

Manufacturing relocations and performance: A contingency perspective

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Abstract

We analyse the impact of manufacturing relocation directions and ownership on operational performance, and analyse if these effects are contingent upon strategy, network size, or plant ownership. We use survey data from 373 Swedish manufacturing plants. Network size and relocation strategy have strong moderating effects for both directions (offshoring or backshoring) and ownership (internal or external relocations), such that plants in networks outperform single plants and having a corporate-wide relocation strategy strengthens the performance. However, plant ownership (domestic or foreign-owned) has mixed effects.

Keywords: Shoring, Sourcing, Survey.

Introduction

Manufacturing firms are constantly exploring new avenues of performance improvements to be competitive on a global scale, in order to provide the best support for their products in the market place. Relocation of manufacturing has become a vital component in this search for operational excellence. The manufacturing location decision is central to business strategy and of crucial concern to most manufacturing firms, since location decisions normally have a long-term impact on the competitive position and profitability of the firm (Gylling et al., 2015). The relocation of manufacturing tasks to countries in Eastern Europe and East Asia have been driven by cost-saving strategies (Bailey and De Propriis, 2014). However, many companies have failed to accurately weigh the costs against the benefits, and have encountered difficulties with e.g. low quality, long lead-times or complications with communication and coordination. This has led some firms to reconsider their previous offshoring decision and bring manufacturing back to the home region, i.e. backshoring. Consequently, the options for manufacturing relocations include both offshoring and backshoring, and some firms are actively seeking to achieve an optimal global operations setup, i.e. rightshoring. Stentoft et al. (2016) propose that more research is needed to gain a better understanding of the backshoring phenomenon and how it relates to offshoring.

Offshoring and backshoring are different from outsourcing and insourcing, since the former is concerned with geography and the latter with ownership. Relocation of manufacturing does not necessarily have to imply a change in ownership. Multi-plant corporations have the possibility to move production between plants in their own

manufacturing network, aiming to gain insights on markets, products, and processes by managing a group of plants as a manufacturing network (MacCormack et al., 1994).

We aim to investigate manufacturing relocation in two dimensions: (i) direction, i.e. the geographical change in terms of offshoring and backshoring (the “shoring” decision), and (ii) ownership, i.e. whether this change is managed within the manufacturing network of the company or to or from other partners (the sourcing decision). In addition, we investigate the effect on operational performance, and the contingencies related to strategy, network size, and plant ownership. Since there are no previous such studies, this research is fundamentally of an exploratory nature.

We focus on manufacturing relocations from and to Sweden. Manufacturing has played an important role for economic growth and social welfare in Sweden because of a historically strong trade balance, and Swedish firms have in general been quite active in rearranging their manufacturing footprint and have experience from both offshoring and backshoring. Sweden is hence an appropriate geographical area to study in this context.

We first discuss the related literature. Then, we present the research design and methodology. The main section is concerned with the results from the survey. We conclude by discussing implications for researchers and managers, as well as limitations and further research.

Related literature

In this study, we are interested in both in the ownership aspect (i.e. make internally or buy from an external partner) as well as the location aspect, in this case the direction of the movement (i.e. offshoring or backshoring). These are the two key dimensions in this research. Figure 1 displays the relocation combinations of internal and external offshoring and backshoring. Four possible types of manufacturing relocation are identified. First, “captive offshoring” implies that manufacturing is relocated from the focal plant to a foreign plant within the company. Second, “captive backshoring” is the activity when manufacturing is returned from a foreign plant owned by the company back to the focal plant. Third, “outsource offshoring” implies that manufacturing is outsourced to another manufacturer (supplier or contract manufacturer) in another country, and finally “insource backshoring” is the case when manufacturing is returned from an external manufacturer in another country to the focal plant.

		Direction	
		Offshoring	Backshoring
Ownership	Internal	Captive Offshoring	Captive Backshoring
	External	Outsource Offshoring	Insource Backshoring

Figure 1 - Categorisation of manufacturing relocation with respect to internal and external offshoring and backshoring.

