The interactive decision when outsourcing new product development

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Abstract

This article focuses on the outsourcing of new product development (NPD) in medium-sized firms, and it specifically focuses the decisions connected to outsourcing. Although the model presented in the article is probably useful for small and large firms, the firms in the empirical study are medium-sized. NPD is a knowledge-intensive line of activities that requires the ability to handle uncertainties and it is very dependent on the individuals involved in the process. In this way it differs from production, which (especially when producing standard items on a large scale) is easier to control, monitor and evaluate the costs.

Outsourcing can lead to advantages in the form of lower costs, access to knowledge or other resources (labs, funding etc.) as well as access to new markets, but it can also result in a knowledge drain, lower motivation among in-house staff or an increased level of dependency on external organisations. A decision model is presented in this article that describes the decision process when outsourcing NPD.

Keywords: Outsourcing decision, NPD, outsourcing of NPD, SME

Introduction

The decision of whether to outsource or not is not an easy one. Even if the costs per hour are lower in some economies, other effects (e.g. alternate costs or lower quality) may appear. As a CEO from our study says: “it is like sending your baby to boarding school. Someone else will be looking after your child.” Another difficulty is how to assess costs. The firm might get access to new competences at a low cost, but it might also drain the in-house competences. An R&D manager from our study said: “Eight years ago we could not afford to build our own product development lab, but counting all our costs over the years to run this outsourcing business, we could in fact probably have funded it ourselves.” He meant that there might be a lower cost per hour agreed in the contract, but also higher costs generated for monitoring and control. Therefore, the outsourcing decision is sometimes referred to as “right-sourcing”, pinpointing that outsourcing is not always the right way to find critical knowledge and lower overall costs. The outsourcing decision is certainly more complex when knowledge-intense activities like new product development (NPD), rather than producing components, is the object to be outsourced.

In this article, the outsourcing of NPD refers to the outsourcing of development activities for developing new products (goods and/or services), where all or the innovative part of the NPD process is purchased externally according to a contract from organisational units separate from the outsourcing firm (Rundquist, 2008). This definition implies that: (A) the activity will be an innovative (strongly contributing to the newness) part of the NPD process, (B) the activity will have previously been conducted internally and (C) the activity will be purchased in a contractual agreement between the organisations.
The focus of this article is the outsourcing of activities in the NPD process, where an activity is a part of the NPD process, with a limited scope, starting with an input and delivering an output. The unit to be outsourced is therefore the effort needed to develop the substance from an input to an output. This is important to understand, as most research on outsourcing deals with the outsourcing of the production of the products (artefacts) and not the activity of developing it.

Swedish medium-sized firms in manufacturing industries often have difficulties in staying competitive. They often lack resources due to, for example, higher costs in comparison with competitors abroad or higher costs compared with larger firms. Therefore, it is hard for medium-sized firms to perform competitive product development on their own. To increase resources, to share risks or to lower costs, many firms choose to collaborate with other firms or organisations in product development. This collaboration can be in the form of, for example, partnership, joint ventures, networks, research contracts or alliances (Chiesa et al., 2000). Outsourcing is therefore one of many possible ways to externally source NPD. Firms use the outsourcing of NPD to lower costs, to cut peaks in NPD efforts or to get access to resources which did not previously exist within the firm.

NPD is a knowledge-intensive activity that requires an ability to handle insecurities, and which is very dependent on the individuals involved in the process. That makes it different from outsourcing production, which (especially when producing standard items on a large scale) is easier to control, monitor and assess costs. Therefore, some considerations connected with knowledge acquisition and insecurity need to be addressed. Three examples of motives for outsourcing, with counter arguments, will be presented below.

The first reason, cost reduction, has been the dominant motive for outsourcing (e.g. Ford et al., 1993), and the outsourcing of NPD can be a method to reduce costs for new product development. If, for example, a firm can find product development competence with an external partner at a cheaper price, the in-house product development department could be smaller and costs could be saved on salaries and appliances. A current example of this phenomenon is the development of new software products that are frequently outsourced to, for example, Indian companies, while in-house software departments become less common. However, the reduction of cost might be an illusion, as costs for control, contracts and monitoring will increase.

A second motive for outsourcing is access to superior quality. Outsourcing an operation might give access to quality that is the “best in the world” for particular components or activities (Quinn et al., 1990). This motive is stronger in more innovative firms than in less innovative firms (Edvardsson and Oskarsson, 2011). For example, a manufacturer of digital equipment may get access to lenses of a world-class quality by outsourcing the development of the optical parts instead of building an in-house development competence in a new area. However, there can be problems connected with monitoring the quality of external activities (Jennings, 1996) and problems connected with less flexibility in production and less possibilities to even out peaks (Alexander and Young, 1996).

