

BUYER BEWARE—NEARSHORING, RESHORING, AND INSOURCING MOVING BEYOND THE TOTAL COST OF OWNERSHIP DISCUSSION

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ABSTRACT

There may be a manufacturing renaissance on the horizon for the U.S. The findings from this case study research suggests 1) manufacturing relocation decisions are primarily made in response to one or more trigger events, 2) the current manufacturing relocation shift is not perceived by manufacturers as a long-term business strategy (as is/was outsourcing) and 3) manufacturing relocation decisions based exclusively on models such as total cost of ownership (TCO) will not deliver anticipated near-term costs savings. In addition to TCO, firms must have access to information concerning the complexity of the outsourced manufacturer's manufacturing and supply chain processes in order to fully evaluate the 'as-is' outsourced function against 'to-be' manufacturing relocation opportunities. Implications for the Department of Defense are discussed.

THE LOCATION SPECIFIC MANUFACTURING SHIFT

For nearly 35 years, U.S. manufacturers have leveraged outsourcing as a predominant business strategy. Similar to commercial industry, during this time period the DoD has also relied extensively on original equipment manufacturers (OEMs) to design, build, field and sustain many of its most advanced weapon systems under loosely formalized, overarching programs such Public-Private Partnerships (PPP), Contractor Supported Weapon Systems (CSWS) and Contractor Logistics Support (CLS). In its infancy, outsourced manufacturing was seen as a way to minimize or eliminate those manufacturing functions which the focal firm did not consider a core competency or which did not directly add to the firm's competitive advantage in the market.

In more recent years, executives have viewed overseas outsourced manufacturing as a strategic approach for decreasing labor-related costs in the production of components, commodities and end items. While core competency and competitive advantage remain important focus areas, labor costs in overseas manufacturing markets are increasing and many firms are evaluating opportunities to relocate manufacturing nearer to, or even within, the U.S. or to within their own firm (insourcing). As location-specific manufacturing begins to shift (see Figure 1) from overseas outsourcing toward nearshoring, reshoring and insourcing, manufacturing, supply chain and DoD executives may find themselves facing very difficult relocation decisions. The outcome of any manufacturing relocation

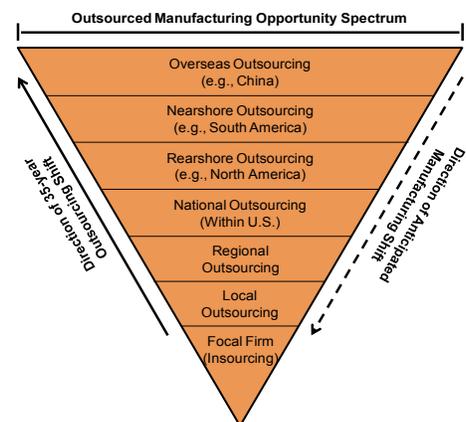


Figure 1. The Outsourcing-to-Insourcing Shift

decision may systematically alter the focal organization's global manufacturing and supply chain strategies.

For more than three decades, outsourcing has been exhaustively studied by industry professionals and academic researchers alike. Collectively they have developed comprehensive answers to the 'why?', 'how?', 'what?', 'where?' and 'when?' outsourcing-related questions (for example, see Hatonen and Eriksson, 2009). The outsourcing-to-insourcing manufacturing shift will also provide abundant opportunities to address these same questions from different perspectives in the years ahead. There is an undeniable focus on revitalizing the U.S. manufacturing sector and for academic researchers to make value-added contributions to this outcome (Gray *et al.*, 2013). Unfortunately for today's decision makers, there are very few industry-specific 'lessons learned', and even fewer academic journal articles they can reference to help guide them through the myriad of manufacturing and supply chain complexity issues they will undoubtedly face as the anticipated location-specific manufacturing shifts occur.