Direction: offshoring and backshoring

The manufacturing location decision is part of the manufacturing firms’ business strategy (Tate et al., 2014), and offshoring and backshoring are two of the available strategic options when it comes to manufacturing relocation (Fratocchi et al., 2014). Manufacturing firms have moved business functions to foreign locations for the past 50 years, and offshoring has grown to become a mainstream business practice. In the literature, it has often been used interchangeably with the outsourcing concept, though

recent definitions make clear distinctions between the location decision and the ownership decision. Mihalache and Mihalache (2016) define *offshoring* as “the assignment of business activities to locations outside a firm’s national borders in order to support existing business operations”. With this definition, they emphasise the geographic aspect of offshoring as well as the strategic focus on optimising the value chain rather than merely getting access to foreign markets. *Backshoring* was first defined in academia as “the geographic relocation of a functional, value creating operation from a location abroad back to the domestic country of the company” (Holz, 2009). Since then, a number of terms and definitions have been proposed and discussed, such as reshoring, re-insourcing etc., (see e.g. Kinkel, 2012; Ellram et al., 2013; Gray et al., 2013; Kinkel, 2014; Tate et al., 2014; Fratocchi et al., 2016). However, in this study we use the term backshoring to make clear that we investigate the move back to the original location of manufacturing.

According to Mihalache and Mihalache (2016), *offshoring* has increased during the past years and is expected to continue to grow in the near future, even though there is no consensus regarding the absolute extent of the activity. Traditionally, offshoring has been focused on manufacturing or assembly operations, and it is still more common to offshore simple than advanced tasks (Lewin and Peeters, 2006; Jensen and Pedersen, 2012). However, firms have increasingly started to offshore more complex tasks, even though they are careful not to offshore activities regarded as the core competence of the business (Lewin and Peeters, 2006). There are a number of studies on the drivers and motives of offshoring (Lewin and Peeters, 2006; Kinkel et al., 2007; da Silveira, 2014; Waehrens et al., 2015). Even though research often has a multi-dimensional perspective, empirical results concurrently point to cost as the dominant driver of offshoring. According to Mihalache and Mihalache (2016), offshoring has even been defined as a cost-reducing strategy. Lewin and Peeters (2006) found that even though offshoring has become a mainstream business practice, most offshoring firms have no formulated corporate-wide strategy for planning and guiding the activity. Instead of a top-down strategy, the offshoring process – more or less without exception – starts with improvisations and experiments at the bottom-up level (Lewin and Peeters, 2006). This is a surprising finding, because having a corporate-wide offshoring strategy is important for cost performance (Massini et al., 2010). Massini et al. (2010) compared cost savings between offshoring firms with and without strategy and found that firms with an offshoring strategy performed significantly better than the ones without.

Even though companies have moved manufacturing in both directions for quite some time, *backshoring* is a relatively new phenomenon to academia. A number of survey studies have been conducted to provide quantitative evidence on a possible trend (see Kinkel and Maloca, 2009; Kinkel, 2012; Canham and Hamilton, 2013; Ellram et al., 2013; Tate et al., 2014; Stentoft et al., 2015). The results differ slightly from study to study, but the common picture is that even if offshoring of manufacturing has decreased to some degree, the extent of backshoring will not outpace offshoring within the nearest future. Backshoring is mainly done from Eastern Europe, China and the rest of Asia. In contrast to offshoring, there are a number of drivers for backshoring in addition to cost, such as e.g. quality, time and flexibility, access to skills and knowledge, market access, etc. (Stentoft et al., 2016). In essence, backshoring is driven by contextual factors that could be considered as temporary. When the conditions that determine the optimal manufacturing location changes, companies need to be flexible and reassess the manufacturing location decision (Pearce II, 2014; Tate et al., 2014).

