RESHORING TRENDS: Analysis of Current Data and Impacts on Iowa Manufacturing

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I. EXECUTIVE SUMMARY

During the 1980s, manufacturers rushed to outsource their manufacturing (or sourcing of manufactured parts) to low-cost countries such as China. This decision was driven primarily based on lower labor costs with sourcing decisions often based strictly on unit price. Currently there is an effort to reshore this manufacturing (or sourcing of manufactured parts) back to the United States (U.S.) from these low-cost countries. Four key drivers are behind this reshoring interest: (1) reduction in the labor cost differential between the U.S. and low-cost countries; (2) exchange rate changes; (3) energy cost changes; and (4) better awareness of nonprice factors by managers within industry.

Our analysis of the reshoring trend examined industries that are considered at the tipping point for reshoring, including appliances and electrical equipment, computers and electronics, transportation products (including plastic and rubber), heavy machinery (including agricultural equipment), high-cost or perishable demand items, and products with safety concerns. The geographic areas that most commonly benefit from reshoring are U.S. states with low production costs and locations with similar existing bases of manufacturing. Typically, entire manufacturing plants are not reshored with the associated large job impacts. Instead, specific product lines or production parts are reshored with incremental job increases.

Analysis shows Iowa may have opportunities for reshoring in the machinery, furniture, and plastics and rubber industries due to regional specialization and the cost structure of those industries. In addition, Iowa manufacturers that purchase fabricated metals may see benefits from reshoring work. Although there is clear opportunity, the majority of any reshoring activity in Iowa is likely to create incremental job growth instead of adding entire manufacturing operations. Analysis indicates that the upper limit of job growth is likely 5,000 jobs, or 2 percent of Iowa’s manufacturing workforce.

The reshoring trend is supported by valid economic factors that Iowa-based manufacturers should not ignore. Manufacturers should re-examine their individual business cases and determine what risks or opportunities may exist regarding where they manufacture or source parts (offensive reshoring) or how they are positioned in selling locally produced parts versus foreign-sourced parts to their customers (defensive reshoring). Using tools such as the Total Cost of Ownership or Best Value sourcing can help these manufacturers identify and compare their competitiveness versus other product supply locations.
II. INTRODUCTION

A. Reshoring Background
The reshoring of manufacturing from overseas back to American shores is becoming a hot topic with manufacturers, retailers, and politicians alike. The current reshoring trend is a response to the offshoring activity that occurred over the previous three decades. Offshoring refers to the locating of a manufacturing facility outside of the company’s headquarters region, whereas reshoring refers to locating a manufacturing plant within one’s region (Ellram, 2013; McMackin, 2012). Outsourcing is distinct from the term offshoring because outsourcing refers to subcontracting a specific company function to an outside party regardless of its location (domestic or foreign).

Offshoring of U.S. manufacturing started in the mid-1980s, but “the mass exodus of production following China’s 2001 entry into the World Trade Organization deepened this pessimism” (Sirkin, 2012). At its peak in mid-1977, the U.S. manufacturing sector numbered approximately 19.5 million jobs, 22 percent of all nonfarm employment. After that pivotal year, manufacturing employment began a steady erosion through the 1980s and 1990s before plummeting at the start of the 21st century. By 2010, U.S. manufacturing ebbed to less than 12 million jobs and less than 9 percent of the total workforce (McMackin, 2012).

For our purposes, we will use the terms reshoring and offshoring to refer to the location of a company’s own manufacturing sites and/or the location of a company’s sourcing of product. For example, if a company is sourcing product from a region outside its own region, it is offshoring. If a company changes the source of this product to within the region it is located in, it is reshoring. Typically a region would be defined as a specific country, but the concept can be applied to different definitions of geography equally as well.

There is a lot of anecdotal information in the marketplace in terms of the benefits of reshoring and reports of reshoring activity. Many manufacturers are also becoming interested in learning more about reshoring and/or determining if they should deploy a reshoring strategy. Actual information, however, on the level of reshoring activity that is occurring and the resulting impact is more ambiguous.

B. Analysis Objectives
The objective of this analysis is to try to identify common trends and attributes from the data and information currently available. We will then apply this to the current U.S. manufacturing landscape with specific emphasis on how reshoring trends could affect manufacturers in Iowa. The main topics we will address are the following:
• Summarize key drivers behind reshoring (i.e., what factors could drive a company to consider reshoring).
• Profile the types of products that (1) have been currently reshored, and (2) are good candidates for future reshoring.
• Determine if reshoring can lead to job growth and if it can be quantified.
• Identify locations in the U.S. that are seeing reshoring activity and if there are regional drivers of this activity.
• Understand the potential impact of reshoring on Iowa manufacturers.

