Reshoring: Total Cost of Ownership

To Offshore or Reshore: How to Objectively Decide

MEP/Reshoring Initiative 6/12/13

Harry Moser
President
Reshoring Initiative
Reshoring/Backshoring/Onshoring/Insourcing: Bringing back manufacture of products that will be sold or assembled here.

Transplants are essentially reshoring.

Producing near the consumer!
The concept also works in other countries
Flawed company economic model

60% of manufacturers:

- Apply “rudimentary” total cost models
  - Wage Arbitrage
  - PPV (Purchase Price Variance)
  - Landed Cost
- Ignore 20% or more of the total cost of offshored products

Source: Archstone Consulting survey, American Machinist Mag., 7/16/09
Indexed Unit Labor Costs in the Manufacturing Sector of Selected Countries

Unit labour costs in manufacturing in US$

2000Q1=100

Source: Oxford Economics

Source: Oxford Economics/Haver Analytics
“We expect net labor costs for manufacturing in China and the U.S. to converge by around 2015”

“take a hard look at the total costs”

Source: Boston Consulting Group press release 5/11 & 4/12

Chinese no longer ”just thankful not to go hungry.”

Source: Michelle D. Loyalka, 2/17/12 NYT
The Industry-Led Initiative Provides

- Free Total Cost of Ownership (TCO) Software for companies and suppliers
- Online Library of 430+ reshoring articles
- Case Study template for posting cases.
- Media coverage of the trend: WSJ, Fox Business, USA Today, IW, CBS, CNBC, etc.
- ~100 presentations/year nationwide
- Motivation for skilled manufacturing careers
- Solutions to major supply chain problems
One reason price has dominated sourcing: complexity

<table>
<thead>
<tr>
<th>Decision Criteria</th>
<th>Alternative Sources’ Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Offshore</td>
</tr>
<tr>
<td>Price</td>
<td>Low</td>
</tr>
<tr>
<td>Total risk</td>
<td>High</td>
</tr>
<tr>
<td>Balance sheet</td>
<td>High</td>
</tr>
<tr>
<td>Customer non-responsiveness</td>
<td>High</td>
</tr>
<tr>
<td>Lack of innovation</td>
<td>High</td>
</tr>
<tr>
<td>Typical decision</td>
<td>?</td>
</tr>
</tbody>
</table>
TCO Estimator benefits

- Provides a single TCO for each source
- Flexible: values are 100% user selected.
- Broad:
  - 29 cost factors.
  - Via pull down menus you automatically insert:
    - Freight rates for 17 countries
    - Duty rates for parts or tools, e.g. molds
    - Current value and 5 year forecast of TCO.
- Easy to use:
  - Explanations and references to help select values.
- Free
## TCO Example: a Part

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese unit price</td>
<td>$70</td>
</tr>
<tr>
<td>U.S. unit price</td>
<td>$100</td>
</tr>
<tr>
<td># units/year</td>
<td>12,000</td>
</tr>
<tr>
<td>Unit weight, lbs</td>
<td>2</td>
</tr>
<tr>
<td>Shipments/year</td>
<td>6</td>
</tr>
<tr>
<td>Product life, yrs</td>
<td>5</td>
</tr>
<tr>
<td>Packaging*</td>
<td>1%</td>
</tr>
<tr>
<td>Payment on shipment</td>
<td>Yes</td>
</tr>
<tr>
<td>Quality*</td>
<td>2%</td>
</tr>
<tr>
<td>Product liability risk*</td>
<td>0.5%</td>
</tr>
<tr>
<td>IP risk*</td>
<td>1.9%</td>
</tr>
<tr>
<td>Innovation*</td>
<td>0.5%</td>
</tr>
<tr>
<td>Trips/yr</td>
<td>2</td>
</tr>
<tr>
<td>Carrying cost, rate</td>
<td>22%</td>
</tr>
<tr>
<td>Emergency air freight %*</td>
<td>5%</td>
</tr>
<tr>
<td>Wage inflation, annual*</td>
<td>8%</td>
</tr>
<tr>
<td>Currency appreciation, annual*</td>
<td>5%</td>
</tr>
</tbody>
</table>

* Chinese differential vs. U.S.
TCO Comparison Example

Present and Forecast US and China Price and TCO (US$)

Year 1  Year 2  Year 3  Year 4  Year 5
US TCO  China TCO  US Price  China Price
Even Landed Cost Misses a lot of TCO

- TCO: 100%
- LANDED COST: 87%
- PURCHASE PRICE: 77%

Diagram showing the percentages of TCO, LANDED COST, and PURCHASE PRICE.
“End the practice of awarding business on the basis of price tag. Instead, minimize total cost.”