Ownership: internal and external relocations

The ownership dimension of manufacturing relocation is related to whether the relocation implies a change in ownership (from buy to make or from make to buy) or not. Even though there is a continuum of alternative combinations when it comes to decide whether to make or buy, research primarily focuses on full ownership and full outsourcing (Mihalache and Mihalache, 2016). *Outsourcing* is defined by Ellram and Billington (2001) as “the transfer of the production of goods or services that had been performed internally to an external party”. Even though the decisions regarding location and ownership are two separate, they are faced by firms simultaneously and should therefore be considered simultaneously in order to optimise the decision (Mudambi and Venzin, 2010). However, only few studies on offshoring consider the ownership decision (Mihalache and Mihalache, 2016). The available studies are based on transaction cost economics, i.e. they are viewing outsourcing as a tool to minimise transaction costs (Mihalache and Mihalache, 2016); if the cost of performing the activity within a firm is lower than what the market can offer, then the activity should be performed internally. However, if the market can perform the activity with a lower transaction cost, then the activity could be outsourced to an external supplier as this allows the organisation to use the advantages of the supply market (Hätönen and Eriksson, 2009). The decision then depends on the degree of uncertainties and structural risks connected with outsourcing, such as lower control over operations, quality of relationship with supplier and loss of competences at home. In general when it comes to offshoring, the make-or-buy decision implies that the risks of outsourcing are compared to the costs of setting up and running the foreign operations internally (Mihalache and Mihalache, 2016). Mudambi and Venzin (2010) argue that it is too difficult for firms to consider all possible scenarios and make adequate calculations on the costs versus benefits. Therefore, firms may set up strategic guidelines that help them to limit and prioritise their options. The location may be the primary decision when the home country has lost its competitive advantage of performing the activity. On the other hand, the ownership may be the primary decision when the firm is no longer competitive in performing the activity or if the activity is a core competence of the firm (Mudambi and Venzin, 2010).

In contrast to outsourcing, *insourcing* is the activity of reincorporating an outsourced activity back within the boundaries of the firm (Foerstl et al., 2016). It has two main attributes, according to Foerstl et al. (2016). First, it implies a reduction or termination of production volume that has been subcontracted to an external supplier, and second, it demands creation of a new or updated governance structure within the own organisation. Insourcing often occurs together with backshoring. Bals et al. (2016) analysed backshoring cases from the business press and found that most firms also changed the ownership of the operations from offshore outsource to domestic in-house.

There are thus many options and set-ups available regarding the location and ownership of a firm, and firms are increasingly developing complex international manufacturing networks in order to improve their performance and stay competitive. However, keeping the activities within the boundaries of the own firm instead of outsourcing them demands a higher level of vertical integration (Mudambi and Venzin, 2010). This is easier to achieve in a multi-plant network, where there are more opportunities to keep the manufacturing relocation within the boundaries of the firm. As a single-plant, there are no other plants within the network to engage with and the firm needs to seek options external to the organisation.

Performance

The literature on performance effects of manufacturing relocation gives a scattered and inconsistent picture. In theory, there are a number of benefits with offshoring that would motivate the relocation of manufacturing, such as cost advantages (lower labour and production costs), access to resources, talented and qualified labour as well and innovation capabilities, proximity to customers and suppliers, etc. (Roza et al., 2011; Ancarani et al., 2015). However, previous studies give no clear answer, as the results regarding the returns on offshoring in terms of performance effects are unclear or mixed. The reason could be that performance is contingent upon certain aspects of offshoring, as indicated by several studies (Bhalla et al., 2008; Lo and Hung, 2015).

Backshoring has also been associated with a number of benefits. By bringing manufacturing home, the costs per unit produced can be lowered, improving economic performance of the firm (Drauz, 2014). In addition, the results of a Danish study showed that the vast majority of backshoring firms had improved quality, delivery and flexibility performance to a very high or high degree (Stentoft et al., 2015).

Synthesis

The related literature thus indicates that direction and ownership are important dimensions for manufacturing relocation, but also that relocation strategy and network size can be important contingencies concerning the impact of relocation on performance. In addition, we will explore the role of plant ownership, based on the presumption that foreign-owned plants may be more susceptible to move production from the host country than domestically owned plants.