C. Analysis Approach
Our general approach to this analysis was to leverage data that have been made publicly available from a variety of sources, including other universities, management consulting firms, and U.S. government data. We have been unable to identify any central database or resource specific to the level of reshoring activity. For example, the U.S. census data provide a view of imports into each state by broad categories; however, it is not possible to identify what portions of this are specifically linked to a previously offshored manufacturing activity or a newly reshored activity.

We have therefore gathered a wide range of data, reports, and examples about reshoring and interpreted these into common themes and trends for this analysis. We then applied these reshoring themes and trends (using our organizational knowledge of manufacturing in general and in Iowa specifically) to the manufacturing environment in Iowa.

Analysis has identified four key factors that are driving the reshoring trend by manufacturers: (1) labor cost changes; (2) currency exchange rate trends; (3) energy cost reductions; and (4) better awareness of nonprice cost drivers. The combination of these factors has significantly changed the economic landscape that resulted in offshoring decisions. The following sections describe each key factor and how it has changed over time.
A. Labor Cost Changes

**Wage Inflation Rates**

One of the key factors that created the original offshoring trend was the lower manufacturing wage rates overseas, especially in China and other developing economies, versus the U.S. and Western Europe. However, over the past decade the annual labor cost per hour in these developing countries is increasing at a faster rate than labor costs in the U.S.

Comparison of wages in China to U.S. wages is extremely difficult because China does not report wage data in accordance with internationally accepted standards. As a result, many public and private sources attempt to determine compensation through analytical tools and estimates. A Boston Consulting Group study looking at wage rates from 2005 to 2010 found wages in China increased by an average of 19 percent per year (Sirkin, 2012). Other reports have found similar increases not only among manufacturing wages, as warehousing and logistics wages were found to be increasing an average of 15 percent each year from 2009 in locations such as Shenzhen, China (Kuljanin, 2014). During the same period (2005 to 2010), the average wage rate in the U.S. increased less than 4 percent per year (Sirkin, 2012).

Analysis of data from the Bureau of Labor Statistics (BLS) International Labor Comparisons program provides further detail on wage rates from China and other major U.S. trading partners. When compared to the top four countries importing to the state of Iowa, U.S. costs have made gains over the past 10 years (Figure 1) (Bureau of Labor Statistics, 2014b). Whereas the data on Canada, Mexico, Germany, and the U.S. use the same methodologies and are directly comparable, the data on China are based on BLS best estimates for a period from 2002 through 2009.

This data show moderate total compensation cost gains from the U.S. to Canada and Germany during the time period, driven by a variety of factors, including currency fluctuations. Mexico and China still hold significant labor compensation advantages over the U.S. Whereas Mexico’s compensation costs seem to have leveled off, the hourly compensation in China during the eight-year period of data nearly tripled and

![Figure 1: Manufacturing Hourly Compensation Costs.](image-url)
went from 2 percent to 5 percent of U.S. compensation costs. Although not an exact comparison, this shows a gain in one key factor in the total cost of products sourced from China.

**Level of Automation in Manufacturing**

Manufacturers worldwide are increasing the automation of their manufacturing process to increase productivity and address labor shortages in the marketplace. The utilization of robotics and automation decrease the size of the labor cost component in a produced item. Thus as the labor cost component in a specific good is reduced, the benefit of producing or sourcing that product in a low-labor-cost country is also reduced. The cost to acquire and deploy robotics is generally much more consistent across different countries and does not provide a benefit to a low-cost country.

The *Made in America Again* report from Boston Consulting Group suggests this diminished labor cost advantage is generally not offset by any increase in productivity from deploying robotics in low-cost countries (Sirkin, 2011). Conversely, the deployment of manufacturing automation in developed countries such as the U.S. reduces the impact of higher labor costs and may make reshoring production more feasible.

The estimated total installation of robots (a key form of automation) in North American factories grew at approximately 5 percent per year over the past 10 years (Robotic Industries Association, 2014) (Figure 2). In comparison, supply and use of robots to/in China remained significantly below North American levels until 2010 (International Federation of Robotics, 2014) when significant growth began. A variety of industry associations and market research groups predicts the Chinese market will grow at least 25 percent per year for the next several years, far outpacing North American implementation.