A third motive for outsourcing is the need for flexibility. For example, the firm can buy resources for specific projects when the resources are needed, but the firm does not have to conserve the costs when the development project is finished. This is the case when a firm uses a consultancy firm for a specific development activity. The cost per hour is higher, but when the project is finished there is no cost to bear in the future. However, it is important to
note that the resource is probably also needed by competitors or by firms in other industries, so there might be a risk that the desired resource is not available when the firm needs it.

The discussion above indicates that there are some arguments for and some arguments against outsourcing. Empirically, even though outsourcing was one of the strongest trends during the 1990s and the first years of the 21st century, more than half of the firms in a survey by Lonsdale (1999) were unhappy with the performance of the outsourced services. This result indicates that there might be more to outsourcing than cost saving. It could be suggested that arguments for and against outsourcing are different when production is the object of outsourcing compared with NPD as the object of outsourcing, but a trend is on the move, with researchers questioning whether lower costs are the most important results of outsourcing.

There is an established body of knowledge concerning the management of NPD. For example, there is an extensive amount of literature on the critical success factors in product, process or service innovation (e.g. Zirger and Maidique, 1990; Cooper and Kleinschmidt, 1995). There is also a developed area concerning NPD processes beginning in the late 1960s (e.g. Booz et al., 1968; Cooper, 1994; Yasdani and Holmes, 1999).

In addition, there are many reviews of product innovation practices and strategies and their performance consequences across a wide range of industries (e.g. Griffin and Page, 1996; Griffin, 1997; Cooper et al., 2004). However, the research on the outsourcing of NPD is limited and fragmented. There is very little contribution on the subject of outsourcing NPD in existing literature reviews, and a similar situation is present in articles on best practices.

The overall purpose of this article is to explore the outsourcing decision-making process in medium-sized firms when carrying out the outsourcing of NPD. The first part of this article comprises a literature review identifying contemporary research regarding the outsourcing decision in general and applying this research to the specific area of outsourcing NPD. The second part presents data from a case study in six medium-sized firms, comparing the results with results from the literature review and specifically three quantitative studies using the same sampling conditions (Rundquist and Chibba, 2004; Al-Shalabi et al., 2007; Rundquist and Halila, 2010).

**Method**

The research presented in this article is based on a case study approach. Case study research is especially appropriate for exploratory research, as in the current study, which focuses on: a) documenting a phenomenon within its organisational context, b) exploring the boundaries of a phenomenon and c) integrating information from multiple sources (Eisenhardt, 1989).

There were three criteria for selecting the firms for this study. First, the firm should be a manufacturing firm with an own range of products. A firm which has its own range of products has internal control over customer contact as well as supplier contacts, including a marketing and sales department within the firm. A firm which does not have its own range of products will have a different focus when outsourcing product development activities (e.g. providing the NPD consultancy service for customers). Second, the firm should be a medium-sized business, here defined as between 200–1,000 employees. The definition of size is in line with earlier studies (Rundquist and Chibba, 2004) and also makes a distinction from the most frequent sample size (large firms with more than 5,000 employees) used in research on
outsourcing. Third, the firms should be in different industries to enable the opportunity of identifying findings depending on industry differences.

The firms selected for this study are all located in Sweden and found in the associate network of the research group (Centre for Technology, Innovation and Marketing Management, CTIM2). As a close and long-term contact was obtained, the firms were happy to share information, an informal interview situation was arranged and the firms were generous regarding access to their facilities. The firms are anonymous in the presentation, but are briefly described in Table 1, below.

<table>
<thead>
<tr>
<th>Firm</th>
<th>Number of employees</th>
<th>Turnover, 2007 (M euro)</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>395</td>
<td>105</td>
<td>Mechanical articles for use in an office</td>
</tr>
<tr>
<td>B</td>
<td>315</td>
<td>140</td>
<td>Wood fibre construction material</td>
</tr>
<tr>
<td>C</td>
<td>550</td>
<td>90</td>
<td>Textiles for industrial use</td>
</tr>
<tr>
<td>D</td>
<td>320</td>
<td>60</td>
<td>Hospital equipment</td>
</tr>
<tr>
<td>E</td>
<td>250</td>
<td>40</td>
<td>Medical analysis equipment</td>
</tr>
<tr>
<td>F</td>
<td>855</td>
<td>290</td>
<td>Food production</td>
</tr>
</tbody>
</table>

*Table 1. Short description of the firms in the case study*

General data from the firms was collected over seven years (2001 to 2007) via visiting offices and production sites. The seven years have included periods with a closer contact during explicit projects and a looser contact during the periods in-between. Together with written materials (e.g. quality manuals and vision documents), the interviews and observations have been made with a major understanding of how the firms run their operations. Specific data regarding the outsourcing of NPD was collected during semi-structured interviews (Denzin and Lincoln, 1994) with CEOs, R&D managers and project managers at the firms during spring and autumn 2004 and during spring 2007. The respondents have been active in many different projects, and each case consists of information from several projects to improve external validity. In total, approximately 20 projects from the six firms have been documented.