We also recognize there may be firms who are relatively new to the 'manufacturing renaissance' discussion (e.g., see B. McMeekin & McMackin, E. Reshoring U.S. manufacturing: A wave of the present. September 2012, *BusinessClimate.Com*). As Charles Fine (2000) identified, industry business cycles are dynamic and there identifiable mechanisms which force industries to change over time. Fine's research centers on the speed at which supply chain evolution occurs in industry. His findings provide insight into the foundational principals of supply chain design concerning outsourcing and equally apply to the manufacturing relocation shift of nearshoring, reshoring and insourcing. For those firms entering into the discussion, it appears this information will support any firm-level effort to develop a strategic approach for evaluating current outsourced manufacturing relationships and help position the firm for success in any future manufacturing relocation decisions.

We have prepared this manuscript as an initial information framework for decision makers, regardless of where they are in their manufacturing relocation decision making process. Our findings will benefit those firms just beginning to discuss options for relocating manufacturing functions as it will help them identify critical pre-decision information gaps.

METHODOLOGICAL APPROACH

During a recent 18 month period we have worked with 12 large, mid-size and small manufacturing firms to gain an in-depth understanding of the critical information needed by senior decision makers prior to entering into a manufacturing relocation decision. We would like to thank the following firms for their support of this study: AeroJet, American Axel Manufacturers, Cox Manufacturing, Deere & Company, E&R Industrial, Evenflo, M2 Global Technologies, PEPSICO, Pratt & Whitney, Sulzer Metco, The Triumph Group, and Westinghouse.

Qualitative research methods were selected to support this research since the primary focus was to address 'why' questions concerning the outsourcing-to-insourcing manufacturing relocation shift. As the research centers on 'why' questions concerning the outsourcing-to-insourcing manufacturing relocation shift, Yin (2009) and Ellram (1996) suggests that qualitative, exploratory case study research is appropriate. This is in part due to the uniqueness of the contemporary event where there is little prior understanding of the phenomenon. Coughlin and Coghlan (2002) recommend use of qualitative research methods to develop models and theories to explain current phenomena such as the manufacturing relocation shift.

Sample Size

Pratt (2009) states, “unlike quantitative research ... there is no magic number of interviews or observations that should be conducted in a qualitative research project. What is ‘enough’ depends on the question a researcher seeks to answer.” Witt and Redding (2009) suggests qualitative research methods usually make a trade-off between sample size and depth of research detail. Eisenhardt (1989) suggests there is no ideal number of cases but 4-10 cases have worked well for most qualitative studies. Her rationale is that researchers using less than 4 cases will find it difficult to convince readers of sufficient empirical grounding while those dealing with more than 10 cases may find it difficult to “cope with the complexity and volume of data,” gathered. Ellram (1996) identifies the use of 6-10 cases for qualitative research as a sample size sufficiently large enough to properly evaluate a set of research propositions. This body of research was developed using 30 interviews completed with 12 different companies, and incorporates findings from 14 specific manufacturing relocation case studies. Information from the interviews and cased studies was used to examine elements of location specific manufacturing relocation shifts.

Data Collection and Analysis

Our approach was to gain insight into the experiences of senior executives and managers familiar with the rationale and objectives which lead to the manufacturing relocation decision. First, during the data design phase, we applied insights gained from the extant literature to develop an interview questionnaire. The primary and secondary questions were developed in such a manner as to allow the participants to share their unique perspectives. The interview questions were validated by colleagues who were experienced researchers with extensive knowledge of the outsourcing literature. Secondly, we selected participants based on their positional responsibilities and understanding of the firm’s insourcing strategies.

A total of 30 interviews were conducted with “persons who are best informed” (Voss, *et al.*, 2002 pg. 206) of the firm’s views on the outsourcing-to-insourcing shift and specific insourcing cases. Each interview participant agreed to provide access to company information, historical records and additional supporting personnel which would round-out the collection of relevant information. Twenty nine structured and semi-structured in-person interviews were conducted with executives and senior managers familiar with their respective firm’s manufacturing relocation decision making processes, procedures and outcomes (one additional interview was conducted via telephone). All 30 interviews were digitally recorded, professionally transcribed then synthesized thorough coding and analysis to produce this original research.