The data suggest that until 2009, North American manufacturing sites may have been able to create productivity gains from automation that Chinese manufacturing sites did not realize. However, a variety of factors, likely including the rise in labor costs, has created significant demand for industrial automation in China. As a result, the productivity gains by U.S. manufacturers over China were maybe a one-time event.

![Figure 2: Analysis of Robotics Use in North America (Robotic Industries Association, 2014) and China (International Federation of Robotics, 2014).](image-url)
B. Currency Exchange Rate Trends

The exchange rate between the currency of the producing country and purchasing country can have a dramatic impact on the final price of a product. The appreciation of the local currency in the manufacturing or sourcing country (e.g., China) versus the end-use country (e.g., U.S.) will serve to increase the cost of an item in the end-use country. Even if a purchasing contract with a foreign supplier is in U.S. dollars (USD), the supplier will eventually be forced to renegotiate the price over time.

Looking specifically at China, the Chinese yuan (CNY) appreciation over the past decade has had a tremendous impact on product cost. Prior to July 2005, the value of one USD was fixed at 8.28 CNY. In July 2005, China depegged the value of the CNY from the USD. In the following eight years, the CNY appreciated an average of 3.61 percent per year to a value in July 2013 of 6.17 CNY per USD (Figure 3). A part purchased for 100 USD in 2005 will now cost 134 USD.

![CNY versus USD Exchange Rate](Figure 3: CNY versus USD Exchange Rate (Oanda, 2015)).

Many other low-cost countries such as Thailand, Taiwan, Singapore, Malaysia, and the Philippines have similar currency trends (see examples in Figure 4). Other countries such as India, Indonesia, and Vietnam have actually shown opposite trends with weakening currencies that reduce the cost for American firms to source goods.

![USD Exchange Rate versus Other Selected Low-Cost Countries](Figure 4: USD Exchange Rate versus Other Selected Low-Cost Countries (Oanda, 2015)).
C. Energy Cost Reductions

The price of energy, specifically natural gas and electricity, has been in an overall downtrend over the last ten years (Figure 5). The advances in the oil fracking process have created a “cheap” source of the domestic supply of both oil and natural gas, which drives down cost of electricity production as well as products made from or using natural gas (e.g., plastics, ammonia/nitrogen, and other chemicals) (Manufacturing & Technology News, 2013).

In the plastics industry, the reduced cost of energy, combined with the high availability of raw materials made from natural gas, may create a step change in cost structure, shifting the global production of plastics. Joe Chang, global editor of ICIS Chemical Business, estimates the plastics industry will expand in the U.S. by as much as 38 percent in the next few years, primarily due to raw material cost reductions driven by fracking (Frazier, 2013).

In addition, the relative energy cost competitiveness in the U.S. has increased versus other countries. For example, natural gas costs have decreased 25 percent over the last ten years while they have increased nearly 100 percent on average for the top 25 economies of the world (Sirkin, Zinser, and Rose, 2014). The combination of relative energy price gains and renewed local sources of supply of raw materials may create significant opportunities in several industries.

D. Better Awareness in Industry of Nonprice Cost Drivers

The initial decisions to outsource were often driven by looking strictly at labor costs or product price in a low-cost country versus the U.S. Over time, companies have gained a better awareness of the other direct and indirect costs in addition to the direct selling or purchase price for a product, detailed in Figure 6 (Center for Industrial Research and Service, Iowa State University, 2010). In many cases, including just a portion of the other costs will provide a much better understanding of the true cost of sourcing products.

![U.S. Natural Gas Industrial Price (Dollars per Thousand Cubic Feet)](image)