Semi-structured interviews were used to overcome the limitations of a questionnaire approach and to get in-depth information from the managers (e.g. Smeltzer et al., 1988). This method enabled an amount of non-directive information to be gathered, but also to complement this non-directive information with structured information, where the respondent did not spontaneously have an opinion (Denzin and Lincoln, 1994).

Construct validity in the case study was built through explicitly discussing the definitions of the concepts before collecting data, on triangulating multiple data sources, and through establishing a chain of evidence during data collection (Yin, 2003). The definitions of the concepts of the study are well understood by the respondents because of the long period of contact. The difference between any type of cooperation and the specific meaning of outsourcing in the current study was made clear. Reliability during data collection was maintained by using an interview protocol.
Outsourcing of NPD: elaborating the decisions

Splitting up the outsourcing decision

Given that a firm needs to expand or improve its NPD efforts, the decision-making process can be divided into three steps. The first decision is about whether to outsource or build the capacity in-house (buy or make). The first decision can be seen as strategic in nature and may be taken at a higher level in the organisation. The second decision is concerned with which activities in the NPD process to outsource. This decision includes an evaluation of which competencies are central to the organisation. The second decision is a mid-level decision taken by R&D department managers or similar. The third decision includes an assessment and choice of which firm will be the outsourcing partner in the NPD process. The third decision is more of an operational one, and may therefore often be taken at a lower level in the organisation. Here, a number of considerations, such as size of the partner, geographical location, competence profile or cooperation backtrack are necessary.

The three decisions are made at different times and, perhaps, also by different decision makers. As previously discussed, the first decision has a strategic dimension and is probably made at a higher level in the organisation. The second and third decisions are more operational in nature, and are therefore made at a lower organisational level. These decisions are not as distinctly separate in medium-sized firms as in larger organisations, and quite often they are made by the same person or the same group of people. Regardless of who makes them, such decisions are never easy. There are two reasons for the difficulty: first, the decision is complex, due to the many unknown and hazardous factors involved, and second, there is a considerable business risk involved. To learn more about the decision-making process and drawing on the conclusions from experiences, it is necessary to look for the motives behind the decision. All decisions are made in a social context and based on the individual interpretation of external factors and internal resources, but they also involve an organisation’s norms, values and beliefs.

These decisions can be very tough. First, they involve a business risk consisting of future dependency on the partner firm. Although the partner firm may initially reserve the results of the NPD process and the technological knowledge, especially for the outsourcing firm, it could, in future, use the general technological knowledge as well as more specific product knowledge in cooperation with competing firms. Second, the decision involves a cost consideration: are the lower NPD costs involved in the outsourcing contract still lower when the costs of administration, monitoring and knowledge integration are included? The third consideration is based on the resource need – it could be argued that resources will be more specific (unique) to the product to be developed if developed in-house. On the contrary, it could be argued that, by outsourcing NPD activities, the firm could gain access to the best or considerably better resources than by developing the product in-house.

These three considerations refer to the theoretical perspectives of transaction costs (e.g. Williamson, 1981; 1985), resource dependence (Pfeffer and Salancik, 1978) and resource base (Barney, 1991; Grant, 1991). These perspectives are developed for the context of outsourcing NPD by Zhao and Calantone (2003), Rundquist (2007; 2008) and Calantone and Stanko (2007).

There are also institutional factors, such as trade agreements, intellectual property rights and legislation, that surround the decisions. These factors have a major impact on such deci-
sions, as, for example, we found that the new interest in the Baltic countries after they joined the EU served as a trigger for outsourcing decisions.

The sequence of decisions
When gathering and sustaining resources for NPD, the organisation faces a make-or-buy decision, and may choose to either conduct the activity internally or to buy the activity externally. Prior to the early 1970s, this decision was largely made on the basis of obtaining the best price, and was less affected by considerations of delivery reliability, quality and technological knowledge (McIvor et al., 1998). The first contribution to the decision-making process involved in the make-or-buy decision was presented by Bergen (1977), and presents a rather complex decision schedule with a strong normative profile. The model is presented in a short article in the journal R&D Management.

On a generic level (outsourcing in general), Quinn and Hilmer (1994) contributed with a model of the outsourcing decision in a firm. In deciding on a sourcing strategy for a particular segment of their business, managers have a wide range of options regarding control and flexibility, and can choose between “contract relationships” (Quinn and Hilmer, 1994, p. 50) ranging from the short-term purchase of standard items to in-house production. Where there is a strong risk of vulnerability and a high potential for competitive edge, tight control is needed, i.e. in-house production.

A similar discussion is presented by McIvor et al. (1997), who suggest a “Hierarchy of Strategic Importance” in the form of a pyramid. In McIvor’s model, little knowledge and high strategic value components are categorised as the apex of the strategic pyramid (core activities). For these activities, McIvor et al. (1997) recommend long-term cooperation and/or strategic partnership, which are opposed to short-term outsourcing. They also present a conceptual model for evaluating the make-or-buy decision. This model is a development of the model presented by Quinn and Hilmer (1994).