RESEARCH FINDINGS

Making executable and supportable decisions concerning outsourced manufacturing functions requires decision makers to evaluate a broad spectrum of information. In considering opportunities to shift or relocate outsourced manufacturing, access to information is critical. We found the information used by decision makers whose managers were directly involved in the outsourced manufacturing functions and upstream supply chain structures was much more accurate and complete than the information used by firms who predominantly focused only on known or assumed cost-related factors.

We also discovered a high degree of inconsistency associated with the inclusion of process complexity factors as critical information inputs needed by decision makers prior to beginning the manufacturing relocation decision making process. In several cases we reviewed, the importance of considering process complexity factors, in addition to financial factors, was not discovered until late into the

relocation decision making process, or worse, after the relocation decision had been made. Therefore, we suggest firms move beyond the total cost of ownership (TCO) discussion for manufacturing relocation decisions.

TCO, as generally applied, includes cost-related elements of interest which can be quantified and traced directly to a specific cost allocation strategy. Some TCO models may include upwards of 20 or 30 different data elements which are required in order to populate the full model. For large firms, with experienced staffs qualified to create the objective financial data or develop assumption-driven financial data, running full-scale TCO models may be appropriate (Ellram and Voss, 1995). TCO models can also be tailored and many mid-size and small firms tailor their TCO model in order to create high-level cost comparisons. This normally includes costs allocated to overhead, fixed plant and equipment, labor (direct and indirect), inventory (e.g. acquisition and carrying costs), distribution and transportation, and cash-to-cash cycle times. In either case, cost-based decision making looks for opportunities which afford the firm the ability to recognize a reduction in total ownership cost (RTOC). If the initial model output does not produce an acceptable RTOC, firms may re-evaluate TCO assumptions and re-run the model (Figure 2).

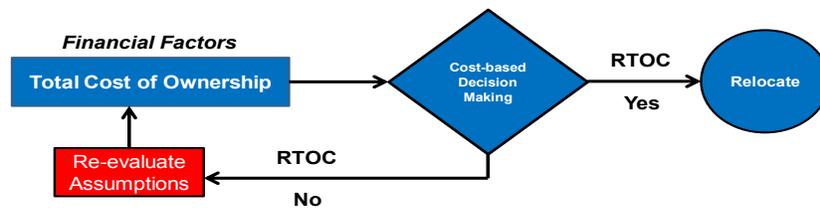


Figure 2. Cost-based Decision Making Approach

In addition to financial factors, including the re-evaluation of modeling assumptions, firms needed accurate and complete information about the outsourced manufacturer’s manufacturing and supply chain processes. Firms identified the need to access process-related information in order to fully evaluate the ‘as-is’ manufacturer against any ‘to-be’ relocation opportunity.

The challenge for decision makers is to determine what financial and process complexity factor information is needed and then to select the best approach for obtaining the information given the relationship between the focal firm and the outsourced manufacturer. In hindsight, determining that evaluating financial factors alone was insufficient, firms recognized the key question that needed to be addressed prior to entering into the relocation decision process was, “how much information do we have about our current manufacturer’s costs, manufacturing processes and supply chain structure?” Without this information, embedded manufacturing and supply chain structure complexities often adversely affected the evaluation outcome and ultimately the achievement of near-term cost savings, productivity and quality improvements, and the firm’s ability to achieve internal or customer-driven performance targets. This is best exemplified by one decision maker’s statement, “*it was a selection criteria mistake early in the process. We made the decision without understanding all of these things. We went to a new supplier that had never done (manufactured) the products...we went to them because of costs and at the end of the day neither the design nor the manufacturing ability was there to do it economically and it was a huge mess for both of us.*”

Throughout our analysis of relocation decision making processes, it became increasingly clear to us that firms lacked a detailed understanding of the process complexities embedded in their outsourced manufacturing relationships. This lack of understanding limited the decision makers’ ability to identify and then obtain the information needed to fully evaluate the spectrum of manufacturing relocation options.

The need to produce near-term results often serves as the mechanism for change. For example, we did not find evidence that firms have fully embraced nearshoring, reshoring and insourcing as a corporate strategy. Instead, in each and every case there was a unique trigger event which caused the firm to begin discussing the possibility of relocating the outsourced manufacturing function.