*Figure 5: U.S. Natural Gas Price Trend (U.S. Energy Information Administration, 2014).*
<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Cost Type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Price</td>
<td>Direct</td>
<td>Unit cost; purchase price; initial capital expenditure</td>
</tr>
<tr>
<td>Logistics</td>
<td>Direct</td>
<td>Freight cost; packaging; duties; import fees; supply chain risk</td>
</tr>
<tr>
<td>Inventory Cost</td>
<td>Direct</td>
<td>Carrying cost of inventory; obsolesce cost; bulk versus just-in-time; pipeline inventory</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Direct</td>
<td>Supplies; training; downtime; repair costs</td>
</tr>
<tr>
<td>Quality</td>
<td>Indirect</td>
<td>Rework costs; scrap; replacement product; expediting costs</td>
</tr>
<tr>
<td>Supplier Reliability</td>
<td>Indirect</td>
<td>Partnering costs; payment terms; supplier capability; travel costs; purchasing support costs; intellectual property risk</td>
</tr>
<tr>
<td>Operations</td>
<td>Indirect</td>
<td>Manufacturing efficiency; capacity utilization</td>
</tr>
<tr>
<td>Life Cycle</td>
<td>Indirect</td>
<td>Redesign costs; life of product; savings over life of product</td>
</tr>
<tr>
<td>Customer Related</td>
<td>Indirect</td>
<td>Market responsiveness; customer specifications; user perceptions and satisfaction</td>
</tr>
<tr>
<td>Opportunity Cost</td>
<td>Indirect</td>
<td>Impact on innovation; cost of funds; overhead costs; strategic issues</td>
</tr>
<tr>
<td>Technological Advantage</td>
<td>Indirect</td>
<td>Changing technology; suitability for intended use</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Indirect</td>
<td>Green issues (carbon footprint, environmental regulations); taxes; value chain; warranty; depreciation; political and country risk</td>
</tr>
</tbody>
</table>

*Figure 6: Total Cost of Ownership Cost Elements.*
IV. ANALYSIS OF RESHORING TRENDS

A. Target Industries—Global

The Boston Consulting Group (Sirkin, 2012) identified seven key industries in which the rising costs of producing in China would make it more economical to shift this manufacturing closer to the U.S. According to the study, products that were likely candidates for reshoring their location of manufacturing are the following:

- Appliances and electrical equipment, including refrigerators and dishwashers, as well as lighting systems and small appliances such as microwaves
- Computers and electronics
- Transportation products, plastics, and rubber
- Heavy machinery, including air conditioning and heating systems, office machinery, and agricultural equipment
- Expensive items subject to frequent changes in consumer demand or changes in color or style such as high-end clothing and home furnishings
- Products where safety concerns are vital, including food products or baby formula

The study illustrated which industries may be good reshoring candidates based on the percentage of labor costs in the total product cost versus their typical logistics costs as a share of product price, as shown in Figure 7.

Traditionally, industries with a high share of labor costs and relatively low logistics costs were offshored to low-cost countries to take advantage of lower labor costs. As the labor cost differential between the U.S. and these low-cost countries decreases, these industries are more likely to be candidates for reshoring. Industries with relatively high labor content coupled with relatively low logistics costs, such as apparel, are likely to remain offshored. However, large products such as transportation goods and fabricated metals may have a combination of labor content and logistics costs that could create a business case for reshoring.

Figure 7: Potential Tipping Point Industries’ Logistics Costs versus Labor Costs (Sirkin, 2012).
B. Job Creation Estimates

At its peak in the late 1970s, the U.S. manufacturing sector had nearly 20 million jobs, 20 percent of all nonfarm employment. After that pivotal year, manufacturing employment began a steady erosion through the 1980s and 1990s before plummeting at the start of the 21st century. By 2010, U.S. manufacturing ebbed to less than 12 million jobs and less than 9 percent of the total workforce (Figure 8) (Bureau of Labor Statistics, 2015).

The reshoring trend is promoted by many as a way to return jobs to the U.S. economy. In a March 2012 study, The Boston Consulting Group said reshoring could add 2 million to 3 million jobs and an estimated $100 billion in annual output in a range of industries by the year 2015 (Sirkin, 2012). However, this is among the higher estimates given by a variety of sources.

The estimates of job creation in the U.S. as a result of reshoring range from as few as 50,000 to more than 3 million (direct and indirect jobs) over the next decade (see Figure 9 for example estimates). This represents a 0.5 percent to 25 percent increase over the existing U.S. manufacturing employment base.

<table>
<thead>
<tr>
<th>Job Range</th>
<th>By When</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 70,000 per year</td>
<td>2016</td>
<td>Reshoring Initiative</td>
</tr>
<tr>
<td>2 to 3 million total</td>
<td>2020</td>
<td>Boston Consulting Group</td>
</tr>
<tr>
<td>Up to 1 million total</td>
<td>2023</td>
<td>Walmart Buy America Initiative</td>
</tr>
</tbody>
</table>

The majority of the analysis and articles published to date only provide anecdotal (per company reshoring event) estimates. Because of the incomplete data in terms of job creation estimates and the complexity in linking specific job growth to reshoring activity, it is not possible to state a specific number in terms of reshoring-driven job creation.