McIvor defines four stages involved in a sequential decision tree:

- Stage 1. Outsource non-core activities. A core activity is, according to McIvor et al., “central to the company successfully serving the needs of potential customers in each market” (McIvor et al., 1997).
- Stage 2. Benchmark core activities against all potential providers using a value-chain approach.
- Stage 3. Total cost analysis of core activities. Total cost includes activities such as R&D, design, assembly and distribution. In stage 3, two possible scenarios could arise: either the firm is more competent than any other external source, which would lead to the recommendation either to maintain internal production or to maintain competence activities and outsource production and/or assembly. If there are external sources that are more competent, the firm could either invest to make, or outsource, a core activity by searching for potential partnership suppliers.
- Stage 4. Analysing potential partnership suppliers. Important issues include design skills, management skills, quality and distribution.

At that time (McIvor et al., 1998), not all firms had a strategic view of the make-or-buy decision, with the result that many bought rather than made, or bought for short-term reasons,
such as cost reduction and increased capacity. Well over half of the respondents in a four-country study indicated that there was no policy input into make-or-buy decisions (McIvor et al., 1998).

The articles presented here are, of course, only a selection of good research to illustrate the development of models over time. Other models, like Cánez et al. (2000) or Fill and Visser (2000) add to the same tradition and development of the field. The chosen articles are often quoted and serve as an illustration of the development.

Rationality in decision making

A historical résumé starts with the rational choice perspective dating back to Downs (1957), which implies that in order to make a decision the decision maker tries to access all necessary information. Downs argues that the decision maker anticipates the possible outcomes of his/her decision, and then chooses the one that will maximise the expected utility, the net benefit from making that particular choice. He also argues that a decision maker will do his/her utmost to obtain the required information. Downs’ perspective is based on the assumption that it is possible to collect all necessary information and to forecast all possible outcomes in order to reach the optimal decision.

The rational man’s decision can be described in four steps:

1) A “given” set of alternatives.
2) A set of consequences for each alternative.
3) “Preference ordering”, i.e. ranking the consequences.
4) A selection of the optimal alternatives.

This classical model of a rational decision has been criticised, as any rational decision is limited by its context. The context can be described by environmental and internal factors as well as by the decision maker’s pre-understanding. It has also been argued that it is difficult to obtain sufficient information and to compute all alternatives.

Weber (1964) categorises three types of rationality: formal rationality, substantive rationality (which relates to how to act) and substantial rationality (which relates to the result). Formal rationality is based on figures and a formal decision-making process. The figures should not be considered as an exact measure of efficiency, but rather as an illustration of the issues inherent in the process. Substantive rationality on how to act expresses how to reach the decision and can be illustrated as a process, while the substantial rationality related to the result is a goal-oriented rationality that focuses on the outcome. The first type of substantive rationality can be considered a classical rationality that can be described retrospectively as a process. The second substantial rationality can be seen as an evaluation of whether the outcome is desirable and reasonable. As such, it is closely connected to the decision-makers’ values and experiences, as opposed to taking objective measures for granted. From the latter perspective a decision will often be described, retrospectively, as rational by the decision maker, but it is difficult to know whether the decision was really made as described.

This phenomenon is defined by Simon and March (1958) as a “bounded rationality”. According to Simon and March, a decision maker has a simplified model of the situation due to limited information. They believed that “administrative man” was a more descriptive term than
a “rational man”. Managers are “satisfiers” who look for the first satisfactory solution, based on limited information (“bounded rationality”). Simon (1976) argues that managers operate under the need to appear rational and wish to demonstrate that their decisions are rational. He believes that decisions are neither totally rational nor totally irrational. Miller et al. (2002) developed this argument and suggested that decisions can be programmed or non-programmed. Familiar or less-complex decisions are, to a large extent, programmed and can be described by a flow model, while unfamiliar or complex decisions tend to be non-programmed and thus more challenging for the decision maker.

Critiques of the serial sequence

However, it is arguable whether a serial process can be followed. For example, one of the firms in the sample started up with an in-house development. But when a relationship of trust and cooperation evolved with a nearby firm, they did not hesitate to decide to outsource some development activities. In this case, the choice of partner marked the start of the process, and the decision to outsource came later. It is obviously difficult to describe the process in three distinct steps following a timeline, thus a model of factors affecting the three decisions seems more relevant.

Critiques of the possibility to be rational

Humans are not always as rational as they tend to believe they are. One manager in the study (Rundquist, 2008) laughed and said: “Everything I tell you is probably my reconstruction to make myself seem more rational than I am.” The following is only a scratch on the surface of this complex subject. One could argue that outsourcing decisions are more political than rational (Lacity and Willcocks, 1998); for example, negative feelings about a certain nation could affect a decision. Managers can also make decisions based on their interpretations of the contextual situation (e.g. to jump on the outsourcing bandwagon) and then later attach causal logic (i.e. constructed reasons) to justify their decisions. Based on these beliefs, managers would make decisions and then look to explain them by using after-the-fact reasons, similar to the decision-making process described in the garbage can model (Cohen et al., 1972).