Research design and methodology

Survey design, data collection and respondents

The survey was designed and processed in accordance with general guidelines and recommendations in e.g. Forza (2009). Before distribution, the questionnaire was pre-tested with both practitioners and researchers that are familiar with survey research in order to assure high quality and accuracy of constructs and questions. The same set of questions was used for both offshoring and backshoring to be able to detect significant differences in any respect between relocation directions. Most items are perceptual with a five-point Likert scale.

The survey targeted all plants in Sweden with more than 50 employees in all manufacturing industry categories (SIC code 10-33), wherefore the target population is 1637 plants. It was distributed in English and Swedish versions and data were collected in September and October 2015. In total, 373 usable responses were received, which implies a response rate of 22.8%.

In this study, the unit of analysis is the plant. The vast majority of the respondents, 47.1%, are production managers, 30.6% are plant directors or managers, 9.4% are global operations directors, and 5.6% are supply chain directors. Based on the respondent positions and the average number of years they have worked in production and operations management (13.8 years), it is fair to assume that they have a good knowledge on manufacturing relocations. The distribution of respondents with respect to plant size and industry is a good representation of the entire population, with a slight overrepresentation of large plants.

Results

The respondents are grouped into four categories based on relocation direction: (i) 48 plants have only done backshoring, (ii) 82 plants have only done offshoring, (iii) 51 plants have moved manufacturing in both directions, and (iv) 192 have stayed at home, i.e. no relocation during the last five years (“non-movers”). Similarly, each plant is grouped into one of four categories concerning potential ownership changes associated with the manufacturing relocation: (i) 55 plants have only relocated internally, (ii) 25 plants have only relocated externally, (iii) 101 plants have moved manufacturing both internally and externally, and (iv) 192 “non-movers”.

Measuring operational performance

We measure operational performance by using the traditional set of competitive priorities, i.e. quality, delivery, flexibility and cost. Cost is measured through three items: unit cost, total cost, and productivity. The respondents were asked to indicate to what extent they have reduced cost and improved productivity during the last three years, and whether they are among the leaders in their industry in terms of product quality, delivery lead-times, and flexibility. All items use a five-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5), and where (3) indicates “neither agree, nor disagree”. In order to test if and how the operational performance measures relate to one another, we performed an exploratory factor analysis (EFA). The EFA showed that all three cost-related performance measures loaded on one component, and product quality, delivery lead-time, and flexibility (QDF) loaded on another component. Thus, both constructs provide solid interpretations. The Cronbach alphas were satisfactory, all factor loadings were high within each component, and cross-loadings were low, indicating high reliability.

The impact of relocation direction on operational performance

The direct effect of offshoring and backshoring of manufacturing on performance is shown in Table 1. We distinguish between those plants that have only experienced offshoring during the last five years (82 plants), those with only backshoring (48 plants), those that have done both (51 plants), and those that have not moved manufacturing in any direction (192 “non-movers”).

Table 1 - The impact of the direction of manufacturing relocation on operational performance.

Category	N	Cost perf.	QDF perf.
Only offshoring	82	3.95	4.04 ^c
Both directions	51	3.93	4.09
Only backshoring	48	4.03 ^b	4.32 ^{b,c,d}
Non-movers (stay at home)	192	3.87 ^a	4.10 ^{a,d}

^a = difference is significant at the 0.01 level,

^{b,c,d} = difference is significant at the 0.05 level.

Table 1 shows that the backshorers (i.e. plants that had only backshored) significantly outperform both the offshorers and the non-movers in terms of QDF performance. This indicates that backshoring can support the manufacturing goals of quality, delivery and flexibility. In addition, we see that both the backshorers and the non-movers have significantly higher QDF performance than cost performance. The other plants also perform better on QDF than on cost, albeit not significantly better. These results align well with the perception that plants in Sweden are not there for cost reasons, rather for performing well on other criteria, such as quality, delivery and flexibility.

The impact of relocation ownership on operational performance

The direct effect of the ownership (or change thereof, when the manufacturing is being relocated) on performance is shown in Table 2. We distinguish between those plants that have only moved manufacturing internally (55 plants) during the last five years, those with only external relocations (25 plants), those that have done both (101 plants), and those that have not moved manufacturing in any direction (192 non-movers).

Table 2 - The impact of the ownership of manufacturing relocation on operational performance.