C. Reshoring Location Activity

A log was generated of reported reshoring activities in the U.S. via a review of trade magazines, industry association websites, press releases, previous studies, and related materials from 2007 through June 2014. Only cases in which the location, general date, and company information could be validated were included in the log. A total of 39 events were recorded in the log and mapped, as shown in Figure 10. While the dataset is relatively small, it does show a few identifying trends, including the following:

- Existing concentrations or bases of manufacturing tend to attract reshoring activities, such as the activity seen in Ohio. It is likely that these actions take advantage of regional manufacturing clusters, allowing companies to take advantage of the synergies from locating reshored activity to existing plants and suppliers.
- Lower-cost regions of the U.S. (e.g., southeastern U.S.) also tend to attract reshoring activities. This is believed to be due to favorable overall cost positions versus other U.S. locations and the offshored locations.
D. Reshoring Approaches

There are two approaches to reshoring based on position in the supply chain, industry, and location: offensive/upstream and defensive/downstream.

1. Offensive/Upstream Reshoring

An offensive reshoring approach would be deployed on a manufacturer’s production or procurement part of their business. It focuses on how a manufacturer would manage their source of supply, whether or not it is their own plant, subcontractors, or suppliers. This approach focuses on using a Total Cost of Ownership (TCO) approach to decide whether the manufacturer should be buying or producing product overseas or at home. This is the traditional approach to reshoring and would be typically employed by medium- to large-sized manufacturers with a global supply chain.

2. Defensive/Downstream Reshoring

A defensive reshoring approach is focused on the distribution or sales side of a manufacturer’s business. It seeks to defend business for a larger manufacturer. By using the concepts of reshoring and TCO, a smaller- to medium-sized manufacturer can demonstrate to their customers how purchasing product from them (versus an overseas supplier) is a more effective sourcing strategy for their customer, even if the product price still may be higher than an overseas supplier.

E. Reshoring Limitations

Level of Offshored Manufacturing

In 2010 it was calculated that the U.S. manufactures nearly 75 percent of what is consumed within the U.S. (Sirkin, 2012). This percentage varies by industry, with apparel/footwear and computers/electronics each having more than 50 percent of the manufacturing offshored from the U.S. and industries such as food and beverage and petroleum and coal having the vast majority manufactured within the U.S. (see Figure 11).

Figure 11: Manufactured Goods Consumed in the U.S. by Source (Sirkin, 2011)

Sources: U.S. National Census Bureau; U.S. Bureau of Economic Analysis; BCG analysis.
By definition the level of products, jobs, and revenue that can be reshored is limited by the amount of those products that are already offshored. Although there isn’t a direct correlation between product value and jobs, this would suggest that the upper limit of jobs would be approximately 25 percent, or just more than 3 million. However, the reality is that only a small fraction of manufactured goods can be reshored economically, and thus the potential jobs are much smaller.

**Growth of Foreign Markets**

Originally offshored manufacturing locations were selected based on the country having a low cost of labor. These countries were known as producing countries with low levels of domestic consumption (Rice, 2014). Over time, these countries have grown their own domestic consumption base, and a significant amount of manufacturers have used their offshored plants to produce for the local or regional market. These manufacturers may then reshore the U.S. consumption portion of the output from these plants back to a U.S.-based plant or supplier. In these cases, it is unlikely that the entire plant would be reshored, resulting in multiple smaller plants serving regional demand.

**U.S. Manufacturing Infrastructure**

The offshoring of some industries has created a reduction or loss in the ability to recreate the manufacturing capability within the U.S. over a short-term horizon. Challenges to bringing manufacturing back to the U.S. include recruiting or training a new generation of employees on the specifics of their industry because the previous industry employee skills may have been lost or greatly diminished (Pisano, 2009). Companies around the U.S. have invested countless hours and costs traveling globally to find low-cost manufacturers, teach them the critical skills required to manufacture their products, and slowly transition production capabilities. In many cases, it will take a similar effort to reshore work. The current lack of critical manufacturing skills, especially among the next generation of manufacturing and engineering employees, is a gap that must be filled. The cost and effort to bring this work back is likely a considerable factor in tempering the amount of work being reshored.
V. INTERPRETATION OF RESHORING TRENDS AND THE IMPACT ON IOWA

A. Reshoring Drivers in the Future

Labor Costs
The gap between the labor rate in low-cost countries (such as China) and the U.S. is expected to continue to shrink. Although there may always be a labor cost advantage in these low-cost countries, global economics and more advanced productivity and labor savings programs should continue to reduce the gap in labor cost between low-cost countries and the U.S.

