A Portfolio Approach to Supplier Selection in Outsourced Product Development

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Portfolio models are widely used in strategic planning essentially at the strategic business unit level. There exists a vast range of models that, until the emergence of the core competence perspective, were among the most frequently used tools in strategic management, including technology management. The Boston matrix, where businesses are positioned in terms of market growth rate and relative market share, is certainly one of the best known (Porter, 1980). General Electric pioneered another matrix, which is more marketing oriented. In this model, each business is rated in terms of market attractiveness and competitive position. A third very popular matrix is Porter's (1980) model of generic strategies. Porter proposes three generic strategies - differentiation, cost leadership, and focus - depending on positioning in terms of strategic advantage and strategic target. Portfolio models have been criticized for their general structure, in which the different dimensions are only approximate estimations of the parameters that are supposed to be measured, and for making managers think in boxes, missing dynamics of integrative and systemic strategic thinking (e.g., Capon et al, 1997). However, if classifications are regarded merely as eye-openers for a number of possible action plans, portfolio models provide useful input for decision-makers.

Supplier involvement, and supplier expertise as a crucial input in product development are today indispensable for keeping up with rapid change in technology and an increased demand for innovation under conditions of strict cost control. Outsourcing of the design and development of discrete components / accessories or entire component systems is common practice in a variety of sectors ranging from aircraft manufacturing (e.g., Airbus) to fashion (e.g., Zara, Benetton and many others). As a consequence, the analysis and selection of suppliers for taking on different tasks and responsibilities with respect to product development is a critical activity. Portfolio models can provide some assistance in this endeavour. A number of models have been developed and implemented with success in corporations (Kraljic, 1983; Olsen & Ellram, 1997; Bensau, 1999). These are presented and summarized in table 1.

table 1

Table 1. Portfolio models for managing outsourced product development.

It is important to note that these contributions are related to situations where the decision to outsource has already been made. The issue is to determine what kind of product development responsibility should be outsourced and what kind of supplier relationship needs to be built in order to match the requirements of the development tasks. The three models presented in table 1 have three steps in common: 1) Analysis of the products for which development is to be outsourced and classification of the products along two dimensions related to the importance of the purchase and the difficulty of the purchase. 2) Analysis of the supplier relationships required to deliver the products, 3) Action plans in order to match the product requirements with the supplier relationships.

Although useful for supporting supplier selection decisions, and for capturing terms and issues that are easily understood by procurement staff, our studies of a number of automotive manufacturers, conducted in collaboration with research colleague Rajesh Nellore, indicate that there is need for integrating more of engineering issues into the portfolio thinking. The product specification is the fundamental means for developing, transmitting and communicating product development requirements between the customer and the outsourcing partners. Outsourced product development encompasses a large variety of specifications that can originate either from the supplier, from the buyer or from both.

The specifications must be adapted to the capabilities and needs of each supplier. Hence, one needs to distinguish between different types of suppliers, which according to our study, was a basic premise for proceeding into any kind of relationship classification. Although the portfolio models discuss a wide range of factors that distinguish between suppliers, they do not attempt to classify suppliers into distinct types or categories. A widely used supplier typology, developed from a benchmarking of best practices, is that of Kamath & Liker, 1994. Table 2 indicates these types and explains how they should be involved in the specification process.

table 1

Table 2. Approach to specifications with different types of suppliers (adopted from Kamath & Liker, 1994).

It is thus obvious that specifications have to be different for different types of suppliers - both in terms of the type of specifications and the generator of the specifications.

We propose a model relating, in a two-step approach:

- the component categories retaining the categories proposed by Olsen & Ellram, i.e., non critical, leverage, bottleneck and strategic,
- the generator of the specifications,
- the supplier categories, and
- the types of specifications.

STEP 1

First are established the links between specification generators and component categories (Figure 1).

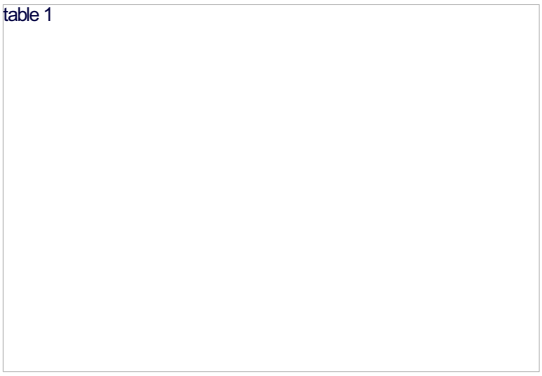

Figure 1. Link between component categories and specification generators (example from automotive industry).