In small and medium-sized enterprises (SMEs), all three decisions are often made by the same person and the three steps are not distinctly separated. Even if the manager, as in our study, tells a story about rationality, the timeline is often blurred. Exactly which decision was made first, who the manager met during the process and what his/her first thoughts were is not always rational.

Development of an interactive decision model

If a sequential decision-making process cannot be employed because the decisions are non-rational and non-sequential, another type of model will be more appropriate. In this part an interactive model for the decision-making process pertaining to the outsourcing of NPD will be presented. The interactive model (Figure 1) is characterised by the absence of normative gates and one-way arrows, and instead focuses on the factors affecting the outsourcing decision. The factors are derived from theory as well as the case study. The model is also characterised by the notion that the decision-making process can start at any of the three decision points, but that all three decisions must be made before the outsourcing starts.
The decision model presented below contains the same three decisions described in Chapter 3, that is: the decision of whom to work with (selecting an outsourcing partner), the decision of which activity to outsource and the decision of whether to outsource or not. In the sequential process described earlier the order would be the opposite, but there is a specific reason for presenting the decisions in a random order. The empirical material indicates that the decision-making process can start with any of the three decisions rather than following a predestined sequence.

For example, one of the firms had never considered outsourcing NPD activities until it found a special competence in a small firm close by. This means that the outsourcing decision started with selecting the outsourcing partner. This decision triggered the decision to outsource and later triggered the decision of which activities to outsource. This means that the decision is not sequential, according to the description in Chapter 3, but is interactive and motivated by the trust in a local partner. In another example, the need for a specific competence yielded the decision to outsource an activity. However, the strategic decision to start outsourcing NPD was not made until the right partner was found. In the second example, the search for competence needed for a specific activity triggered the search for a good outsourcing partner. But before having decided on which activity and the choice of partner, the decision to actually use outsourcing was not taken.

![Decision Model Diagram](image)

**Figure 1. An interactive decision model for the outsourcing of NPD**

The above argument and the two examples indicate that any of the three decisions involved may be the first, in contrast to sequential models that are traditionally presented. The following chapter outlines some of the factors that influence these decisions. These factors can be found in both theoretical and empirical studies, and are presented here with examples, as they are connected to each of the six arrows in the model.

**The choice of which activity to outsource influences the decision to outsource**

The decision to outsource NPD can be triggered by the need for a new or extended NPD activity. Although the firm did not previously outsource its NPD and did not make a strategic decision to outsource NPD, the need for a new activity can trigger a decision to outsource. It can be the need for a certain competence, hardware, network, or simply the need for more labour, that can trigger the firm to make the decision to outsource a new activity.

As an example, one firm obtained an order for a new application that included electronics, which meant that the product development process would include activities associated with...
the development of new electronics. The firm only had a few co-workers with competence in electronics, as this aspect had not previously been focused on. The choice between outsourcing the activity or extending in-house competence was discussed and the firm decided to start outsourcing the product development activity, of which they had no distinct prior experience. The search for a potential outsourcing partner began after a decision to outsource the activity had been taken. In this case, the decision to outsource cannot be categorised as a strategic decision, but as an operational situation triggering a decision to outsource product development activities.

Theoretically, transaction cost theory contributes to the understanding of this decision. If a new activity includes values that are not unique to the firm, transaction costs will not increase and a positive outsourcing decision is more probable (Rundquist, 2008). Furthermore, if the activity considered for outsourcing faces technological stability, transaction costs decrease due to the lower need for structured control mechanisms, and, again, a positive outsourcing decision is more likely. Also, if a resource involved in the activity has a low strategic value, a positive outsourcing decision is more likely. A knowledge-based perspective suggests that a positive decision to outsource NPD is more likely if the knowledge assumed to be generated by the activity is considered to be easy to integrate (Rundquist, 2007). Of course, the opposite in the four examples would support or strengthen a negative outsourcing decision.

A survey study (Rundquist and Chibba, 2004) supports the fact that the outsourcing of NPD is not always a strategic decision. Results showed that 67% of the firms in the sample outsource NPD, although only 29% have a documented NPD outsourcing strategy. Theoretical discussions as well as quantitative and qualitative data indicate that a decision-making process starting with a specific NPD activity which triggers a general decision to outsource NPD can be identified and explained.

The decision to outsource influences the choice of which activity to outsource

The choice of which NPD activity to outsource can be triggered by a strategic decision to outsource NPD. This relationship is the most obvious one and is also supported by the sequential decision-making process. If the strategic choice to outsource NPD activities is taken by, for example, the board, the next step in the decision chain would be to decide which activities to outsource. Of course, there have been many examples of this sequence of decisions as well.