The gap between labor cost in low-cost countries and Iowa may be even smaller. In 2012, Iowa’s average manufacturing wage was 84 percent of the average U.S. manufacturing wage (Bureau of Labor Statistics, 2014a). This places Iowa at an even greater advantage for reshoring in terms of the gap in labor costs between the U.S. and low-cost countries.

Currency Exchange Rates
The change in exchange rates between the U.S. and foreign countries will have a direct impact on how attractive it is to offshore or reshore manufacturing and sourcing. Although it is expected that China will continue to slowly devalue their currency, this trend cannot be guaranteed. Likewise, the value of the U.S. dollar is likely to continue to rise and fall, reflecting the relative strength or weakness of the U.S. economy versus other world economies. Therefore, Iowa-based manufacturers should have a process in place to track foreign exchange rates of supply and demand in their key countries and be ready to review their sourcing decisions with significant changes in exchange rates.

Companies that have established foreign-based manufacturing operations would be less likely, over the short term, to change their sourcing strategy because of exchange rate changes due to the capital investment in the manufacturing plant. Companies that source from foreign suppliers would be more likely to make short-term sourcing changes based on exchange rates because the switching costs are relatively low.

Energy Costs
Changes in energy costs, such as the reduction in natural gas and oil costs via the increasing U.S. production of these commodities, may not have direct impacts on Iowa manufacturers. However, indirect impacts, such as changes in both domestic and international transportation, cost to generate electricity, and relocation of some industries reliant on natural gas and oil, will likely have trickle-down cost impacts on Iowa manufacturers. As such, Iowa manufacturers should remain aware of potential opportunities.

Just as the U.S. enjoys lower energy costs compared to the majority of the rest of the world, Iowa also realizes an advantage compared to other states. Figure 12 shows that Iowa currently has the 3rd-lowest industrial cost for electricity of all U.S. states (U.S. Energy Information Administration, 2014), and Figure 13 shows that Iowa had the 14th-lowest industrial natural gas price of all U.S. states in 2013 (U.S. Energy Information Administration, 2014). Iowa manufacturers therefore may be an attractive location versus other states and countries for industries with large energy inputs. These could be in the form of raw materials made from oil and natural gas, industrial processes that consume significant electricity or natural gas, or industries with costs impacted by global energy prices (e.g., transport costs).
Figure 12: U.S. November 2014 Industrial Electricity Prices by State (U.S. Energy Information Administration, 2014).

Figure 13: U.S. 2013 Industrial Natural Gas Prices by State (U.S. Energy Information Administration, 2014).
B. Target Industries—Iowa

An analysis of import data (U.S. Census Bureau, 2013) for potential tipping point industries provides some insight into potential opportunities for reshoring in Iowa. Figure 14 provides a summary of the percentage of imports from low-cost countries for both the U.S. and Iowa, along with the location quotient. The low-cost countries include China, Cambodia, Taiwan, Vietnam, Thailand, Indonesia, and India. Industries were defined using the North American Industry Classification System codes provided in the census data.

<table>
<thead>
<tr>
<th>Tipping Point Industries</th>
<th>U.S.</th>
<th>Iowa</th>
<th>Iowa Location Quotient*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer and electronics</td>
<td>55%</td>
<td>23%</td>
<td>0.68</td>
</tr>
<tr>
<td>Appliances and electrical equipment</td>
<td>43%</td>
<td>45%</td>
<td>0.85</td>
</tr>
<tr>
<td>Fabricated metals</td>
<td>41%</td>
<td>49%</td>
<td>0.8</td>
</tr>
<tr>
<td>Furniture</td>
<td>72%</td>
<td>52%</td>
<td>1.02</td>
</tr>
<tr>
<td>Machinery</td>
<td>21%</td>
<td>12%</td>
<td>2.08</td>
</tr>
<tr>
<td>Transportation goods</td>
<td>6%</td>
<td>13%</td>
<td>0.63</td>
</tr>
<tr>
<td>Plastics and rubber</td>
<td>44%</td>
<td>38%</td>
<td>0.94</td>
</tr>
</tbody>
</table>

* The location quotient refers to the relative specialization of Iowa compared to the U.S., with any values above 1.00 indicating that Iowa has a specialty in that industry compared to the rest of the U.S.

