

Legal. Laws and regulations may change, reducing or eliminating what may have been key benefits.

Ethical. Corruption and bribery, common in some countries, may be illegal in a company's home country (e.g., illegal in the United States). This poses a number of issues. One is how to maintain operations without resorting to bribery. Another is how to prevent employees from doing this, especially when they may be of local origin and used to transacting business in this way.

Cultural. Cultural differences may be more real than apparent. Walmart discovered that fact when it opened stores in Japan. Although Walmart has thrived in many countries on its reputation for low-cost items, Japanese consumers associated low cost with low quality, so Walmart had to rethink its strategy for the Japanese market.

Managing Global Operations

Although global operations offer many benefits, these operations often create new issues for management to deal with. For example, language and cultural differences increase the risk of miscommunication and may also interfere with developing trust that is important in business relationships. Management styles may be quite different, so tactics that work well in one country may not work in another. Increased travel distances and related travel times and costs may result in a decreased tendency for face-to-face meetings and management site visits. Also, coordination of far-flung operations can be more difficult. Managers may have to deal with corruption and bribery as well as differences in work ethic. The level of technology may be lower, and the resistance to technological change may be higher than expected, making the integration of new technologies more difficult. Domestic personnel may resist relocating, even temporarily.

Not-So-Clear Choices: Should You Export, or Manufacture Overseas?

READING



Russ Banham

When the board-games company Bob Moog created in 1985 sought growth through global expansion 2 years later, Moog faced the usual two options: export the product or manufacture it overseas for local distribution. Moog chose the latter.

"We decided for a number of reasons to manufacture our board game, '20 Questions,' in Holland for distribution throughout Europe," said Moog, president of University Games Corp. of Burlingame, CA.

Recently the company expanded into Australia. Unlike the European ventures, however, Moog decided that it was more economical to import its products into Australia from the U.S. manufacturing facility because "anticipated initial sales in Australia just did not warrant a manufacturing operation there at this juncture," Moog said. "If sales pick up down the line, we may then examine local manufacturing."

Moog's dual strategy is not unique. One of the toughest questions a company confronts when pondering an international sales strategy is: to export, or not to export?

While exporting is often the least risky method of selling overseas, it frequently involves significant transportation, logistics, and tax-related costs that may make it uneconomical when compared with foreign manufacturing.

On the other hand, foreign manufacturing, while potentially a more competitive way of entering an overseas market, has its own bugaboos. Political instability, fluctuating market conditions, and the huge capital costs to set up an overseas manufacturing operation are daunting challenges. Determining the best way to go often involves solving a perplexing conundrum. "It boils down to a trade-off between classic cost-and-time considerations and eco-political factors," said Richard Powers, president of Insight Inc., a provider of management support systems based in Bend, OR.

With exporting, a company must evaluate the various modes of transportation that would be involved in getting the goods there, and how this relates to the cycle time of putting the product in the marketplace. Some products are time-sensitive; others are less so.

On the other hand, if a company determines that an overseas manufacturing operation best meets its needs, it must examine the eco-political factors involved, such as tariff and duty drawbacks and international tax issues. "It may be less expensive, given these factors, for a company to incur the logistics costs of exporting than to risk the eco-political costs," Powers explained.

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Trade-Offs and Traps

In addition to weighing these trade-offs, there are other related factors affecting the decision to either export or locate a plant overseas. To compete in their market, for example, some countries require that some form of local infrastructure be in place.

"Sometimes you run into government contracts where the only way to distribute a product in that country is to have it made locally," said Fred Ehram, vice president at Bain & Co., a Boston-based strategy consulting firm. "In China, for instance, you pretty much have to build something there in order to enter that market."

Certain products also dictate the international sales strategy to be taken. "If your company makes drinking glasses, you'll want to manufacture them in whatever country you plan to sell them," observed Scott Setrakian, a director in the San Francisco office of Mercer Management Consulting. "Drinking glasses, generally speaking, are pretty cheap to make and expensive to ship."

Political instability is another guiding force in a company's decision-making process. "If you want to sell in Russia, you're facing political instability as your biggest single operating risk," noted John Koopman, a principal in Mercer's Toronto office. "In Western Europe, this is not an issue. In Asia, there's a little risk, but in Russia it's a given." . . .

The maturity of a company's product affects this decision. A product expected to require design changes, for example, may not fit well with foreign manufacturing plans. "It's pretty hard to implement changes to a product when the product is fairly far removed from the product development and engineering people," Ehram continued. "Tactically, you want to be moving products offshore that are relatively stable."

Another factor is the skill of the labor force in the market being considered. "You have to question whether or not the labor pool—no matter how low-cost—can be trained to do the things you need," Ehram added.

