

A Message To North American Manufacturers: Save Your Factory

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North American manufacturers are facing very aggressive off-shore competition. Just say the words "global competition" and it automatically makes people think of outsourcing.

A new paradigm today says: My company can't compete with low cost labor markets such as China. However, the prevailing belief that North American companies can improve their competitiveness only by relocating manufacturing operations to low-cost labor markets is based on incomplete information and analysis. While it may make sense to move manufacturing overseas for some companies, many organizations fail to look at other options that can lead to greater profitability while keeping their manufacturing operations in North America.

Companies need to understand that they have choices when it comes to manufacturing, and that the chips are not always necessarily stacked in favor of low-cost labor markets. That is what the Save Your Factory initiative is all about; encouraging manufacturers to fully and objectively analyze the advantages of technology, lean manufacturing and quality-enhancing techniques, process improvements, robotic automation, and the total costs of off-shore manufacturing before deciding whether to source overseas.

Take a closer look at global competition. North American manufacturers have weathered decades of competition, but today's global competitors are different. In China, there are dozens of manufacturers battling for domestic market share, which keeps everyone lean. As John Engler, president of NAM said earlier this year, fierce global competition is here to stay, and America's businesses and workers have no choice but to meet that competition head on through innovation.

He went on to say that even with tough competitive challenges, America is still the world's largest exporter, and nearly three-fourths of all U.S. exports are manufactured goods. Off-shore competition threatens to weaken this strong position, and action must be taken now to offset the threat.

So how can we argue against the new paradigm that the chips are stacked in favor of low-cost labor markets when it comes to manufacturing?

A variety of issues that have increased the costs of manufacturing in this country have made other countries such as India and China look appealing.

Consider the high costs of labor, healthcare, retirement, tort, tax rates and environmental regulations in the U.S.; all of these items weigh heavily on a company's bottom line.

The Costs of Off-shore Manufacturing

The news is filled with stories of manufacturing jobs being outsourced to low-wage countries. Many companies are lured by tales of low labor costs and decide to transition their products to China, only to find the initially estimated savings were never realized. Before making a move, manufacturers should consider the tangible and intangible factors including transportation bottlenecks, counterfeiting of intellectual property, trade barriers, currency devaluation, and human resource issues.

Take for example, the entire shipping process, from land shipping in China, through unload and land ship in the U.S., it can take four to six weeks for a product to reach its destination. Unexpected delays, such as the West Coast dock strike of 2002, can increase this time considerably. Issues around "Homeland Security" affect shipping schedules, and these costs continue to unfold. Another important issue that many manufacturers encounter is discovering too late that the product, once it is on the ocean, has to be re-worked. It's very difficult, if not

impossible, to ship products back. In addition, a number of fees are required upon leaving and entering ports, depending on the port of origin and arrival.

Another cost not routinely recognized is that many Asian companies demand payment when the door on the container closes. A North American firm is forced to carry four weeks of inventory that it cannot actually sell. The firm must also insure the cargo against loss.

The manufacturing quality of your product is an issue that requires constant vigilance. China's low labor rates exist because there is a plentiful supply of unskilled workers from rural areas who are trying to make a better life for themselves. Since payment is often based on the number of units completed, any unit finished is a "good unit." Many companies are surprised when the container is unloaded and a product sample exhibits a variety of quality issues. In fact, a recent article, "China Through a Lens," states that for the growing Chinese middle class, quality is a huge concern related to products manufactured in their own country.

Combine quality and shipping issues with lengthy travel time for representatives of North American companies, time zone differences causing communication difficulties, the cost of exporting raw materials not available overseas from the U.S. to the point of manufacturing, and the threat of shipping accidents, and the thought of outsourcing becomes a much more serious financial risk.

According to a 2004 Boothroyd Dewhurst, Inc. report, these tangible and intangible costs often sum to approximately 24 percent of total product cost. We arrived at this number based on our experiences with various suppliers and product development companies. This is a conservative estimate because we did not want to argue over particular intangible costs relevant to a particular product or firm. Keep in mind, however, that individual analysis should quantify all of the relevant intangible costs for your product, such as:

- Legal issues
- Quality issues
- Theft/piracy
- Shipping losses
- Cost of additional paperwork
- Cost of employee morale
- Cultural/communication difficulties
- Loss of manufacturing control and flexibility
- Training costs
- Underestimation of startup costs
- Increasing labor costs once a vendor relationship is established
- Cost of transition
- Cost of layoffs and severance
- Cost of inventory carry due to shipping
- Cost of managing the business off-shore
- Cost of bringing a project back to the U.S.

However, even when we take into account the pitfalls of off-shore manufacturing, we're often still not at a level playing field.

How do we get to that level playing field? We must implement state-of-the-art technologies including lean manufacturing, robots and automation, and other quality-enhancing techniques. By taking advantage of the fact that, we have recognized the crisis, and have public and private organizations dedicated to the betterment of manufacturing. It also helps that we are familiar with our markets, culture, laws and standards.

How Innovation Impacts Productivity

The facts show that manufacturing will go to the countries whose companies win the race to automate and use lean manufacturing processes, which in turn, helps reduce production costs while improving quality.

Let's look at some interesting statistics. We have so often heard that off-shore competitors such as China are "stealing" jobs from the U.S., but the statistics tell a different story. China actually lost 15 million manufacturing jobs between 1995 and 2002, whereas the U.S. lost two million jobs for the same period. In fact, the

world lost 22 million manufacturing jobs from 1995 to 2002. Where did all of these jobs go? To automation, and other types of productivity-enhancing technologies, and initiatives such as lean manufacturing.