# Offshoring multiplies Waste

<table>
<thead>
<tr>
<th>Toyota Wastes</th>
<th>Offshoring Contributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overproduction</td>
<td>Large batch shipments, filling containers</td>
</tr>
<tr>
<td>Waiting</td>
<td>Uncertain delivery/Inconsistent quality, port, customs, shared “awake time” window for discussions</td>
</tr>
<tr>
<td>Transport</td>
<td>12,000 mi. inbound, 6,000 return (boat ½ full)</td>
</tr>
<tr>
<td>Overprocessing</td>
<td>More packing and unpacking, customs paperwork</td>
</tr>
<tr>
<td>Inventory</td>
<td>In transit, cycle, safety stock, uncertain delivery and quality, less ability to check and count</td>
</tr>
<tr>
<td>Motion</td>
<td>Increased cost over time – repetitive motion injuries or additional labor to compensate</td>
</tr>
<tr>
<td>Defects</td>
<td>Much higher than local sources, extra inspection of materials and tolerances, customers unhappy longer</td>
</tr>
</tbody>
</table>
Some Reshorners

- Caterpillar
- GE
- Ford
- NCR
- Morey
- Regal Ware Worldwide
- Electrolux
- Scovill
- Master Lock
- Terryberry
- WHAM-O
- Farouk Systems
- Google
- Wright Engineered Plastics
- Lightsaver Technologies, Inc.
- Ace Clearwater Enterprises
- Unilife Medical Solutions
- Karen Kane
- Neutex Advanced Energy Group
- Freeman Schwabe Machinery
- Sleek Audio
- Seesmart Earth Friendly LED Solutions
- Stanley Furniture
- Calibowl
- Pigtrolin
- Peerless-AV
- SCI
- Prodigy
Bringing Production back from China:

- Water-heater production
- Unionized facility in Louisville, KY
- 400 jobs, renovated facility

Reasons:
- Tax incentives
- High-tech new model
- Ease of design collaboration with workers: cut cost $20
- 2 tier contract
- Chinese cost: -30% becomes +6% considering inventory and delivery problems

Will move a “significant piece” of appliance production back
Had 100,000 ft² in Chennai, India
Reshored to Westknoxville, TN
60,000 sq. ft.

Reasons:
- Fast delivery vs. 5 wks on the water
- Fewer supply chain problems
- If a quality problem, no more bad units en-route

Source: Knoxvillebiz.com Ed Marcum 8/7/10
China to Manatee County, FL

Reasons:

- $100Ks scrap
- $Ms lost sales
- emergency air freight
- costs up
- communications: language and time
- ~daily calls at 11 pm
China to Clarkesville, GA

Reasons:

- Salaries up
- Expectations up
- Rising Yuan
- 20-25% of employees did not return from annual holiday
Wright Engineered Plastics injection molding

- China to Santa Rosa, CA
- Medical and Telecom customers
- 4+ customers reshored, including JDS Uniphase and ECO Funnel™

Reasons:
- Transport costs up
- Wages up
- Quality issues common and difficult to handle

Source: Design2Part mag, *Yes, You Can Go Home Again, Say Some Manufacturers* by Mark Shortt
Woodridge, IL
Supplies many AEM members
Had quality issue with a Chinese component
Found local IL source
Result:
  - Quality problem fixed
  - Inventory cut by 94%
● 50% of Frisbee production
● China back to CA and MI
● 8 jobs added
34% of larger companies surveyed “are considering bringing manufacturing back to the U.S.” (MIT forum for Supply Chain Innovation 1Q12)

40% of contract manufacturers have done reshoring work this year (MFG.com 4/12)


More likely to buy U.S. product 76%
Less likely to buy Chinese product 57%

(Perception Research Services Intl. survey 7/12, 1400 consumers)
Reshoring yielded:

- About 80,000 manufacturing jobs*
- ~10-15% of manufacturing job growth since the Jan. 2010 low
- ~160,000 total, including multiplier effect

* Source of estimate: Reshoring Initiative tabulation of jobs listed in 287 Reshoring Library articles, 85% published since Jan 2010
BCG’s Tipping Point Industries

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

*U.S. Manufacturing Nears the Tipping Point*, Boston Consulting Group
The U.S. cost advantage represents the labor and logistics costs compared with those of Chinese manufacturers, for products consumed by people in China.