Many companies enter a foreign market by first exporting there, but with an eye toward building overseas in the future. "Exporting will give you a feel for the product and its market potential," Powers said. "Instead of jumping in the lake head first, exporting allows you to get your toes wet. It may cost more, but you're able to hedge your risks."

But CPC International favors full-scale overseas manufacturing to either foreign product assembly or exporting. "We rely on exporting chiefly as a means of entering a new marketplace," said Gale Griffin, vice president at the Englewood Cliffs, NJ-based food company. "We then like to move from an exporting environment into local manufacturing."

CPC manufactures such well-known food brands as Hellmann's Mayonnaise and the Knorr's line of soups. Altogether, the company manufactures in 62 of the 110 countries in which it markets its products.

CPC uses local personnel and managers almost exclusively when operating overseas. "We look for people who understand the markets and can compete very effectively within them," Griffin said. "They help you understand local government regulations, which can be tricky. We also let our local managers do their own marketing, figuring they know their own markets and how to compete there better than Englewood Cliffs does."

Finding someone qualified to fill these shoes is as easy as calling an executive search firm or accessing the Internet. "There are many qualified people looking to represent all kinds of companies on the Net," Powers noted.

Powers' company, Insight, offers a computer software model that can help companies find the right overseas representatives. Called the Global Supply Chain Model, the software guides companies through the maze of decisions required to develop an international sales strategy, from how many plants [are] needed to satisfy global markets to the best means to source products. The software costs \$30,000, excluding consulting services. The task of finding a local rep should not be taken lightly, especially when it concerns finding someone to manage an overseas plant. "Having a plant manager who can create a culture from the ground up with the right discipline and values to develop a solid team of people is crucial to the success of the endeavor," Ehram said. "I've seen the best prepared and executed strategies succeed or fall to pieces on the basis of that one individual."

Best-Laid Plans

While some elements making up an international sales strategy can be predicted with a degree of certainty, others—like currency exchange values—are capricious at best. "At Mexx, we planned twice to enter the Italian market," Koopman recalled. "In both cases, one week before we were set to launch our clothing line there, the Italian lira was devalued 20 percent—meaning our prices would increase by 20 percent. Both times we were forced to cancel our plans."

Technology obsolescence and improvements in logistics play similar, unpredictable roles. A company may spend hundreds of thousands of dollars building a foreign facility weeks before a new automated manufacturing system renders its technology a buggy in an age of automobiles.

Moreover, a new way of moving goods faster, more efficiently and less expensively may materialize, reversing the status quo and making exporting a more cost-effective means of reaching a marketplace.

Ultimately, no matter which way a company chooses to enter a foreign market, it needs a pair of fleet feet. "It's very important, especially with new economies, to get in as early as possible," Griffin counseled. "You want to establish market leadership for your brand, and the fact is, the first one there often has the best chance."

Questions

1. What advantages and disadvantages does exporting have?
2. What advantages and disadvantages does foreign manufacturing have?
3. What are the advantages of employing local personnel and managers when operating overseas?
4. What relevance do currency exchange rates have for foreign trade?
5. What other factors might be relevant?

Source: Russ Banham, "Not-So-Clear Choices: Should You Export, or Manufacture Overseas?" *International Business*, November/December 1997, pp. 23–25. Copyright © 1997 Russ Banham. Used with permission.

Whatever Happened to Quality?

READING



Quality is more than just a statistical analysis tool for manufacturing lines. When done right, quality should encompass the entire enterprise.

Some 50 years after the advent of the total quality management (TQM) movement championed by W. Edwards Deming, manufacturers of all different sizes and stripes are still being dogged by high-profile manufacturing quality defects. The list is long, and getting longer every week, and crosses every manufacturing vertical. At least a token "quality program" is de rigueur for U.S. manufacturers, but many are still at lip-service level agreement with the means required to reach the necessary ends. However, talk is cheap—recalls are not.

From tainted beef to spinach, from lead-painted toys to poisoned pet food and blood thinners to exploding laptop batteries and malfunctioning medical devices, the costs in scrapped product, consumer lawsuits and lost brand equity from defects and recalls are huge. Persistent, expensive and well-publicized recalls are striking companies with even the most stellar quality reputations. Toyota, the progenitor of a legendary quality-focused production system, has suffered a rash of defects that have caused the company to drop in *Consumer Reports'* Annual Car Reliability Survey ratings—an important market barometer for its consumers.