According to a recent NAM report, 80 percent of manufacturing executives report a shortage of qualified workers and 68 percent state that this negatively impacts productivity.

What about the long-term picture? By 2018, there will be a gap of 30 million workers - 70 million baby boomers will retire and there are only 40 million new workers to enter the U.S. workforce. Now more than ever before productivity and automation are a critical factors for North American manufacturers to be competitive in the world market.

The productivity enhancing technologies that we see today such as plant floor automation are having as much impact on the economy as the farming technology that was implemented in the last century. In 1900, agricultural workers constituted more than 38 percent of U.S. employment. Today, they represent about two percent of the work force; however, we produce more of the world's food than we have ever produced.

Because of the productivity enhancing technologies used in farming, we not only produce more food than ever before in our history, but have become the world's largest producer of food.

A similar analogy can be drawn with the U.S. steel industry. Over the last 20 years, the number of U.S. workers employed by the U.S. steel industry dropped by 74 percent from 289,000 to 74,000. However, output increased by 36 percent from 75 million tons to 102 million tons during the same timeframe. This was accomplished by technology innovations and productivity-enhancing tools.

Late last year, we decided that as the leader in the robotics industry we needed to take a stand and convince North American manufacturers that they can still compete with foreign competitors by optimizing their processes, keeping themselves lean and fully automated with the latest and best technologies.

Our message is clear – there are alternatives to plant closings and moving off shore. With lean manufacturing, robots, and automation, North American manufacturers can be profitable and competitive in today's global market.

Reducing Part Costs

Cost is a major factor in the decision to move a factory off-shore. An example of how robotics can help companies stay competitive with off-shore companies was provided by The Lincoln Electric Company, the world's leading manufacturer and supplier of welding products, robotic welding systems, and plasma and oxyfuel cutting equipment. Lincoln's customer requested an analysis on the cost of weld wire - a consumable in welding. The customer indicated that they were considering moving their manufacturing operations to China unless they were able to reduce their consumables cost.

Lincoln Electric worked with the customer on a thorough cost analysis. The analysis showed that the cost of manual welding the part in the U.S. was \$.86 per part. The cost of manual welding the part in China was \$.30 per part.

When the consumable cost was eliminated, the cost of manual welding in the U.S. was still high, at \$.69 per part. This led the company to conclude that even if the weld wire consumable was free, there was no way they were going to make enough of an impact on their overall costs to prevent them from moving to China.

This in turn led the customer and Lincoln Electric to do a thorough cost analysis using robotic arc welding. What they found is that with robotic arc welding, their costs went down to the equivalent of manufacturing in China, \$.30 per part.

This U.S. manufacturer found that what used to take 1.23 minutes of weld time became .61 minutes of weld time using robotic welding. This significantly reduced weld time, increased throughput and lowered costs substantially.

They also found that what used to be 1.52 minutes of non-welding, non-productive activity was reduced to only .50 minutes of non-welding activity. This significantly reduced non-value added/non-productive time and lowered costs substantially.

In addition, the customer found that robotic welding had a significant impact on higher quality and improved process control.

The customer was not looking forward to the anticipated lead times that they were told to prepare for if they decided to manufacture in China. That, coupled with the issues related with shipping back to the U.S. made the company confident that they made the right decision by investing in robotic arc welding automation and keeping their manufacturing in the U.S.

In another example of a customer who was considering moving machining operations to China, we looked at the cost to manufacture a five-pound aluminum automotive part. Our customer's finish machining area ran two shifts and a five-day operation (260 days per year). When we compared labor costs, the part was \$.21 higher in the U.S. versus China.

Once robotic automation was introduced, the cost dropped to just \$.73 per part - \$.03 less than the part costs to make in China, not to mention the additional costs associated with off-shore manufacturing, including transportation, delays, duties, risks, etc.

The Importance of Machine Productivity

In machining operations, several factors influence machine productivity, which means the amount of parts that a given machine can produce on an annual basis.

One factor is the amount of time that a machine can cut parts in an eight-hour shift. If we ignore the lunch break that operators (in any country) take, there is still a 15-minute break in the morning and afternoon during which the machine is idle. Since a robot does not require breaks, this means that machines that are manually loaded are reduced to seven and one-half hours of production, while a robot achieves a full eight hours of production.

A second issue is the amount of time a machine waits for manual loading and unloading. Our studies have shown that a robot is faster than an operator is since a robot does not have to wait for a part or cutter to stop moving, or a door to open. Instead, a robot can access parts through the top of a machine, and unload parts immediately upon their completion.

In the case that we examined, operators produced 445,000 parts, while the robot produced 545,000 parts based on machine productivity.

Conclusion

Save Your Factory encourages manufacturers to fully and objectively analyze the advantages of robotic automation and the total costs of off-shore manufacturing before deciding whether or not to source overseas. There is a variety of tangible and intangible factors to consider including transportation bottlenecks, counterfeiting of intellectual property, trade barriers, currency devaluation, and human resource issues.

After reviewing the options, the facts show that manufacturing will go to the countries whose companies are agile and innovative. North America is in the best position to win the competitive race given the infrastructure that currently exists because of automation technology and lean manufacturing.

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