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Efficient collaboration between main and sub-suppliers

Björn Fagerström[a,b,*], Mats Jackson[c]

[a]*Envirotainer Engineering AB, Lagga Marma, Knivsta, Sweden*
[b]*Department of Machine and Vehicle Design, Chalmers University of Technology, 412 96 Göteborg, Sweden*
[c]*Mälardalens University, 631 05 Eskilstuna, Sweden*

Abstract

Many sub-suppliers are interested in closer integration with main suppliers for product development. However, main suppliers have much work that needs to be coordinated, and close integration with suppliers is used only when it is required, and when additional value is created through integration. The main objective of this paper, is therefore, to discuss different supplier roles and increase the understanding of how suppliers can be integrated with the main supplier. The result is based on a case study with one main supplier and nine of its sub-suppliers, where the main supplier develops, assembles, and delivers a complete, complex product to the customer, and the sub-suppliers develop and manufacture sub-systems for the main supplier. The results give new insights into what the sub-suppliers could do in order to improve integration with the main supplier.

Keywords: Supplier integration; Design coordination; Collaborative product development; SME research

1. Introduction

Many main suppliers are streamlining their operations, moving towards more external contracting of their key activities. Sub-suppliers (SMEs) become more important as they develop and produce an increasing amount of the components for the end product. As a result, the main supplier becomes reliant upon the sub-suppliers' knowledge within certain areas. It is, therefore, obvious that the customer/supplier interface now plays a key role in the design and development of new products [1]. This results in the sub-suppliers influencing the products' price, performance, and quality to an ever-increasing degree. The interface between main and sub-suppliers is shown in Fig. 1. Main suppliers use sub-suppliers for flexibility, innovation, and resource purposes. The point in time at which the sub-suppliers are brought into the process is critical. The ability to quickly put together a team with distributed actors is an important factor for success. The efficiency of collaboration between distributed actors will be easier to monitor by concentrating on upstream/downstream activities and on coordinating and integrating the actors. Little attention is paid to how to integrate suppliers in integrated product development (IPD) [2] including the creation of a distributed production system, which will be further discussed in this paper. This paper will first give a theoretical background to the integration of suppliers, which is then related to a case study that has been carried out at one main supplier in the mechanical industry and nine of its sub-suppliers. An interface model has been developed in order to interpret and discuss the results from the case study.

* Corresponding author.
E-mail addresses: bjorn.fagerstrom@envirotainer.com (B. Fagerström), mats.jackson@mdh.se (M. Jackson).

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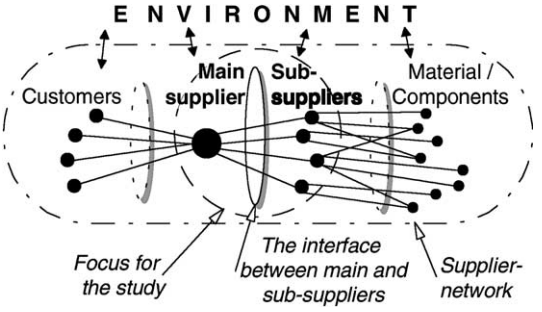

Fig. 1. Focus of the study.

2. Research methodology

A combined systems theory with actors' approach has been used in this study, in accordance with Arbnor and Bjerke [3]. This approach has similarities to the soft systems methodology (SSM) [4]. SSM was established in the 1970s and is a response to systems engineering (SE). SE works well for systems with defined objectives, but SSM is preferable for poorly structured problem situations, which is the case involved in the case study presented in this paper.

Increased complexity stresses the need for models that could be used for teams to develop a shared understanding [5]. Systems theory is a promising effort to deal with this problem, where an understanding of a system cannot be based on knowledge of the parts alone. In systems theory, the whole could be greater than the sum of the parts.

> The real leverage in most management situations lies in understanding dynamic complexity, not detail complexity [5].

According to a rational approach, there is only one correct explanation for how data is connected to theory. Instead, in systems theory with an actors' approach, knowledge is built up from the studied indicator effects, which means that the forces influencing the system are important. The relationships are not necessarily deterministic or stochastic. It is also important to see the processes of change for the system, rather than taking snapshots.

Semi-structured interviews have been used to collect empirical data. The interviewed companies have checked all the written documents from the interviews. The interviewed persons were selected on the basis that they should be involved in the day-to-day activities with the main supplier. Thus, personnel, mostly at management level from production, product development, marketing, and logistics were chosen. One to two interviews have been carried out at each sub-supplier, with each interview taking approximately 2 h. The purchasing and product development manager at the main supplier was also interviewed. A common criticism of interviews is that it is not possible to generalize from just a few interviewed persons. Still, it is possible to obtain general knowledge from few cases, if they are representative in relation to the research area. The selected case study is a representative example of distributed product development. This makes it possible to study cooperation and integration of main and sub-suppliers. Furthermore, the product development project is complex both in organizational terms and in terms of its product structure.

The presented model has been developed throughout the study with both an inductive and deductive approach. The interviewed companies have been an active part in the development of the model. The model is used to interpret the interviews and to understand which factors that influence the integration between main and sub-suppliers.

Finally, the conclusions from the case study are based on a systems approach. This means that the analysis has been made from a holistic point of view trying to see the overall performance (the cooperation and integration of main and sub-suppliers) of the system instead of only individual and isolated activities.

3. Theoretical background

This section presents some theories related to the integration of suppliers in integrated product development that have been used as basis for the case study that will be presented in Section 4. These theories will be discussed in relation to the case study in Section 5. The theories that will be presented are:

- The product development process—what are the important aspects in the distributed design process, in order to understand and improve the integration between main and sub-suppliers?