On a perhaps less dangerous but equally costly front, Microsoft's X-box 360 video gaming platform suffered a high-profile manufacturing defect that at one point had up to one-third of all units suffering from a "fatal error" (device owners called it "the red ring of death") that led at least indirectly to markedly weaker competitive positioning in the crucial holiday selling season, as well as a warranty extension that is estimated at more than \$6 billion in unplanned accruals.

Many of these manufacturing problems are coming from global supply chains, which is a failure as much of management as it is the defective products themselves. However bleak the situation may seem, all is not lost. Indeed, the responsibility for quality manufacturing finally seems to be taking hold across all levels of the enterprise.

Quality Goes Upstream

Talk to the manufacturing community about quality's place in today's environment and a clear pattern emerges—companies are finally grasping the "shared responsibility" aspect of Deming's teachings. If quality is truly everyone's responsibility, then the idea goes beyond the shop floor and into the front office, the service department and everywhere else that provides value to customers and shareholders.

Ron Atkinson, chairman of the American Society for Quality (ASQ), has been watching this trend unfold. He describes the path that the idea of quality management in manufacturing has taken over the years.

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"When I started in manufacturing 35 years ago, there was a policeman installed at the end of the line who looked at the parts and said, 'That one is OK, that can be shipped and that one can't.' Gradually, it got to, 'Let's find better ways to do the checking,' and then to, 'Let's find a way to predict what the parts are going to look like when they hit the end of the line,' so we started doing defect prevention. Now where we're at is that quality is expanding to cover everything, including outside of the actual manufacturing process, to 'how do we improve the quality of our HR services and support services? How do we improve the quality of the decisions that are made?'"

According to Atkinson, concepts crucial to establishing a top-quality manufacturing line have been driven upstream, and expanded to become part of an overall continuous improvement strategy. "Quality has become a systems approach, rather than focusing on one part at a time and whether it's dimensionally correct. Quality is continuous improvement."

Rework and Morale

Larry Coburn, vice president of operations at high-tech audio equipment manufacturer Crown Audio, has seen the need for strong management and employee commitment in his company's recent quality improvements. The market in his industry was driving the development of more complex products that need to be produced more cheaply, and these twin trends put so much pressure on his manufacturing operations that things were breaking down. Their first-pass yields had gotten so bad that their rework inventory had piled up, and even became a major line item on the balance sheet.

"We had areas that were designated for rework that were so large that they were getting on our inventory control list because they were major entities in terms of dollars in inventory," he recounts. In fact, the problem was large enough to conceal what Coburn and his team call 'hidden factories'—millions of dollars of untapped production and sales potential existing within their production line. "We started analyzing these hidden factories and we actually identified \$4 million of cost related to poor quality," Coburn says.

To stem the tide of red ink, Crown Audio embarked on a drastic plant-floor triage process that involved stopping production entirely, so as not to generate any more rework. They then analyzed and tested the defective inventory, broke the components up into groups based on the common problems they exhibited, and used those groupings to analyze potential process improvements and defect reduction strategies before plugging them back through the process. Once they finished, they not only had saleable inventory to get out the door, but also had a pretty

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good handle on the parts of their process that needed changing, says Coburn. "When we started, we had months and sometimes close to a year of backlog that needed to be fixed and repaired," he relates. "Now we are talking in terms of hours of rework in front of us."

However positive and dramatic this change, Coburn and his management team also realized that it wouldn't help much if the scrap and rework inventory piles kept growing, he says, which is where he says the less-tangible "employee engagement" part of the equation comes in.

The first aspect is enabling them to do their jobs. "We're continuing to empower our workers to get real-time data at their fingertips so they're making good decisions without two-week-old data, or without estimating or just evading what they think the problem is," he says. Rather than having his workers hanging their heads, Crown Audio's management team is now in the enviable

situation of having different lines and shifts brag about their first-pass yields to each other.

Sustaining this motivated, engaged workforce is itself a team effort, says Coburn, who says that he has learned over the course of Crown Audio's continuing quality initiative that solidly designed manufacturing processes backed up by an engaged and empowered workforce is the essential combination to move any company forward. Quality truly is everyone's responsibility, and everyone appreciates a job well done.

"There is nothing more frustrating than working hard and then knowing that what you did, did not work out or did not come through," Coburn stresses this point in no uncertain terms. "Morale is everything in quality," he says. "People want to do a good job, and we have to enable that."

Source: Excerpted from Brad Kenney, *Industry Week*, April 1, 2008.

INSIGHTS ON QUALITY MANAGEMENT

Successful management of quality requires that managers have insights on various aspects of quality. These include defining quality in operational terms, understanding the costs and benefits of quality, recognizing the consequences of poor quality, and recognizing the need for ethical behavior. We begin with defining quality.