Transaction cost theory suggests that it is better to choose activities that are less unique, do not need specific hardware owned by the firm and do not require technologically uncertain components (Rundquist, 2008). Such activities would generate the least transaction costs, such as the costs of monitoring a supplier when an activity is uncertain. Furthermore, according to resource-based theory, activities that need competences which are not of strategic value to the firm are more likely to be chosen for outsourcing, while resource dependence theory indicates that activities requiring a limited resource are less likely to be outsourced (Rundquist, 2007).

As mentioned above, the results from the survey indicate that the number of firms that outsource NPD activities are greater than the number of firms with an NPD outsourcing strategy. This result is also supported by the fact that an operational function, such as the R&D department, is the most frequent function to initiate the outsourcing of NPD (Rundquist and
Chibba, 2004). In 83% of the firms in the sample, the R&D function was the most frequent initiator of NPD outsourcing.

This specific order of decisions is the most frequently described in the business literature and is also equivalent to the linear decision-making process. Empirical and theoretical evidence can identify and explain a decision-making process where a strategic decision to outsource NPD triggers the process of choosing the activities to be outsourced.

**The decision to outsource influences the choice of outsourcing partner**

The choice of outsourcing partner can be triggered by a strategic decision to outsource NPD. Following a linear model, the choice of partner would come third, after the strategic decision to outsource and the choice of activity to outsource had been made. However, there are examples where the decision about a partner was made before the choice of activity. For example, one firm decided to outsource activities when a nearby and long-term partner could be used. The firm had in-house competence, but needed more man-hours due to a period of severe pressure on the R&D function. The trust in, and close geographic distance to, a certain partner led to the decision to outsource all activities that this specific partner could handle and to carry out the activities that the partner was not familiar with in-house. Another firm in the food industry had to outsource the quality testing of new products, as the EU demanded that all new products must be tested by certified laboratories. The decision from the EU also lead to the choice of outsourcing partner, as only one Swedish laboratory is certified. This is an example of when institutional factors influence the outsourcing decision.

Theoretically, transaction cost theory supports the choice of a well-known partner, as this decision generates lower transaction costs in terms of relationship building and contract handling (Calantone and Stanko, 2007; Rundquist, 2008). It is also supported by resource dependency theory, as a long-term relationship makes it more probable that a certain partner will be chosen due to the impact of trust on the willingness to be dependent on a supplier (Rundquist, 2008). These theoretical standpoints are also supported by the survey study, where 63% of the firms chose a partner who was already in their current network as either a supplier or a client (Rundquist and Chibba, 2004). The laboratory example above is theoretically supported by institutional theory, as an over state rule triggers an outsourcing decision as well as the choice of outsourcing partner.

The theoretical discussions and the empirical support indicate that a decision-making process starts with a strategic decision to outsource NPD, triggering the process to choose the outsourcing partner before selecting the activities to be outsourced.

**The choice of outsourcing partner influences the decision to outsource**

The decision to outsource NPD can be triggered by the intention, and decision, to work with a specific partner. It could, for example, be a situation where a firm in the close network develops a certain skill or knowledge. This triggers the decision to outsource NPD, as the skill becomes available with a trusted partner. If that particular firm in the network had not developed the skill, the firm would probably have preferred to develop it in-house, but the trust, long-term relation and confidence in the partner firm triggered the decision to outsource.
Transaction cost theory indicates that a close partner in a firm’s network may trigger a positive outsourcing decision, as the costs associated with relationship building and contract handling will be less (Calantone and Stanko, 2007; Rundquist, 2008). The discussion is also supported by resource dependence theory, as trust makes it easier to accept dependency (Rundquist, 2008).

Resource dependency theory also suggests that if both partners are equally powerful (size, importance) a positive outsourcing decision is more likely (Rundquist, 2008). This implies that the choice of partner has a major impact on whether NPD outsourcing is practised at all. The results from the survey studies also indicate the importance of the presence of a suitable partner for a positive outsourcing decision.

The survey studies as well as the theoretical discussions indicate that the existence of a good partner can be the factor that triggers the decision to outsource, if such a decision was not previously taken.

The choice of outsourcing partner influences the choice of the activity to outsource

The choice of which NPD activity to outsource can be triggered by an earlier decision on which partner to work with. If, for example, a closely related firm develops certain knowledge, the decision to outsource a specific activity that requires this skill can be triggered. The presence of a trusted partner firm and the competences of this firm affect the decision about which NPD activities to outsource.

A transaction cost perspective supports this order of decision making. If there is already a close partner in the network of the firm with the special competence needed for a specific activity, this activity is more likely to be outsourced as relationship-building costs and contract handling will be cheaper (Calantone and Stanko, 2007; Rundquist, 2008). From a knowledge-based perspective, it is suggested that the activities chosen for outsourcing will depend on the position of overlapping knowledge in order to increase efficiency when integrating knowledge (Rundquist, 2008).

The theoretical discussions and the empirical support indicate that a decision-making process starting with the decision pertaining to the outsourcing partner can trigger the decision about which NPD activity to outsource.

