

Product-Service Systems across Life Cycle

Functional Products business model elements: five industrial cases mapped to Hill categories

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Abstract

The paper addresses the Functional Products business model and how its elements are mapped to Hill categories in five industrial cases. The Hill categories include: order-winners, order-losers and qualifiers. The objective for Functional Products is to provide a function to customers with an agreed-upon level of availability, productivity or efficiency, etc. The paper outlines how different cases and their offers, based upon the Functional Products business model, can be element-wise mapped to Hill categories. Insight into the importance of the different business model elements provides valuable knowledge for an appropriate planning, design, sales and provision of Functional Products, as well as for determining how much effort, resources and money to spend on keeping the status of the element sharp, up-to-date, acceptable or just present.

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Keywords: Business model elements; expensive business model; Functional Product; Hill; Industrial Product-Service System; order-loser; order-winner, qualifier.

1. Introduction

A prominent and emerging trend in the manufacturing industry is to integrate products, services and additional constituents in order to provide more value than the product would alone. There are a number of such concepts or offerings comprising various levels of complexity, e.g., solutions [1, 2], servitization [1], Extended Products [3], Through-life Engineering Services (TES) [4], Product-Service Systems/Industrial Product-Service Systems (PSS/IPS²) [5-6], Functional Sales (FS) [7], and Total Care Products (TCP) [8]. However, in this study we focus on the concept of Functional Products (FP) [8-11]. FP integrate the four main constituents: hardware, software, service-support system and management of operation, into provision of a function with a guaranteed or agreed-upon level of availability to the customers. Other potential contract parameters are, for instance, an agreed-upon level of productivity or efficiency. Commonly, the provision of FP is based on a long-term relationship, sometimes ranging up to twenty or thirty years, between the FP provider and the customer. The FP concept shares similarities with the above-mentioned concepts regarding the importance of increasing

soft parts such as service/support, integration of additional services, knowledge/know-how, intellectual property and long-term management. Tukker and Tischner [12] have identified three main categories of PSS i.e., product-oriented, use-oriented and result-oriented, which are also applicable for many of the other concepts mentioned. FP can be considered as mainly result-oriented by providing a function/result. The FP, originating from hardware aspects, have most commonalities with PSS/IPS², TES, FS, and TCP. However, having four main constituents to develop in parallel, FP add additional complexity to the development process in question [13].

FP providers and customers are interested in a long-term relationship in order to find a sustainable win-win situation and lower the overall total costs. Thus, the value and importance of an efficient long-term management of operation is essential in most cases, since the operational costs often many times exceed the initial costs [14]. Subsequently, for the provider, it is of great importance to understand the FP business model and which of its business model elements are key to setting up a sustainable and profitable FP business as the FP offered to customers are based on the underlying FP

business model. Examples of FP business model elements are: customer value and value carrier, recipe for profit and financial stability, risk level and availability, and competence and know-how. The business model can be regarded as providing the infrastructure necessary to build offers upon, and provides the logic and commonalities for the offers based upon it, e.g., a high availability requires a service-support system, risk management, monitoring and analytic capabilities and competences, whereas the development of the offer addresses matters such as hardware reliability, maintainability, monitoring and analytic specifics. Thus, the FP business model needs to be kept in shape as well as the offers based on it. Further, as the business model elements reflect the underlying business logic, this understanding is important for planning, design, sales and provision of FP as well as for determining how much effort, resources and money to spend on keeping the status of the element sharp, up-to-date, acceptable or just present.

Recent research on business modeling and business model elements within the FP context includes the following: outline of a proposed set of business model elements [10], business models and operational tactics [15], win-win situations [16], value co-creation [14], value-based selling [17], risks related to value creation/delivery/capture [18], a proposed set of customer values related to sustainable management of operation [19], sustainable-oriented customer values [20] and general values for both provider and customer [21]. Further, PSS/IPS² literature proposes additional insights such as: business model elements [22-24], customer values and value proposition [23, 25], business models and tactics [26], management of risk [27], and profitability [28]. Thus, the emerging literature indicates which FP business model elements may be of interest in terms of value creation and support for the value creation. However, the research listed above does not provide guidance on why the business model elements are of importance for the planning, design, sales and provision of FP.

The concept of co-creation of value is regarded as a key aspect in many FP scenarios to achieve long-term relationships and to create necessary win-win situations [14, 16]. Co-creation of value [29-31] adds new possibilities and dynamics to the provider/customer relationship by involvement of both actors in the production and distribution of value. Thus, the co-creation of value may have a greater impact in FP contexts than it does in a pure product or service context, since FP contracts may range up to as long as twenty or thirty years.

To sum up, guidance on why and which FP business model elements are of importance for an appropriate planning, design, sales and provision of FP is scarce in the current literature. Therefore, this paper attempts to address this gap by using Hill's framework [32] to highlight which elements are important and why they are important.

The rest of the paper is organized as follows. First, there is a section describing the research approach, which is followed by a section outlining FP and their business model elements, and a section on the Hill framework. Subsequently, the findings of the study are presented and, finally, the paper is summed up with a conclusions and discussion section.

2. Research Approach

The research approach employed in this study has been based on in-depth qualitative studies with 10 respondents representing five manufacturing companies. The empirical studies were conducted using semi-structured open-ended interviews [33-34] with respondents working for companies active in the Faste Laboratory at Luleå University of Technology, Sweden, which is a VINNOVA¹ Excellence Centre focusing on FP Innovation. One additional company, Electrolux, which sells functional offers to customers, was also part of the empirical studies. Thus, the respondents were well aware of and knowledgeable regarding FP. The respondents were professionals responsible for marketing, services, strategy, development and sales at four international companies and one Swedish-based company:

1. Gestamp Hardtech AB (one respondent – manager tool design and development)
2. Volvo Car Corporation (two respondents – product strategy and marketing directors)
3. Volvo CE (two respondents – service marketing manager, advanced engineering engineer)
4. Infrafone AB (four respondents – CEO, sales representatives)
5. Electrolux (one respondent – regional category manager)

The purpose of having multiple companies with diverse focus was to ensure an advance in the understanding of the FP business model elements and their importance as well as why they are important, considering the similarities and differences between the companies (cf. [35]). Although the companies have different offerings, they all face the common challenge of how to best plan, design, sell and provide FP and/or similar concepts such as PSS/IPS², either as a provider in a partner consortium or as part of their own offerings. The companies are all manufacturing companies with roots in hardware development. However, additional complimentary components have been added to their customer offerings. What the additional components comprise and their weight or importance differs depending on industry and customer segments served. Some of the companies aim to increase their revenue from soft parts; i.e., services, knowledge or know-how, etc., as well as FP sold globally. Thus, the FP planned or currently offered by the companies vary and have different emphasis on the composition of hardware, software, service support system and management of operation.

Initially, semi-structured interviews were used, with open-ended questions [33-34] allowing the respondents to give detailed answers and the possibility to add extra information where deemed necessary [36]. The duration of the interviews was between two and three hours. In order to keep a wider view on FP business modeling, planning, design, sales and provision as well as to reduce response bias, the respondents

¹ VINNOVA – The Swedish Governmental Agency for Innovation Systems

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