SUPPLY CHAIN

Defining Quality: The Dimensions of Quality

One way to think about quality is the degree to which performance of a product or service meets or exceeds customer expectations. The difference between these two, that is Performance – Expectations, is of great interest. If these two measures are equal, the difference is zero, and expectations have been met. If the difference is negative, expectations have not been met, whereas if the difference is positive, performance has exceeded customer expectations.

Customer expectations can be broken down into a number of categories, or *dimensions*, that customers use to judge the quality of a product or service. Understanding these helps organizations in their efforts to meet or exceed customer expectations. The dimensions used for goods are somewhat different from those used for services.

Product Quality. Product quality is often judged on eight dimensions of quality:¹

Performance—main characteristics of the product.

Aesthetics—appearance, feel, smell, taste.

Special features—extra characteristics.

Conformance—how well a product corresponds to design specifications.

Reliability—dependable performance.

Durability—ability to perform over time.

Perceived quality—indirect evaluation of quality (e.g., reputation).

Serviceability—handling of complaints or repairs.

¹Adapted from David Garvin, "Competing on the Eight Dimensions of Quality," *Harvard Business Review* 65, no. 6 (1987). Copyright © 1987 by the Harvard Business School Publishing Corporation; all rights reserved.

Harvey Industries

CASE



Background

Harvey Industries, a Wisconsin company, specializes in the assembly of high-pressure washer systems and in the sale of repair parts for these systems. The products range from small portable high-pressure washers to large industrial installations for snow removal from vehicles stored outdoors during the winter months. Typical uses for high-pressure water cleaning include:

Automobiles	Airplanes
Building maintenance	Barns
Engines	Ice cream plants

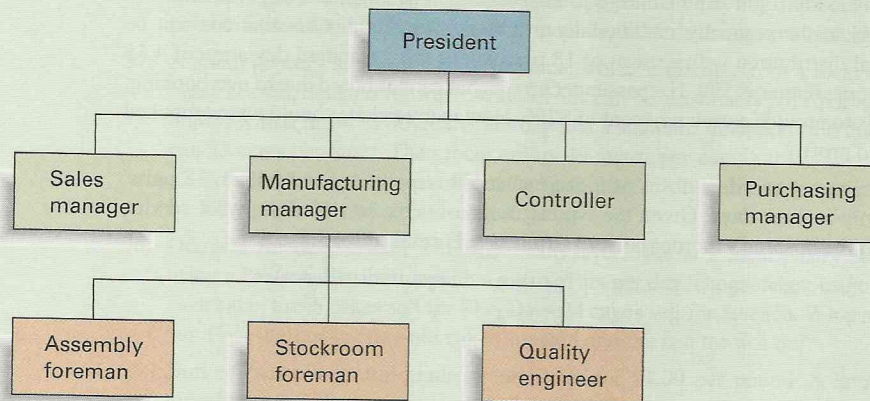
Lift trucks

Machinery

Swimming pools

Industrial customers include General Motors, Ford, Chrysler, Delta Airlines, United Parcel Service, and Shell Oil Company.

Although the industrial applications are a significant part of its sales, Harvey Industries is primarily an assembler of equipment for coin operated self-service car wash systems. The typical car wash is of concrete block construction with an equipment room in the center, flanked on either side by a number of bays. The cars are driven into the bays where the
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owner can wash and wax the car, utilizing high-pressure hot water and liquid wax. A dollar bill changer is available to provide change for the use of the equipment and the purchase of various products from dispensers. The products include towels, tire cleaner, and upholstery cleaner.

In recent years Harvey Industries has been in financial difficulty. The company has lost money for three of the last four years, with the last year's loss being \$17,174 on sales of \$1,238,674. Inventory levels have been steadily increasing to their present levels of \$124,324.

The company employs 23 people with the management team consisting of the following key employees: president, sales manager, manufacturing manager, controller, and purchasing manager. The abbreviated organization chart reflects the reporting relationship of the key employees and the three individuals who report directly to the manufacturing manager.

Current Inventory Control System

The current inventory control "system" consists of orders for stock replenishment being made by the stockroom foreman, the purchasing manager, or the manufacturing manager whenever one of them notices that the inventory is low. An order for replenishment of inventory is also placed whenever someone (either a customer or an employee in the assembly area) wants an item and it is not in stock.

Some inventory is needed for the assembly of the high-pressure equipment for the car wash and industrial applications. There are current and accurate bills of material for these assemblies. The material needs to support the assembly schedule are generally known well in advance of the build schedule.

The majority of inventory transactions are for repair parts and for supplies used by the car washes, such as paper towels, detergent, and wax concentrate. Because of the constant and rugged

use of the car wash equipment, there is a steady demand for the various repair parts.