U.S. Manufacturing Competitiveness in Domestic Markets

1) The U.S. cost advantage represents the labor and logistics costs compared with those of Chinese manufacturers, for products consumed by people in the United States.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elec. equip., appliances &amp; components</td>
<td>46</td>
</tr>
<tr>
<td>Transportation equipment</td>
<td>34</td>
</tr>
<tr>
<td>Computer and electronics</td>
<td>25</td>
</tr>
<tr>
<td>Machinery</td>
<td>21</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>19</td>
</tr>
<tr>
<td>Plastics and rubber</td>
<td>16</td>
</tr>
<tr>
<td>Fabricated metal parts</td>
<td>16</td>
</tr>
<tr>
<td>Furniture</td>
<td>12</td>
</tr>
<tr>
<td>Clothing and textiles</td>
<td>4</td>
</tr>
<tr>
<td>Food and beverage</td>
<td>4</td>
</tr>
<tr>
<td>Primary metals, food and beverage</td>
<td>2 each</td>
</tr>
</tbody>
</table>

Source: Reshoring Library, March 2013
<table>
<thead>
<tr>
<th>REASON</th>
<th># of CASES CITED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage and Currency Changes</td>
<td>72</td>
</tr>
<tr>
<td>Quality, Warranty, Rework</td>
<td>51</td>
</tr>
<tr>
<td>Freight Cost</td>
<td>44</td>
</tr>
<tr>
<td>Delivery</td>
<td>43</td>
</tr>
<tr>
<td>Travel Cost/Time or Local Onsite</td>
<td>38</td>
</tr>
<tr>
<td>Inventory</td>
<td>26</td>
</tr>
<tr>
<td>Intellectual Property Loss or Risk</td>
<td>25</td>
</tr>
<tr>
<td>Total Cost</td>
<td>22</td>
</tr>
<tr>
<td>Communications</td>
<td>20</td>
</tr>
<tr>
<td>Image/Brand (prefer US)</td>
<td>17</td>
</tr>
<tr>
<td>Difficulty of Innovation/Product Differentiation</td>
<td>10</td>
</tr>
<tr>
<td>Loss of Customer Responsiveness</td>
<td>9</td>
</tr>
<tr>
<td>Price</td>
<td>7</td>
</tr>
<tr>
<td>Natural Disaster Risk</td>
<td>6</td>
</tr>
<tr>
<td>Green Considerations</td>
<td>4</td>
</tr>
<tr>
<td>Government Incentives</td>
<td>4</td>
</tr>
<tr>
<td>Burden on Staff, Political Instability, Personnel Risk, Regulatory Compliance</td>
<td>3 each</td>
</tr>
</tbody>
</table>
61% of Reshoring Cases are from China

<table>
<thead>
<tr>
<th>Country from which reshored</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>105</td>
</tr>
<tr>
<td>Mexico</td>
<td>21</td>
</tr>
<tr>
<td>Japan</td>
<td>12</td>
</tr>
<tr>
<td>India</td>
<td>8</td>
</tr>
<tr>
<td>Taiwan</td>
<td>5</td>
</tr>
<tr>
<td>Canada, Spain</td>
<td>3 each</td>
</tr>
<tr>
<td>Germany, Malaysia, Philippines</td>
<td>2 each</td>
</tr>
<tr>
<td>Brazil, El Salvador, Indonesia, Hungary,</td>
<td>1 each</td>
</tr>
<tr>
<td>Singapore, UK, Venezuela, Guatemala,</td>
<td></td>
</tr>
<tr>
<td>Singapore, Malaysia</td>
<td></td>
</tr>
</tbody>
</table>

Source: Reshoring Library 3/16/13
40% of reshoring has gone to the South

<table>
<thead>
<tr>
<th>US regions</th>
<th>States with published cases</th>
<th>Reshored companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>FL, NC, GA, KY, TN, VA, MD, SC, TX, OK, WV</td>
<td>#</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>40%</td>
</tr>
<tr>
<td>Midwest</td>
<td>IN, OH, MI, IL, MO, MN, KA</td>
<td>29</td>
</tr>
<tr>
<td>West</td>
<td>CA, WA, ID, OR</td>
<td>14</td>
</tr>
<tr>
<td>Northeast</td>
<td>NY, PA, NH</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: Reshoring Library 8/12
Special Relevance to Quality, Process Improvement and Workforce

- By understanding the small TCO gap instead of the large price gap:
  - You can justify domestic process improvement, automation, training, etc.
  - You do not have to sacrifice quality to be competitive.
- Recruiting is enhanced as reshoring becomes more visible
## Potential for reshored jobs is huge!