Figure 14: Percentage of Imports from Low-Cost Countries (2013).

The location quotient portion of the analysis shows that Iowa has a significant strength in the machinery sector. In addition, Iowa is near the U.S. average in both furniture and plastics and rubber manufacturing, suggesting proficiency in these industries. These specialties compared to the rest of the country may create an opportunity for Iowa to be a location to attract reshoring opportunities in those industries. Companies in those industries that face foreign competition may potentially benefit from an offensive reshoring strategy, showing that the regional strength, along with changes in total cost and noncost considerations, may justify that their customers shift from low-cost country supply to Iowa-based supply.

There are several tipping point industries in which Iowa’s percentage of imports from low-cost countries is significantly lower than the balance of the U.S., such as computer and electronics products. As a result, there is less opportunity for Iowa manufacturers to shift purchases from low-cost countries to local suppliers. However, industries in which Iowa’s purchase of products in tipping point industries is close to or larger than the U.S. average, such as fabricated metals, may constitute an opportunity for Iowa manufacturers to implement an offensive reshoring strategy and source products from closer, reducing the total cost of products.

C. Job Impact in Iowa

Reshoring will not reestablish the same level of manufacturing jobs that existed prior to offshoring because of a variety of factors previously discussed. Some of these factors include the increase in automation and efficiencies gained since the original offshoring, changes in industry and consumption, and the trend by companies to produce for local consumption in a foreign market near to that foreign market.

Defensive reshoring will likely be the most common type of job creation in Iowa. This will largely be in the form of retaining existing jobs (by successfully defending existing business to larger manufacturers from being offshored) and incremental new job growth by successfully increasing the level of sales to larger manufacturers (at the expense of foreign suppliers). There may be limited offensive reshoring opportunities in Iowa in the identified Iowa target industries for small and medium manufacturers and a very few large-scale factory relocations to Iowa in very specific industries such as ammonia production.

Since reaching peak employment in 1999, Iowa’s manufacturing sector has lost nearly 38,000 jobs, or 15% of the manufacturing workforce. More than 22,000 of those lost jobs were in the tipping point industry sectors. Considering the percentage of imports from LCCs, the likelihood of significant shifts of products, and other factors, the upper limit of potential jobs being reshored to Iowa is likely less than 5,000. While 5,000 manufacturing jobs are significant, this represents only about a 2 percent impact on Iowa manufacturing.
D. Reshoring Location Trends and Iowa Impact

There are no indications that the current economic trends would change to position Iowa for significant reshoring activity. Low-labor-cost states and states with large existing industry clusters will likely see the majority of any reshoring activity. Iowa’s largest strength among tipping point industries is in the machinery sector, but there is not a large enough base of low-cost countries importing to expect a significant impact.

While macro-level shifts are unlikely, manufacturers throughout the state should position themselves to take advantage of the drivers behind reshoring:

1. Offensively go after specific segments of business that are offshore now and that are related to, or supplement, their existing manufacturing capabilities.
2. Defensively support their existing products manufactured within Iowa to their customers, encouraging their customers to continue to purchase from a local source.

E. Related Reshoring Trends: Exporting

The same drivers and trends that are making it attractive to reshore are also making the U.S. a more advantageous location to manufacture and supply products to higher-cost countries and regions such as Western Europe. Just as U.S. labor costs and efficiencies versus low-cost countries have improved, the increase in labor costs and regulations in European countries is making U.S.-made products more competitive in these markets. Analysis of the same reshoring drivers and use of TCO methods can help U.S. manufacturers grow their business by opening up or expanding markets in Europe.
VI. CONCLUSIONS AND SUMMARY

The reshoring of manufacturing activities from low-cost countries to the United States is more than a fad. Although there are selected examples of large-scale reshoring involving an entire plant or product line being relocated from a low-cost country, such as China, back to the U.S., the majority of the reshoring activity is taking place in smaller increments with specific products or portions of product lines being reshored back into existing plants and shop floors of U.S. manufacturers.

