quality problems; customer perception and acceptance of products produced in China; currency risks; risks associated with IP transfer; risk associated with cultural and language differences; and skill/experience variation. There is also potential risk from corrupt and adverse business practices. Biagioni showed labor cost projections from the Economist Intelligence Unit.<sup>2</sup> After labor costs are adjusted for productivity, labor costs in China are actually slightly higher than in Mexico and if they continue to rise rapidly, they are projected to approach those in the United States by 2011.

Using a spreadsheet template enables rapid, accurate calculations. Using a TCO analysis spreadsheet employed by Invensys in selecting sourcing options, Biagioni and Gauvin described three examples — the TCO for United States, Mexico, and China sourcing options. In each example the low-

est piece part cost was in China, followed by Mexico. When all the added costs were considered, however, it was found that one product's lowest cost option was China, another was Mexico, and the third was the United States.

Biagioni suggests the following preliminary steps should be done before using a TCO model.

- Create standardized work processes that document remaining labor content, so it can be more easily transferred if required.
- Lean the process, considering the whole process, not just labor. Labor only accounts for seven to 12 percent of the part cost (less for total landed cost and TCO).
- Focus on “clean sheeting” and “should cost” designs to determine what the absolute lowest cost will be based on index pricing.
- Spaghetti-map the complete supply and demand chain from cradle to grave.
- Focus on redesigning product lines based on customer order winners.

“Clean sheet and should cost” is part of the McKinsey Design to Cost Toolset. “Clean sheet” is a transparent collaboration of data sharing between suppliers and customers. “Should cost” is using estimates on the data to come to a “should cost” buildup of price. Biagioni said the concepts reflect a systematic process of breaking down a product's cost components including raw material, transportation, direct labor, indirect labor, scrap, productivity enhancing technologies, overhead, energy regulations, other relevant components, etc. These components are then built into a simple, quantitative model that can be used to understand the magnitude of costs and how they can be reduced. Use the

data to better negotiate or leverage your spend with suppliers.

After developing the TCO model, Biagioni said you must challenge it and track the actual costs of implemented decisions. This enables the model to be continuously improved. He showed an example that included initial cost estimates and the actual costs after 12 months of production in China. Some of the costs increased, others decreased, and some stayed the same when compared to the estimates. The overall cost per unit turned out to be 15 percent lower than estimated.

### ***Focusing on the Value Proposition***

Development of the Rocket Program (a key lean/six sigma initiative) by Invensys offered lessons learned in sourcing. Gauvin explained that the plant management at Foxboro challenged plant employees there to develop a process to deliver small orders within 24 hours for the products in the pressure transmitter line that accounted for 60 percent of the product line's sales (referred to as the Rocket Program). Before the program was implemented, leadtime was six to eight weeks. The fulfillment time for these small orders was reduced to 24 hours, accomplished by implementing ideas such as having customers enter orders directly into the system through the Internet and routing orders directly to production cells.

Delayed postponement also played a key role. Foxboro employees found that there were 36 base models accounting for 60 percent of the product line's sales. These base models can be customized in a calibration center in various ways to produce thousands of end items. To reduce order turnaround time and

keep lower inventory on hand, they decided to set up a supermarket to stock the 36 items (see Figure 2). When orders arrive, the calibration center customizes the products and ships them within 24 hours. This approach has been used on other product lines including the Mag Flow/IMT25 transmitter lines, providing Invensys a competitive advantage through rapid delivery times.

Invensys manufactures pressure transmitters for petroleum refineries and other applications. When sourcing was considered for the pressure transmitter product line using TCO, it was found that centralizing the core technology and processes used to produce the base units in Foxboro was least expensive. The primary reason for centralizing in Foxboro is that a large percentage of the product line's sales are in the United States

(the center of gravity). To meet demand around the world quickly (less than 24 hours), the calibration center has been duplicated in other locations including Shanghai, China so that the 36 base products can quickly be customized and localized and then shipped to the customer. Each location maintains a supermarket and operates on a kanban supply system. For example, Shanghai sends its orders daily to Foxboro through the Internet and Foxboro makes two shipments each week by air back to Shanghai.

When the Mag Flow/IMT25 transmitter lines were evaluated using TCO, building the base assemblies in Shanghai proved less expensive. There are eight base assemblies that can be configured into 48 end products. Invensys decided that the final configuration would be done locally (as with the pressure

transmitter line) so that the competitive advantage of the Rocket 24-hour program could be maintained.

In addition to being able to ship orders rapidly to local customers, the duplication of the lines around the world (to customize the final end products) provides Invensys with ample global capacity. This capability can be used to quickly respond to "special events" that occur.

Biagioni led the workshop group through Invensys's machine shop. Participants learned that several products would not be transferred to low-cost countries because of volume, mix, and age of design considerations. There were also several examples of products produced in the machine shop that were difficult to transfer to outside suppliers because of special tolerances. Biagioni stressed the importance of methods such as value analysis and Design for Manufacturing and Assembly (DFMA) as enablers for global sourcing and in redesigning product lines.



**Figure 2.** Invensys employees learned how to reduce order turnaround time and keep lower inventory on hand by setting up a supermarket to stock the 36 items accounting for 60 percent of a product line's sales. Products are customized and shipped within 24 hours of order receipt, offering a competitive advantage.

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1. [www.businessdictionary.com](http://www.businessdictionary.com)
2. The Economist Intelligence Unit is a provider of country, industry, and management analysis and is a leading research and advisory firm. Founded in 1946 when a director of intelligence was appointed to serve *The Economist*, the Economist Intelligence Unit has more than 40 offices worldwide. Their website is [www.eiu.com](http://www.eiu.com).

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