Category	N	Cost perf.	QDF perf.
Only internal	55	3.82 ^a	4.20 ^a
Both internal and external	101	4.05	4.16
Only external	25	3.98	3.89
Non-movers (stay at home)	192	3.87 ^b	4.10 ^b

^{a,b} = difference is significant at the 0.01 level

Table 2 shows that there are no significant differences between the groups, neither in terms of cost performance nor in QDF performance. This indicates (compared to off- and backshoring) that the role of internal versus external relocations is minor. However, the plants that have been involved in internal relocations only perform significantly better on quality, delivery, and flexibility than on cost, i.e. the relocations seem to have strengthened QDF performance relative cost performance – at least in relation to other plants that have moved externally or both internally and externally. The result concerning the non-movers have been commented already in the previous section; however, this result is included in Table IV as a control group (point of reference).

Contingencies

The contingency effect of corporate-wide relocation strategy

First, we investigated whether the impact of relocation direction (off- and backshoring) and ownership (internal and external relocation) on cost and QDF performance is contingent or not upon having a corporate-wide relocation strategy. The respondents were asked to state whether they have a corporate-wide relocation strategy or not, i.e. a “yes” or “no” response. The results are striking: having a relocation strategy strengthens the performance effect in 15 of 16 cases (four relocation groups and four ownership groups, and two performance constructs). The only (but minor) exception is QDF performance for plants with only backshoring. This result confirms the notion that strategy is important and can be transformed into performance advantages, see e.g. Swamidass and Newell (1987).

The contingency effect of network size

Second, we investigated if the impact of relocation direction and ownership on cost and QDF performance is contingent upon the size of the manufacturing network. Network size is related to the number of plants in the network to which the focal plant belongs; either the plant belongs to a multi-plant network or is the single plant in the company. Again, the results are striking, in that 15 of 16 cases indicate the same type of contingency effect; belonging to a multi-plant network strengthens the performance effects (the only exception is the group with only external relocations, which exhibits a slightly higher QDF performance for the single-plant group). This result supports the statement by MacCormack et al. (1994) that multi-plant firms can gain insights on markets, products, and processes by managing a group of plants as a manufacturing network. Even the multi-

plant firms that have not relocated manufacturing during the last five years perform better than their single-plant counterparts. Thus, there are advantages to be gained by belonging to a multi-plant network, at least for plants located in Sweden.

The contingency effect of plant ownership

Third, we investigate if the impact of relocation direction and ownership on cost and QDF performance is contingent upon the ownership of the focal plant; the plant is owned either by a Swedish firm or by a foreign firm. Here, the results are mixed as shown in Figure 2. The Swedish-owned plants that (i) both offshores and backshores, (ii) offshores, and/or (iii) relocate both internally and externally outperform their foreign-owned counterparts for both cost and QDF performance. Thus, Swedish-owned plants that move a lot manage to gain performance advantages, which suggests that these are relatively better at balancing and locating manufacturing. The reverse is true for those plants that (i) only backshores, (ii) only relocates internally, and (iii) do not move manufacturing at all. In particular, the first result (see Figure 2, sections a and b) shows that foreign-owned plants that only backshore (to the Swedish plant) strongly outperform their Swedish-owned counterparts in both cost and QDF performance. This result indicates that foreign-owned plants operating in Sweden can both grow (backshoring effect) and prosper (performance effect). These plants are thus receivers of manufacturing relocations, which suggests that they have a clear strategic role within the foreign-owned firm.

