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## Method to create proposals for PSS business models

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### Abstract

Different authors of the product-service bundle literature agree on the fact that business models are central to implement PSS successfully. However, most of the studies about PSS business models mention its importance but do not explore which content should compose such models. Furthermore, PSS business models are explored taking into account a partial view of business model dimensions. Finally, actions that lead to the creation of a new business for PSS or the adaptation of a current one are not distinguished. The goal of this study is to present a guideline to support the creation of PSS business models. Through systematic literature review and consulting with experts, the content of such models were developed. This content is organized in steps that encompass tasks, which must be performed in order to create a PSS business model. The method was already improved after application through a case study and currently is being utilized to generate a PSS business model for a bicycle sharing system. Final considerations include the weak and strong points of the method and further steps to enhance it.

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**Keywords:** Product-service system; business model; fuzzy front-end.

### 1. Introduction

PSS is an alternative for companies seeking business innovation. The paradigm of developing solutions only in the form of physical products to be sold must be broken, because value is not necessarily provided through the sale of the product, but by means of the functionality or result it can generate. Thereby, PSS does not address only the configuration of service and product components, but also the configuration of business models [1]. Business models represent how companies create and deliver value to its clients based on their strategic choices [2] and enable to express simplified description and representation of the business logic of a firm [3]. Tan [4] states that the business model concept is useful to characterize PSS, since its implementation often requires the redefinition or creation of new business models [5].

Despite the fact that recent studies highlighted that business models are essential to implement PSS successfully [6,7,8],

orientation on how companies should plan and implement such models is still very limited [8,9,10].

The lack of guidance on how to create PSS business model might be related to some factors. First, there is a lack of agreement about the definition of PSS business models [11] because there is little fundamental research developed on business models for PSS [7].

Second, these studies explore PSS business models taking into account a partial view of a given business model, i.e. they consider just some business model dimensions [11].

Third, there is a lack of methods and tools that support the creation of proposals for PSS business models in the fuzzy front-end [12].

The goal of this research is to develop a method, named Configurator of PSS Proposals, to cope with the factors mentioned and guide companies during the creation of PSS proposals for a current or new business model.

The proposals, also named as business case [13,14], covers information about the potential market to be reached,

customer needs and technical and financial analyses to support final decision-making [15].

## 2. Methodology

The methodology adopted as main approach is the design research methodology (DRM), which presents four stages: Research Clarification, Descriptive Study I, Prescriptive Study and Descriptive Study II [16].

The Research Clarification stage addresses the formulation of a realistic and valuable research objective (section 1 of this paper), based on gaps identified in the literature.

In the Descriptive Study I stage, the content of the configurator was defined based on systematic literature reviews, whose steps are presented in [17]. It is considered that PSS business models should embrace specifics of product and service development projects besides the PSS development. Thereby, attributes of PSS, product and service development projects were searched. Table 1 presents two of the 106 attributes identified. The different options covered by the attributes, the references and from which literature the attribute was found are also mentioned in the table.

Table 1. Examples of attributes identified by systematic literature reviews

Attributes	Options			Ref.	Literature
Types of product-service orientation	product oriented	use oriented	result oriented	[18]	PSS
				[19]	
Level of innovation on the product	incremental	really	new radical	[20]	Product Development

According to the DRM in the Prescriptive Study stage, the researches use their increased understanding of the existing situation to correct and elaborate a proposition [16]. Thus, a concept of the configurator was outlined and the attributes identified in the previous stage were classified according to business model dimensions. The Descriptive Study II stage covers the investigation of the impact of the method and its ability to achieve the goal, i.e. the desired situation [16]. The last two stages are carried out iteratively.

Two rounds of experts' evaluation were used to assess the attributes identified by the systematic literature review. By means of a questionnaire, they evaluated the relevancy of the attributes to create PSS proposals by giving grades between 1 (not relevant) and 5 (really relevant) to the attributes. Taking into account the grades and through a discussion with the experts, inclusion, exclusion and enhancement of attributes were carried out and a consolidated database built.

The method is being applied to generate a PSS proposal for a bicycle sharing system.

## 3. Configurator of PSS proposals

### 3.1. Application Context

The decision about creating or modifying a business model takes place in the fuzzy front-end.

The fuzzy front-end is a planning phase that encompasses activities performed prior to the development of technologies [15], products and/or services or new business [13]. The fuzzy front-end has as input the identification of an idea or opportunity and outputs a proposal for new product, service, technology or business [14,21].

Figure 1 shows the context of utilization of the method.

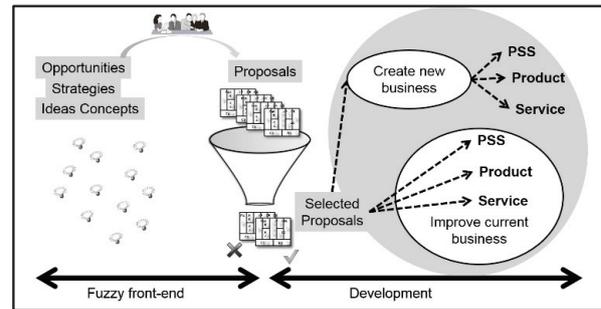


Fig. 1. Context to utilize the method

This study defines PSS proposal as a document elaborated based on strategies, ideas, opportunities or concepts and created during fuzzy front-end, which contain the description of PSS business a company intends to develop. These proposals need to be evaluated and selected to be further developed. It is important to mention that the scope of this study is to create such proposals but not to define criteria to select the proposals. In addition, it does not cover the selection of which strategies, opportunities, ideas and concepts should be used as input for the method.

### 3.2. Elements of the method

The method is composed by five elements, named inputs, outputs, steps, tasks and help.

Figure 2 presents the complete overview of the method.

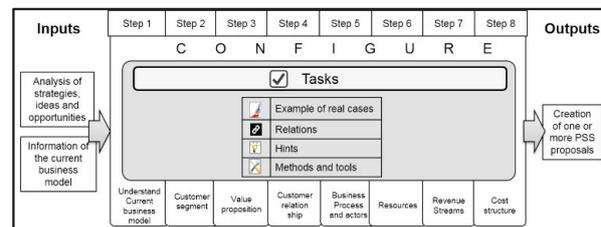


Fig. 2. Representation of the method

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