The choice of activity to outsource influences the choice of outsourcing partner

The choice of which partner to work with can be triggered by a previous decision on which NPD activity to outsource. This connection follows the sequential model and is easy to understand. For example, when one firm decided to outsource the chemical testing of glue for wood fibre, the choice of partner was within a population that had the knowledge and hardware to conduct such a test.

Resource-based theory supports the assumption that when a gap exists that requires a specific competence, a partner who already possesses this competence is likely to be chosen (Calantone and Stanko, 2007; Rundquist, 2008). The need for a specific competence is the most frequent reason (59% ranked it as the most important motive) for outsourcing NPD in medium-sized Swedish firms (Rundquist and Chibba, 2004). The finding that R&D is the most frequent function to initiate the outsourcing of NPD (83%) (Rundquist and Chibba, 2004)
supports the assumption that the activity and partner, rather than strategic considerations, are in focus when the outsourcing decision is taken.

The empirical results support the theoretical assumption that a decision-making process that starts with the decision about which NPD activity to outsource can trigger the decision on the choice of outsourcing partner.

**Discussion and conclusions**

An interactive decision model (Figure 1) for outsourcing decisions has been suggested on the basis of a case study. In order to develop this model, theoretical as well as empirical studies were conducted.

**General discussion**

Although the area of NPD outsourcing has been a subject of growing interest in recent years, there are still very few publications in the field. A wide search has only revealed approximately 50 articles published in the area since 2002, of which only a few deal with the outsourcing decision per se. One strong effort in the area is a special issue on operations research and outsourcing in Computers & Operations Research (Schniederjans, 2007). This issue includes 19 articles on outsourcing, of which, 11 refer to the whole or parts of the decision-making process. For example, Isiklar et al. (2007) evaluate a software tool for choosing outsourcing partners. The context is the outsourcing of logistics, but it is still interesting that the field is now producing some research on a more detailed level.

A trend is that articles on outsourcing (of NPD) appear to have turned towards knowledge management (e.g. Söderquist, 2006; Allen et al., 2007) and service outsourcing (e.g. Yang et al., 2007; Chiesa et al., 2004). It is also interesting to see that some quantitative studies with standardised definitions and measures (metrics) are appearing (e.g. Kremic et al., 2006; Calantone and Stanko, 2007; Yang et al., 2007). These signals are considered an indicator that an area of research is maturing.

**A sequential or an interactive decision model?**

The interactive decision model presented in this article counters the sequential model by comprising factors that will affect the next decision without placing a timeline and linear structure on the model. The results of this article very much correspond with other studies of strategy formation and decision-making processes in medium-sized firms (or SMEs, which is more often the size span than just medium-sized firms).

The traditional view of decision-making processes (i.e. deciding what to do) and implementation (i.e. decisions made in action) was questioned, in general terms, by Mintzberg et al. (1976). They focused on what happened in practice instead of what happened in theory. For example, they showed that strategies typically evolve from unstructured managerial decision making.

The outsourcing decision chain described in the sequential tradition has a strategic decision (to outsource or not) on the top, moving down to more operational decisions. In the model presented in this article (Figure 1), the order of decisions is interactive, and strategic/operational decisions are not bound to occur in a certain order. This thinking is supported by Mintzberg and Quinn, who argue that: “In reality, formulation and implementation are intertwined as complex interactive processes in which politics, values, organizational
culture and management styles determine or constrain particular strategy decisions” (Mintzberg and Quinn, 1991, p. 17).

Planned decision making in SMEs has been even more questioned than in firms in general. Carson et al. (1995) suggested that the value of time and resources in SMEs would lead to less-structured decision making. O’Gorman and Doran (1999) showed that clear vision statements had a lower value in SMEs than in large firms. Frese et al. (2000) argued that entrepreneurs play a more important role in SMEs and that entrepreneurs often act intuitively.

All these findings support the interactive decision model comprising three decisions that have to be taken, but indicate that the decision-making process can be triggered by any of the three decisions and move on to either of the two other decisions.

**Comparison with other studies on the outsourcing of NPD**

Two recent studies focus on the same area as the one in this article. They deserve a special mention that compares approach, methods and results. One is a case study (Barragan et al., 2003) and the other is a quantitative survey study (Calantone and Stanko, 2007). Barragan et al. (2003) developed a conceptual model, while Calantone and Stanko (2007) used regression analysis to test drivers (motives) for the outsourcing of innovation.

Barragan et al. (2003) took their theoretical basis from Quinn and Hilmer (1994) and operationalised their model in a three-case study. Some of their findings support the results of the current article. For example, they conclude that the R&D function is normally responsible for the decisions associated with the outsourcing of NPD. This is explained by the fact that this function is also, all in all, responsible for the NPD process. Barragan et al. (2003) argue that this is a disadvantage, as the R&D function lacks expertise in purchasing. They also conclude that, in reality, the decision to outsource is often not a strategic one, which supports the thinking behind the current article and model. They also present results which suggest that project teams have difficulty in controlling the outsourcing situation, and that they often lack competence in the area of knowledge management to enable them to integrate the knowledge developed. Some later research regarding knowledge integration when outsourcing NPD can be found in Rundquist (2009) and Tell (2011).

