

Innovations

Distorted outsourcing decisions

Product redesign, not manufacturing outsourcing

The outsourcing of manufacturing to has become a major issue for manufacturers, especially in the USA and the UK. However, a few voices are now questioning the presumed logic of lower-cost manufacturing in Asia and China, pointing out that perhaps this lemming-like exodus has not been fully examined from a cost perspective. Business analysts such as Boston Consulting Group and Aberdeen Group are uncovering both the risks of outsourcing and the limited view most manufacturers have about what it costs them to produce their products. Adding to this argument, a new study now attacks longstanding assumptions about product cost, claiming that in many cases product redesign, not outsourcing to Asia, holds the real cost advantage for manufacturers.

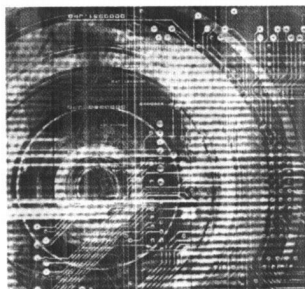
Through this benchmarking study "Improving product design practices would make US manufacturing more cost effective: a case to consider before outsourcing to China", the authors, Nicholas P. Dewhurst and David Meeker, argue that it is vital that companies do a much better job of integrating cost analysis into product design. If rigorous cost analysis was instituted as a foundation for product design, the study states, manufacturers would be able to develop innovative products that are more economical to produce in the West. Moreover, the study also shows that in many instances, a potentially better option for saving money is for manufacturers to redesign the product, rather than outsource its manufacture to other countries.

Myopic view of cost elimination

To support this idea, the study identifies two fundamental principles of design that many companies overlook when making outsourcing decisions. The first is that many manufacturers have become myopic in their pursuit of cost reduction. They are drawn by the lure of extremely low labor rates, and so rarely take the time to understand the significant potential for cost savings that better design can bring

Yet, the fact is that most of the cost of a product is fixed during design, and so in many cases the best place to find large cost reductions is through improving a design, not in manufacturing. Moreover, that it is often possible to redesign products to reduce part count significantly (often the major contributor to product costs) has been proven time and again, over many years, by companies who have been willing to reconsider the design of a product, using tools like Design for Manufacture and Assembly (DFMA).

DFMA is a methodology for evaluating part designs and the overall design of an assembly and its manufacture. It is a quantifiable way to identify unnecessary parts, and then simplify the product concept through part reduction strategies. These strategies involve incorporating as many features into one part as is economically feasible. The outcome of a design for assembly (DFA)-based design is a more elegant product with fewer parts that is



both functionally efficient and easy to assemble. The larger benefits of a DFMA-based design are reduced part and assembly costs, improved quality and reliability, and shorter development cycles.

Questioning the magic bullet of outsourced manufacturing

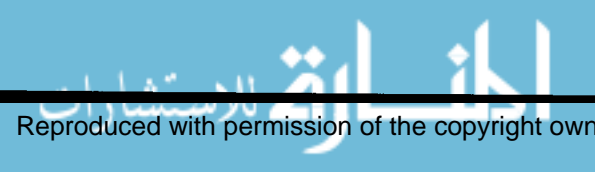
The second principle often overlooked, according to the report, is that for a realistic cost assessment it is necessary to account for all the additional costs associated with offshore manufacturing and to apply these to the product costs. Yet, outsourcing decisions are often made on the basis of cost benefits that are calculated solely in terms of incredibly low labor cost. Other costs, both tangible and intangible, are rarely taken into consideration because they are not allocated to the actual product but are paid for by the corporation from various other budgets.

The authors claim that they have come across a growing number of manufacturers who want to eliminate domestic manufacturing entirely in favor of outsourcing to China, but have little or no understanding of what the true costs really are. When asked about the real cost of producing, shipping, and distributing the products, they do not have an answer because they have "not done the math or thought it".

To highlight what should be included to calculate the true total cost of an outsourced product, the report identifies a number of costs – tangible and intangible – that need careful consideration, and determines their potential product cost impact:

- *Labor.* Assessing a move overseas always begins with labor rates, and unfortunately, often ends there. But, even so, this has to be examined. For example, the latest figures from the US Bureau of Labor Statistics (BLS) show labor rates for mainland China vary widely from \$0.33/hr to \$4/hr. However, the study authors caution against expecting a labor rate of \$0.33/hr. Often, setting up a manufacturing project usually requires the services of a third party acting as a broker in the deal, and these charge overhead on the labor as fees for their services. This overhead can be significant, increasing the true labor rate to about \$5.10.
- *Shipping and logistics.* As well as the basic shipping container costs, this should include the cost of associated land transport, customs and security, plus an estimate for inventory carrying costs and reduction in cash flow while products are in transit. Firms must also insure the cargo against loss. The study estimates that shipping and logistics can add 17 percent to the product cost.
- *Ancillary labor costs.* The study estimates that start and maintain a relationship with a overseas vendor a company spends an average of 1 percent of product cost on travel, communication and lost time, which is typically allocated to expense budgets, not manufacturing costs. In addition, the cost of developing a new vendor in China can run from 0.2 to 2 percent of product cost.
- *Quality costs.* In reality, outsourced product quality is often less than that of domestic products, and experiences suggest that these quality defect costs can run high. But, again, they are often paid for by warranty funds and never attached to the product cost. The study estimates that quality defects have a "conservative" average impact of 4 percent of product cost.
- *Miscellaneous costs.* The study also conservatively estimates that miscellaneous costs of outsourcing to Asia can add another 1 percent to the product cost.

Overall, the study claims that all the hidden costs, taken together, can add an extra 24 percent to the cost of a product manufactured overseas. Crucially the study notes that these estimates, based on the authors' experiences with various suppliers and product development companies, compare favorably with numbers actually quoted by a number of major US manufacturers.



The surprising case for design

Naturally, original equipment manufacturers (OEMs) who have made the move to China often contend that the severely reduced labor rates make up for any additional costs. However, the report stresses that it is important to recognize that the most significant part of a product's cost is typically not labor, but part costs. This is where the greatest potential for savings often occurs, and therefore it is crucial that manufacturers first use redesign to eliminate the hidden and unnecessary part costs that remain in their products, and then see whether it still makes sense to send manufacturing offshore. To emphasize this general conclusion, the study includes two investigations that quantify costs associated with manufacturing products in China. As the authors note, the results may surprise many.

The first case details the costs, cost savings, and potential cost of overseas manufacture for a Milwaukee Electric Tool power drill. By applying DFMA principles to the drill, it was found that the product could be redesigned to reduce costs significantly. Then using a labor rate of \$5.10, the cost of making the existing drill in China, was compared with the cost of making the redesigned model drill in the USA. Based on labor alone, the option of outsourced manufacture does give an illusion of savings. However, once the 24 percent adder is taken into account for all the costs involved in outsourcing, the bottom line is that it would actually cost slightly more to produce the existing drill in China, compared to redesigning the product with DFMA and manufacturing it in the USA.

To illustrate the case further, the authors point out that if the extra cost "adder" is halved to just 12 percent, the cost savings of outsourcing to China is only 8.5 percent, which is well below what 30 percent most companies typically seek before they will consider it worth the move overseas. Alternatively, if the labor rate is reduced to just 33 cents an hour, the resulting saving is only 2.2 percent over manufacture in the USA.

For the second case study, the authors worked with a consumer goods manufacturer to analyse the design of a major subassembly for one of the company's products. The aim being to determine whether manufacturing in China would be economical. Again, design analysis indicated that reducing the number of parts in the subassembly from 26 to 12 parts was a realistic goal that would result in a cost saving of 27 percent. This would bring the product cost to within a few dollars of the cost of manufacturing the existing unit in China, (parts and labor) and well below the cost if the cost adder associated with overseas manufacture is applied.

The obvious question

As the report concludes, these results confirm, albeit in a limited sample, that just blindly outsourcing a product for low labor rates is not always a good decision. In fact, when the potential for design improvement is considered along with a realistic estimate of the full costs of outsourcing, it could often makes more sense not to outsource manufacture.

Although this still leaves the obvious question; why not outsource the manufacture of the DFMA redesign? While this may be an option, note the report authors, it should certainly be pursued with caution. In the end, outsourcing a redesigned product may not save as much cost as promised unless companies can be sure the foreign supplier has the manufacturing capability in terms of labor skill, material availability, and quality standards that innovative redesigns often require.

Overall, the report calls for a closer look at the relationship between product design practices and outsourcing trends, and contends that with manufacturing capability being a serious concern for any nation, more needs to be done by all concerned to understand better the cost dynamics of product design and manufacture.

This benchmarking study "Improving product design practices would make US manufacturing more cost effective: a case to consider before outsourcing to China", co-authored by Nicholas P. Dewhurst, executive VP for Boothroyd Dewhurst Inc. (BDI), and David Meeker, a consultant with Neoteric Product Development, is available at www.dfma.com/truencost

Keywords:

Product design,
Product costs,
Outsourcing,
Labour,
Design for assembly,
Cost benefit analysis