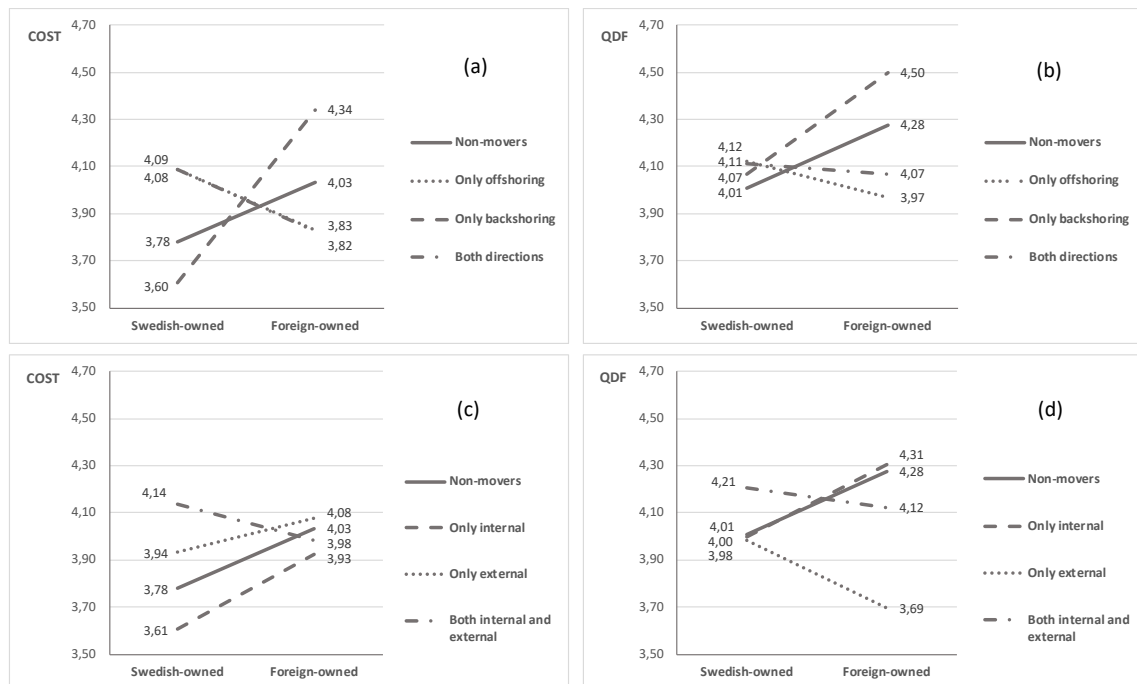


Figure 2 – The moderating effect of plant ownership on the impact of relocation direction and ownership cost and QDF performance (QDF: quality, delivery, and flexibility).

Discussion and conclusions

The overall view is that Swedish plants have been quite active in relocating manufacturing, since 133 plants (35.7%) have experienced offshoring and 99 plants (26.5%) have experienced backshoring during the last five years. No less than 156 plants (41.8%) have experience from internal relocations, i.e. relocations within their own multi-plant network, and 126 plants (33.8%) have experienced external relocations, i.e. to or from other manufacturers (outsourcing and insourcing).

The most obvious *implication for managers* from this research is the importance of having a corporate-wide location strategy, since these plants outperform other plants on cost, quality, delivery and flexibility. In addition, it is advantageous to belong to a multi-plant manufacturing company, since plants in networks generally outperform plants of single-plant companies on cost, quality, delivery and flexibility. The degrees of freedom in locating and relocating manufacturing increases with the number of plants in the network. In deciding who should be doing what, it is possible to take advantage of the relative competences each plant possesses. In addition, the positive aspects of backshoring are not negligible – instead, bringing manufacturing back can help build and strengthen competitive advantage on all operational performance measures.

An *implication for researchers* is that this study shows that relocation direction seems more important than the potential change of ownership. Since the focus of this study was on offshoring and backshoring, i.e. a change in geographical location, and whether these relocations were made internally, i.e. within the company or externally, we did not capture the two combinations of domestic outsourcing or domestic insourcing, which can be analysed in further studies.

A *limitation* of this study is its geographical focus on Swedish plants. It would be of interest to survey other parts of the globe. While survey research can provide the broad picture and statistically significant results, it cannot provide the details and situation-specific contingencies of case studies. Therefore, *further research* using in-depth case studies is needed for more detailed understanding of the interaction between manufacturing relocation, strategy, and performance. In particular, plants that have both offshored and backshored have a unique background for in-depth case studies to understand the rationale, merits, and pitfalls of relocating manufacturing in each direction and how the directions jointly can help to balance the manufacturing network.

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