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Source of Scenario</th>
<th>Mfg. Jobs*</th>
<th>Total Jobs**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today: If all companies used TCO</td>
<td>Reshoring Initiative</td>
<td>~500,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>By 2015: If Chinese wage trends continue</td>
<td>BCG</td>
<td>1,000,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Better U.S. training, process improvement, automation, tax rates</td>
<td>~AMP (Advanced Mfg. Partnership)</td>
<td>2,000,000</td>
<td>4,000,000</td>
</tr>
<tr>
<td>End of offshore currency manipulation</td>
<td>Most mfg. trade groups</td>
<td>3,000,000</td>
<td>6,000,000</td>
</tr>
</tbody>
</table>

* # of jobs is cumulative. ** Assumes a low 1.0 Multiplier Effect.
The fastest and most efficient way to strengthen the U.S. economy

- Reshoring breaks out of:
  - The economic zero-sum-game of tax/borrow and spend.
  - The increases in consumer prices of relying solely on currency changes.
  - The waiting-for-policy-decisions problem.
- Assures that the pie grows, to the advantage of all Americans.
- Grows the pie by taking back what we earlier lost.
- Focuses on the manufacturing sector which has suffered so many job losses for decades.
- More efficient than exporting, stimulus programs or tax reductions.
Gaining support in Washington, DC

- **Commerce Dept:**
  - 2012 budget specifies TCO.
  - **Links:**
    - [http://nist.gov/mep/reshoring.cfm](http://nist.gov/mep/reshoring.cfm)
    - [http://business.usa.gov/program/reshoring-initiative](http://business.usa.gov/program/reshoring-initiative)
    - [http://www.manufacturing.gov/other_orgs.html](http://www.manufacturing.gov/other_orgs.html)
    - **Major new site:**
      - [http://acetool.commerce.gov/](http://acetool.commerce.gov/)
  - 6 rounds of free MEP webinars
  - Testified at Congressional hearing on 3/28/12
  - Working actively with SelectUSA

- **Calls from:**
  - United States-China Economic and Security Review Commission
  - White House National Economic Council
1/11/12 Insourcing Panel
$40 million

Criteria:
- Reshoring, FDI and/or retention
- Skilled workforce
- Sustainability/durability
- Public/private partnerships
- Impact

Organized by:
- Department of Commerce
- Department of Labor


Reshoring Initiative available to partner
But how do apprenticeships and credentials pay?

**Education pays...**

Education pays in higher earnings and lower unemployment rates

<table>
<thead>
<tr>
<th>Education Pays</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unemployment rate in 2011 (in %)</strong></td>
</tr>
<tr>
<td>Doctoral degree</td>
</tr>
<tr>
<td>Professional degree</td>
</tr>
<tr>
<td>Master's degree</td>
</tr>
<tr>
<td>Bachelor's degree</td>
</tr>
<tr>
<td>Associate degree</td>
</tr>
<tr>
<td>Some college, no degree</td>
</tr>
<tr>
<td>High school diploma</td>
</tr>
<tr>
<td>Less than high school diploma</td>
</tr>
</tbody>
</table>

**Average:** 7.6%

**Average:** $797


Note: Data are for persons age 25 and over. Earnings are for full-time wage and salary workers.


BLS has some data on the **employment status** of the civilian noninstitutional population 25 years and over by educational attainment, sex, race, and Hispanic origin online.

The Census Bureau also has some data on **educational attainment** online.
What can you do?

- Use the tools to source and sell. Free at [www.reshorenow.org](http://www.reshorenow.org)
- Use our archived webinars to inform staff and customers
- Work with groups being trained on TCO, e.g. MEPs
- Prepare your workforce for reshoring
- Call on the Initiative to speak at: open houses, webinars, customer industry conferences
- Submit cases of reshoring for publication and posting using our template. Add visibility to your company, industry and state
- Sponsor
Sell using TCO

- Focus on profit impact, risk management, strategic benefits
- Overcome mandates
- Many Supply Chain Managers believe
- Work with natural allies:
  - Lean, Green, compliance, quality, line management
- Match “Chinese” price or ……?
Some MEP references
$50MM Company was looking to move operations to Mexico from the Bay area, affecting 75 employees.

Manex employed TCO to show the total impact:
- Direct labor is significant but,
- Indirect and secondary costs (Warranty, travel, logistics, transportation, 3rd party subcontracting fees, worker safety etc.)

Company is relocating to a newer and larger facility in the East Bay and through lean efforts will reduce costs. Plan to double sales over next 5 years.
- Attractive real-estate pricing made the move a cost saver
- Can now add second shift operations

Source: Bill Browne, MANEX
A not-for-profit with 46 sponsors
A non-profit with 46 sponsors

Bronze

FESTO  
Stiles

DOOSAN  
MILLTRONICS

Iron

MANEX  
CNA  
Drma

Steel

Swiss Machine Tool Society  
Innovation in Manufacturing Conference

MWCC  
minnesota BUSINESS magazine

NAAMM  
USCT

INDUSTRIAL FASTENERS INSTITUTE  
Commerce Lexington

Starrag
Help slow the offshoring flood now!

Contact:
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847-726-2975
harry.moser@reshorenow.org
www.reshorenow.org

Recruiting trainees for the skilled manufacturing workforce:
http://tinyurl.com/33vpz9k