The primary drivers for relocating outsourced manufacturing workload most often referenced were cost reduction, quality improvement, and productivity improvement. Example triggers cited included unanticipated costs increases from the manufacturer, inability of the manufacturer to consistently meet quality and delivery standards, and the need to improve the firm's internal equipment and capacity utilization to better distribute overhead costs.

Because the relocation decision making process began as a response to a trigger event, superficial and easily obtainable financial or cost-related factors often served as the primary criteria to evaluate relocation options. In our discussions with senior decision makers, we discovered that there were very few who had access to complete information concerning the complexities of existing outsourced manufacturing functions. This further supports our findings that many of these relocation decisions were near-term reactions to one or more trigger events and not part of a strategic manufacturing relocation plan where financial factors and process complexity factors should have been developed and evaluated. It was these insights which lead us to create an information flow framework that identifies critical information flows associated with financial and process complexity factors.

Critical Information Flows

Our findings support development of financial factors using TCO modeling, full or tailored depending upon the firm's unique requirements (e.g., see http://www.reshorennow.org/TCO_Estimator.cfm). However, as stated earlier, financial models alone have proven insufficient for identifying the hidden costs associated with engineering design and manufacturing, and supply chain structure complexity factors. We illustrate these critical information flows in Figure 3 where we incorporate financial factors and process complexity factors in parallel (Bozarth, et. al. 2009). Here we are suggesting independent development and analysis of financial and process complexity factors but also recognize that there are critical information flow linkages between these overarching factors.

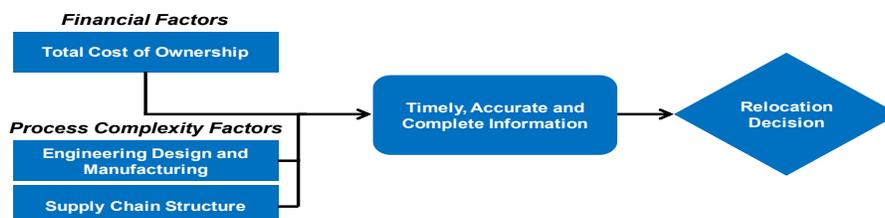


Figure 3. Financial and Process Complexity Factors

Experience garnered from participating firms has shown that process-unique complexities must be considered by decision makers. Obtaining process complexity information may prove to be a time consuming and difficult task. We discovered that a firm's access to process complexity information heavily depends on three factors, 1) type of firm-manufacturer relationship in place; 2) firm's ability to control or influence specific process elements within the relationship; and 3) duration and quality of the firm-manufacturer relationship.

At its height of appeal as a business strategy, firms entered into outsourced manufacturing relationships expecting to recognize immediate benefits (e.g., lower production costs). Many of these relationships were developed focusing on near-term objectives and, therefore, the focal firm may not have considered

the strategic implications of their relationship development decision. In many cases, the type of relationship formed directly affected the firm's ability to access process-unique information needed as a baseline for evaluating the 'as-is' outsourced manufacturer against any 'to-be' (i.e., nearshore, reshore, insource) manufacturing relocation opportunity.

Implications for the Department of Defense

In spite of their great appeal (e.g., increased weapon system availability), the outsourcing strategies used by the DoD since the early 1980's have created a near-term tipping point for the DoD depot infrastructure—a point where the DoD as a whole (vs service-specific) will no longer meet congressionally mandated core (OMB A-76) and 50/50 (USC Title 10, 24) requirements—forcing DoD senior acquisition executives to re-examine the full spectrum of workload outsourced to OEMs. Our research suggests that using TCO as the primary evaluative model will not provide decision makers with the detailed information needed to fully examine process complexity factors such as engineering design and manufacturing, as well as supply chain structures. The 2011 attempt by the USAF to insource the sustainment of the Boeing C-17 aircraft to Warner-Robins Air Logistics Center is a specific (but not unique) case study which clearly illustrates the negative (and costly) consequences DoD executives may face if they rely predominantly on cost related factors, to the exclusion of process complexity factors, as the basis of support for any manufacturing and/or sustainment relocation decision.

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