The stockroom is well organized, with parts stored in locations according to each vendor. The number of vendors is relatively limited, with each vendor generally supplying many different parts. For example, the repair parts from Allen Bradley, a manufacturer of electrical motors, are stocked in the same location. These repair parts will be used to provide service for the many electrical motors that are part of the high-pressure pump and motor assembly used by all of the car washes.

Because of the heavy sales volume of repair parts, there are generally two employees working in the stockroom—a stockroom foreman who reports to the manufacturing manager and an assistant to the foreman. One of these two employees will handle customer orders. Many customers stop by and order the parts and supplies they need. Telephone orders are also received and are shipped by United Parcel Service the same day.

The assembly area has some inventory stored on the shop floor. This inventory consists of low-value items that are used every day, such as nuts, bolts, screws, and washers. These purchased items do not amount to very much dollar volume throughout the year. Unfortunately, oftentimes the assembly area is out of one of these basic items and this causes a significant amount of downtime for the assembly lines.

Paperwork is kept to a minimum. A sales slip listing the part numbers and quantities sold to a customer is generally made out for each sale. If the assembly department needs items that are not stocked on the assembly floor, someone from that department will enter the stockroom and withdraw the necessary material. There is no paperwork made out for the items needed on the assembly floor.

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There were 973 different part numbers purchased for stock last year and those purchases amounted to \$314,673. An analysis of inventory records shows that \$220,684 was spent on just 179 of the part numbers.

Fortunately for Harvey Industries, most of the items they purchase are stocked by either the manufacturer or by a wholesaler. When it is discovered that the company is out of stock on an item, it generally takes only two or three days to replenish the stock.

Due to the company's recent losses, its auditing firm became concerned about the company's ability to continue in business. Recently the company sold off excess vacant land adjoining its manufacturing facility to generate cash to meet its financial obligations.

New President

Because of the recent death of the owner, the trust department of a Milwaukee Bank (as trustee for the state) has taken over the company's affairs and has appointed a new company president. The new president has identified many problem areas—one of which is improper inventory control. He has retained you as a consultant to make specific recommendations concerning a revised inventory control system. What are your recommendations and their rationale?

Source: Case "Harvey Industries" by Donald Condit presented at Midwest Case Writer's Association Workshop, 1984. Copyright © 1984 Donald Condit. Reprinted by permission.

3. Checkout time at a supermarket is monitored using a mean and a range chart. Six samples of $n = 20$ observations have been obtained and the sample means and ranges computed:

Sample	Mean	Range	Sample	Mean	Range
1	3.06	.42	4	3.13	.46
2	3.15	.50	5	3.06	.46
3	3.11	.41	6	3.09	.45

p-chart

- Using the factors in Table 10.3, determine upper and lower limits for mean and range charts.
- Is the process in control?

OBSERVATION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Number of defects	2	3	1	0	1	3	2	0	2	1	3	1	2	0

9. After a number of complaints about its directory assistance, a telephone company examined samples of calls to determine the frequency of wrong numbers given to callers. Each sample consisted of 100 calls. Determine 95 percent limits. Is the process stable (i.e., in control)? Explain.

SAMPLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Number of errors	5	3	5	7	4	6	8	4	5	9	3	4	5	6	6	7

10. Specifications for a metal shaft are much wider than the machine used to make the shafts is capable of. Consequently, the decision has been made to allow the cutting tool to wear a certain amount before replacement. The tool wears at the rate of .004 centimeter per piece. The process has a natural variation, σ ,

$40 \times 260 = 10400$

- annual cost?
4. A large law firm uses an average of 40 boxes of copier paper a day. The firm operates 260 days a year. Storage and handling costs for the paper are \$30 a year per box, and it costs approximately \$60 to order and receive a shipment of paper.
- a. What order size would minimize the sum of annual ordering and carrying costs? *yes*
 - b. Compute the total annual cost using your order size from part a.
 - c. Except for rounding, are annual ordering and carrying costs always equal at the EOQ?
 - d. The office manager is currently using an order size of 200 boxes. The partners of the firm expect the office to be managed "in a cost-efficient manner." Would you recommend that the office manager use the optimal order size instead of 200 boxes? Justify your answer.

13. A mail-order house uses 18,000 boxes a year. Carrying costs are 60 cents per box a year, and ordering costs are \$96. The following price schedule applies. Determine
- The optimal order quantity.
 - The number of orders per year.

<u>Number of Boxes</u>	<u>Price per Box</u>
1,000 to 1,999	\$1.25
2,000 to 4,999	1.20
5,000 to 9,999	1.15
10,000 or more	1.10