The key drivers of this movement are the following:

- Labor costs increasing faster in low-cost countries versus the United States and Iowa
- Currency value appreciation in low-cost countries (especially China) versus the USD, making foreign-produced goods more expensive compared to local production
- U.S. energy costs declining while energy costs for much of the rest of the world increase, especially for products/industries impacted by the cost of natural gas
- Better education and awareness of business managers of the cost impact of nonprice factors (e.g., TCO) impacting their sourcing decisions, including risk costs, supply chain costs, and the cost of quality

The first three drivers are economic trends that can (and will) change over time. Companies need to remain aware of these trends and continually reevaluate their costs, including factoring in nonprice factors, to determine the best decisions regarding where to manufacture or source their product and how well their company is positioned to compete against offshore suppliers.

Industries and products with a relatively higher labor component (as a percentage of total product cost) and low logistics costs (as a percentage of total product price) are good candidates for reshoring, or at least reviewing the sourcing and production strategies for these products. Examples of these industries would be the following:

- Machinery
- Furniture
- Plastics and rubber
- Computer and electronics
- Appliances and electrical equipment
- Fabricated metals
- Transportation goods

In addition, existing industries such as metal fabrication (machining, milling, etc.) and suppliers to original equipment manufacturers in the above industries could see incremental business because of their increased competitiveness versus offshored supplies.

Job growth within Iowa due to reshoring is likely to remain modest and consist of incremental job additions at existing businesses. Reshoring would follow the overall manufacturing location trends in the U.S. with the companies leveraging either a lower-cost base in the southern states or existing manufacturing infrastructure in the eastern states. A few exceptions could occur where a new plant or industry moves into Iowa to take advantage of the economic drivers behind reshoring (e.g., the creation of new nitrogen/ammonia plants in Iowa to take advantage of the lower natural gas cost and proximity of their customers, resulting in lower logistics costs as compared to their previous locations in the Middle East).

Based on this review and analysis, there are four key steps each Iowa manufacturer should take with regard to reshoring:

1. Understand how the drivers behind reshoring may impact their current sourcing strategy and determine if opportunities exist to source parts locally (offensive reshoring strategy).
2. Understand their TCO, compare this to offshore competitors, and determine if there are opportunities to replace these offshore suppliers with their customers and original equipment manufacturers (defensive reshoring strategy).
3. Review the tipping point industries and determine if there are new opportunities for market expansion.
4. Put into place a structure and expertise to review the economic cost drivers behind reshoring on a recurring basis to enable a proactive approach to manufacturing sourcing and purchasing decisions; also determine competitiveness in different markets (at home and abroad).
APPENDIX A—SELECT RESHIRING ANNOUNCEMENTS

**General Electric:** The company announced in early 2012 that it was opening a water heater plant at Appliance Park in Louisville, Kentucky—the first new plant at the site in more than 50 years. Another plant has been retrofitted to make high-efficiency refrigerators. Eventually, GE plans to invest $800 million in Louisville, part of a $1 billion commitment to create 1,300 new jobs in the U.S. by 2014. Many of those jobs are being shifted from plants in China.

**Caterpillar:** The heavy equipment manufacturer has picked a site near Athens, Georgia, for a plant that will build small tractors and excavators, investing $200 million to shift some production from Japan.

**NCR:** The venerable business machine company builds ATMs and self-service checkout systems at a Columbus, Georgia, plant that opened in late 2009, and it plans to add another 370 jobs there by 2014, building products that were formerly made at plants in China, Hungary, and Brazil.

**Coleman:** The iconic outdoor equipment maker announced in 2012 that it's moving production of its 16-quart plastic wheeled cooler from China to Wichita, Kansas.

**Methanex:** The Canadian-based company will relocate a methanol production plant from Chile to a 225-acre site in Geismar, Louisiana. The $550 million project will give the company its first U.S.-based methanol production facility in more than a decade.

**Horton Archery:** The archery and crossbow manufacturer expanded its domestic manufacturing facility and moved all its production to Kent, Ohio, from China. “Being on-site to answer the phone and hear feedback from the field was one thing that we felt couldn’t be done in China,” says CEO Gregg Ritz.

**Watts Water Technologies:** The company and its Webster Valve subsidiary will make a multimillion dollar investment in a 30,000-square-foot plant complex in Franklin, New Hampshire, that will bring an estimated 100 manufacturing jobs back from China.

**Farouk Systems:** The manufacturer of hair dryers moved 1,500 jobs from China back to the United States.

**Chesapeake Bay Candle:** The company, founded in 1994, opened a U.S. manufacturing operation in Maryland for its candles and home-fragrance products that had been made exclusively in China and Vietnam.

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