An interesting aspect of Barragan et al. (2003) is that, despite the fact that they question the sequential model and show results that agree with their standpoint, they present a sequential model as a support for the process of outsourcing NPD, comprising the following four steps: (1) Assemble the expertise, (2) Analyse the strategic position, (3) Identify the appropriate arrangements and (4) Plan for knowledge migration. Each step is wide and leaves room for flexibility. Although they include knowledge migration, which is, to some extent, new, they still rely on the notion that the strategic decision-making process is sequential.

Calantone and Stanko (2007) explore the first decision (whether or not to outsource NPD) by using a quantitative approach. Their study is interesting, as it is the only one I have seen, so far in this field, that employs a propositional approach with a survey instrument and regression analysis. They clearly state that their theoretical framework is based on transactions cost theory. The results reveal two significant relationships. The first suggests that exploratory research increases the likelihood that innovation activities will be outsourced. This means that firms that focus on research activities (biotechnical firms or computer development firms) are more likely to outsource later phases in the innovation process, such as the product launch. The second suggests that inventory turnover has a negative relationship
with the propensity to outsource innovation activities. Inventory turnover is the number of times an inventory is converted to cash over a year. According to Calantone and Stanko (2007), the relationship can be explained by the fact that a low turnover indicates non-recurring activities which require special knowledge or resources in order to be conducted. Both of the results support a focus on core activities and the outsourcing of non-core activities. The first relationship is concerned with the outsourcing of non-core phases, while the second is concerned with the outsourcing of non-core activities within a phase.

**Suggestions for future research**

A first suggestion for future research is to further explore the decision-making process and investigate if the suggested model is consistent for internal and external variations. As this exploratory study used a quite narrow sample of case firms (medium-sized manufacturing firms) it could be assumed that more knowledge is needed to get more general knowledge about the decision-making process. Internal variations could be different object types (e.g., radical NPD vs. incremental NPD, technologies new to the firm vs. technology known to the firm, etc.). It can, for example, be assumed that the decision-process might vary between radical NPD, which involve more strategic assessments as opposed to incremental NPD which is more operational. External variations could be the contingencies of different situations in various industries (e.g., oligopolies vs. fragmented industries). Sky and Stenbacka (2003), for example, suggest that the outsourcing decision becomes more delicate in an oligopoly situation, as dependency on potential competitors is harder to accept. By exploring these areas in more depth, it is likely that more detailed understanding of decision-making models can be achieved.

Secondly, future research should also explore if the model of the decision-making process actually affect performance in long-term NPD outsourcing arrangements. This would not only explain what organisations are doing, but also provide guidance on what they should be doing. As performance in the NPD outsourcing arrangements is probably affected by the contingencies mentioned above in addition to other contingencies spanning from personal relations to international trade agreements, this question calls for further explorative studies to find relevant mediating variables as well as quantitative studies to test variables found.

One development of this second area for future research is to develop quantitative measures for outsourcing performance. Some attempts have been made (e.g. Han et al., 2008; Blumemberg et al., 2009). Han et al. (2008) use a bundle of economic variables including enhanced economies of scale and increased control of expenses. This approach is in line with the majority of studies on outsourcing which often use firm performance rather than performance of the outsourcing per se. Blumemberg et al. (2009) use a relational perspective (perspective of the purchasing firm) including the variables rating of the overall service quality, reliability of the service, responsiveness of the provider, and proactivity of the provider. This type of measure can provide assessment of primarily the choice of outsourcing partner. However, there is a great need for further research in this field. This is also motivated by the fact that all the measures described above are developed in the context of information systems outsourcing.

A third area for future research is to develop practitioners’ measures for outsourcing performance. Organisations need robust performance measurements and performance measurement systems in place to evaluate and manage outsourcing effectively. If an organisation
outsources its NPD processes without developing effective performance measures, it cannot judge how well the providers are performing.

Fourthly, the results of this study have pinpointed the role played by trust in the decision-making process. In the long-term outsourcing relation both the scope and depth of outsourcing relationships may develop over time. This relation often develops from transactional to transformational outsourcing (Sako, 2006). Transactional outsourcing focuses on efficiency gained through the application of standardised solutions to automate previously labour-intensive processes. Transformational outsourcing, by contrast, involves creating customized solutions, which go beyond simple standardisation and centralisation (Sako, 2006). Suppliers then develop higher value added by providing services which are closer to the consultative and knowledge creating end of the spectrum. In this case transactional outsourcing can relate to routine work, incremental NPD or development of partial solutions in collaboration with the outsourcing firm. Results from this study indicate that firms use transactional outsourcing as “trial orders” to test the supplier and build trust which can develop to more extensive and transformational outsourcing in the future. How this trust is built and what investments and costs are connected with the building of trust is also an interesting area for future research.

References