Here the buyer has to internally evaluate its competency in each component category and then determine the generator of the specification. Three basic situations are possible in this matrix:

- Situation 1: The buyer generates the specifications on its own without any interference from the suppliers. Such components are known as detail-controlled parts.
- Situation 2: The buyer purchases parts that are a result of the supplier-generated specifications, which have been subject to no interference from the buyer. Such components are known as supplier proprietary parts.
- Situation 3: The suppliers and the buyer engage in a range of relationships with each other, thereby generating components/specifications in an integrated manner. The range of relationships in this last type of interaction is collectively combined under the heading of co-development. The following are examples, from the automotive industry, of products developed according to the five different modes of relations resulting from the three basic scenarios:
- Shock absorbers are manufactured based on specifications developed by the buyer and simply executed by the supplier.
- Lamps, which are highly standardized items (except for headlights), are confined entirely to the suppliers, both in terms of specification generation and development.
- In the case of the whiplash system, the OEM dictates the specifications and the supplier uses co-development in order to jointly create the part, following the initial specification of the OEM.
- For airbags, the suppliers are asked to generate the specifications and the OEM can engage in co-development with the supplier to fully meet the specifications.
- Total co-development, where the specifications are jointly generated and development can be exemplified with the case of hybrid car batteries. In general, co-development is prevalent for parts that may become sources of competitive differentiation or for brand new items coming out on the market.

Step 2

We have elucidated the fact that in order to develop the appropriate management approach for complex outsourcing situations, it is not enough to classify suppliers into different categories, nor does a component classification suffice. We also need to understand the specification relationship between the buyer and the suppliers. Thus, we will attempt to link the four categories of components in the portfolio models (strategic, non-critical, leverage and bottleneck) and the generator of the specifications (step 1), to the supplier types, and, in this process, also develop a link to the different types of specifications. Based on a thorough analysis of a large number of components in the studies firms, we classified components into the four component categories as identified by the portfolio models. Then, we identified, within each component category, what kind of supplier was used and what type of specification was required. The results were validated through interviews and focus groups composed of engineers and purchasers. The following parameters were found to apply (table 3).

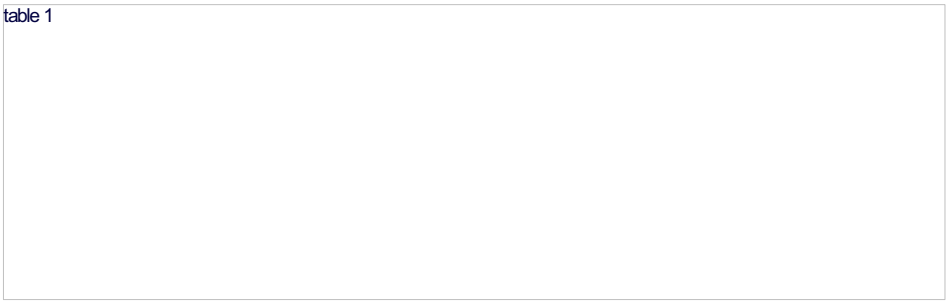

Table 3. Integrated links components-specifications-suppliers-relationships.

Non-critical items with a low innovation level (such as lamps, clips, bands, etc.) do not require partnership; hence they can be procured from any supplier. If specifications for these items were to follow an *industry standard*, their management could be simplified. Often, however, buyers operate with specialized drawings for commodities leading to extra cost. In order to fully leverage the economies of standardized simple parts, this strategy has to be deployed throughout the different tiers in the entire supply chain.

As with non-critical items, **leverage components** have many suppliers. If black-box engineering is applied, i.e., the specifications are firstly developed internally by the OEM to a rough state restricting main parameters (function, cost, quality, system fit), the supplier base could be fully tapped and leverage exerted on existing suppliers. After handing the rough specification to the supplier, the latter would undertake further development and ultimate sealing. Toyota follows this approach in the case of leverage suppliers. Rough specifications are given to a large number of suppliers in order to exert leverage should the need arise. These suppliers need to be capable of developing a component based on the rough specifications from the OEM through a small-scale R&D division. The suppliers of leverage components are competing against many other suppliers for delivery of similar components, hence the differentiating criteria will be the "extra" that the supplier can add to the restricted specification of the OEM. Suppliers of leverage components are basically mature suppliers.

In the case of **bottleneck components**, the reduced number of capable suppliers makes it necessary to have collaborative agreements with them - the buyer has to act in a collaborative way right from the beginning. The relatively low strategic importance of the purchase means that the buyer can allow the supplier to develop the specifications and then help the supplier to standardize them, then jointly try to reduce the costs in the entire supply chain. Suppliers of bottleneck components are considered as experts in a complex technology field which is, however, not strategic for the buyer.

In the case of **strategic components**, the main aim is to be the first to market. There is a need for close relationships with the suppliers and early or even continuous involvement. Without integrated development, there will be a slack in competitiveness instead of continuous improvement of component performance. Suppliers of strategic components should be engaged in a collaborative specification setting where both the buyer and the supplier together generated the specifications. This situation calls for partner suppliers who are expected to be involved from the start of development or even before the development commences.

Elaborating on the use of portfolio models for strategic procurement in the product development process, we propose an expansion incorporating a number of intricate issues. After an initial necessary classification of components and the type of supplier needed to develop and deliver specific components, we have explained how the important issue of generation of specifications, the relationship required and the type of specification required for a given component can be integrated. Then strategies can be developed to align the supplier to the requirements so that the supplier can deliver as required. This approach to supplier management in product development allows the engineers to be involved in the purchasing process through a close link between the category of purchase and the process of specifying. If it is clear who will generate the specification, then both purchasing and engineering can reap the benefits through reducing costs and late changes in the product development process. Moreover, the specification generation matrix allows the full talent of the suppliers to be tapped into, so as to avoid over- and under-management of the suppliers.

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Additional Readings

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