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Involvement of Procurement in the Product Creation Process: A Systematization Scheme of Measures

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Abstract

Manufacturing firms transferred a significant share of their value creation in terms of the development and manufacturing to suppliers, while concentrating on their core competences. The subsequent integration of suppliers challenges the procurement department as connector between internal organizational customers and external suppliers in the supply chain network. Over the last decades, industry and academia provided numerous measures that address specific situations in this involvement process. However, there is a lack in literature on their systematization. This paper aspires a systematization scheme of measures for involving procurement in product creation processes describing the measures against a set of classifying criteria.

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1. Motivation for the involvement

Manufacturing firms face emerging global markets in the midst of the transformation from a sellers’ to a buyers’ market [1]. To prevail in this fierce competition manufacturing firms rethought their concept of cooperation and concentrated on their core competences [2]. This cultivation and exploitation of core competences lead to a transfer of their value creation in terms of developing and manufacturing to their suppliers that are arranged in a supply chain network (SCN) [3]. The subsequent integration of suppliers in product creation processes (PCP) challenges especially the procurement as connector between internal organizational customers and external suppliers in the SCNs [4]. At the same time the number of variants and the complexity of products as well as its creation process increases [5]. Over the last decades, industry and academia provided numerous measures for an early involvement of procurement and suppliers in PCPs. These measures address certain situations occurring in this

involvement process like standardization and bundling of procurement requirements in order to cope with the increased complexity of the product and its SCN [6, 7]. Due to the nature of situations these measures are diverse. This requires a systematic overview of measures in order to provide a decision support for manufacturing firms. However, literature is not delivering a corresponding systematization of measures. As a result, the primary objective of this paper is to provide a systematization scheme of measures for the involvement of procurement in PCP. This paper describes the concept of the PCP (1.1) and the fundamentals of procurement and the corresponding procurement process (1.2) as basis for the systematization scheme of measures (3.3).

1.1. Product Creation Process (PCP)

The PCP is essential for involving procurement through certain measures [8]. Thereby, this process refers to all workflows of a manufacturing firm from the idea for a new

product to its serial production. The impetus for the launch of a PCP can be of various origins. On the one hand the impetus can be formed by the need of the market (market pull), on the other hand the PCP can also be initiated by a progress in technology (technology push) [9]. Different approaches for a phase model of the PCP is provided by literature [8, 10]. The description of a phase model is necessary for an explicit assignment of measures to the PCP. This assignment allows a first systematization of measures.

This paper uses a six-step phase model for the PCP. The starting point of any PCP is the project order by the manufacturing firm's management, which is formulated on the basis of long-term firm strategies and product strategies [11]. Based on the project order the idea phase is following the generation, collection and evaluation of ideas (PCP-1). The next step (PCP-2) is formed by the definition of the product. This covers the first definition of requirements for the product as objective of the development [11]. The essential target of the subsequent concept development phase (PCP-3) is the development of the product architecture as description of the product from the perspective of its functions and components [12]. The product architecture is the basis for the creation of modules [12]. For the manufacturer of a product, the definition of its product architecture and its constituents at the level of concrete dimensions represent a necessary condition. This concretization takes place in the context of the phase of product development (PCP-4) [11]. At the same time the production process has to be developed in this step [9]. The start-up phase (PCP-5) with the preparation of production and finally the serial production (PCP-6) complete the PCP [8].

1.2. Procurement and the Procurement Process (PP)

The objective of the paper at hand is to involve the supply function of a firm in the PCP at an early stage by developing a systematization scheme for measures. Since such measures are of a strategic nature, the concept of purchasing with its often operative and dispositive character is not supporting the objective of this paper. The procurement concept shows some similarities to the purchasing, but emphasized the security of supply. This depends on internal aspects as well as on the situation in the procurement market such as the economic situation or the capacity of suppliers. Procurement has a deeper responsibility. The creation of a value-added relationship with suppliers in the procurement market and the early recognition of market developments to exploit technical potential for success are major objects of consideration, justifying an involvement of procurement in the development activities [13].

Literature provides various established models to describe the procurement process (PP) [14]. Most of them are formed by three phases and put their focus on the perceptive of operational activities like negotiations and settlement [15]. Others focus on the perspective of long-term tasks of the procurement as well as on the order processing aspect of the PP [16]. However, none of the mentioned phase models is able to capture the early involvement of procurement aspired in this paper. Since measures that describe such an early

involvement, are more of a strategic nature, the description of an operational PP cannot be used as a basis for the systematization of these non-operative and dispositive measures. In the existing phase models for the strategic PP one or more phases are missing in terms of an early involvement of procurement in product development. A vital example is featuring the role of procurement as a coordinator between the in-house development and the development of cooperating suppliers. For this reason the following six-step phase model for the PP is introduced [8, 17].

The first phase (PP-1) covers procurement activities that affect the generation, collection and evaluation of ideas for a project or a product. This includes the procurement market research to monitoring current technological developments and competitive products. It also includes activities such as the selection and coordination of suppliers involved in the generation of ideas or a subsequent definition of requirements. The second phase (PP-2) focuses on influencing the development of a new product and controlling through specifications. This includes inquiry of using alternative materials or parts such as standardized or repeat parts for the bundling of requirements as well giving suggestions in terms of availability, quality, cost and delivery times of certain components that need to be purchased [17]. The third phase (PP-3) involves a make-or-buy analysis. Accordingly, it is essential to select suitable suppliers or rather plan and initiate the development of a new supplier if required [8]. In the fourth phase (PP-4), procurement deals with the embodiment of the sourcing strategy developed in the previous phase. Thus, it can either be the development of a suitable development cooperation depth as well as the development of an organizational structure of a supplier relationship. As a result, procurement at this stage occurs as a coordinator between the in-house and the supplier's development. The fifth phase (PP-5) describes the activities of the classic procurement. It is primarily concerned with the supply of less complex parts, whereat the price is the center of attention. Likewise, the order management (e.g. invoice processing, logistics planning ...) is implemented. The sixth phase (PP-6) – referred to as controlling – can be understood as a cross-cutting issue throughout the entire PP. It refers to the continuous monitoring of the performance of suppliers as well as the checking of invoices. This is only possible after an agreement with a supplier and an operating SCN, so that it represents separate phase at the end of the PP.

2. Research methodology

The involvement of procurement in the PCP has two major perspectives (product development and procurement) as it intends an involvement of procurement activities in product development. Thereby, the PCP (1.1) sets the impulse of manufacturing firms as core business process. Therefore, a comprehensive understanding of this process and its major activities is essential for the incorporation of other activities like those from procurement. The PCP is derived from literature in the field of product development and focuses on contributions that show a distinct support of activities from other disciplines especially like procurement. The PCP

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