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A service design framework for the initial phase of service development

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Abstract

Services dominates our economy and plays a decisive role on the success of any business strategy. The process of service development is important concern in many product service industries to ensure sustainable competitive advantages. In developing new services, a large amount of efforts has been focused in crafting its core features and attributes, and extensive attention is paid to conform to customer needs, with an eye to satisfy the expectations of high quality. In this paper we present a ParBaSe service framework, which aims to enable parametric based service design approach in the initial service development process. This novel framework provides an adequate means to represent stakeholder's requirements in the design phase of service innovation. Furthermore, a dedicated software application is used to improve the efficiency and accuracy while applying the conceptual phase of service development process

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Keywords: Service Engineering; Service development; Service design

1. Introduction

As the concern of reliable, low cost and high quality of services broadens in regional and global economy, the significance of service innovation has risen to the forefront of service industries and research institutions, since the development of product services still forms an obstacle [1]. Efficient and high-quality services are crucial not only to its consumer but also to product service providers. The process of service development is critical to service innovation, that is, when designing a new service or increasing the value of the existing service offerings. In the initial phases of service development, where interests and needs of different stakeholders are considered, numerous challenges may arise such as when addressing the customer perspective to engineer service experience factors, fulfilling the obligation of advocating business benefit maximization. Hence, the necessitated blending of requirements to address both the customer and the business perspectives and their proper transformation into design requirements is of utmost importance. Moreover, even once the service design requirements are established, there remains a gap between the service specifications and of the delivered service [2]. In this attempt, this investigation is the continuity from our previous work, where service design framework ParBaSe is introduced [3][4]. The detailed explanation of this framework and examples on its applications are also available here [5].

However, it has been observed that even though the use of ParBaSe framework reduces the complexities and ambiguities associated with in service conceptualization, but its use calls upon much expertise to work around, due to the utilization of extensive service design artifacts, which includes 4 service models; 44 service categories; 467 service parameters; and more than 800 service attributes. Thus, making it a quite challenging task to exercise service development through ParBaSe service framework. Therefore, to address this gap, the paper presents firstly the workflow of *ParaBaSe* service framework, to provide a clearer understanding on consequent activities that needs to be carried out in the initial development phase of the service development and secondly the use of dedicated software is presented. The aim here is to offer a structured approach for the development of services. Thus, the

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purpose of this paper is to facilitate the service development tasks to be more operationalized; thereby enabling the service designer to focus better on his creativity to resolve objectives in service innovation activities. Hence, the prime target to reduce the complexities and to reach a higher efficiency while specifying services.

The rest of the paper is organized as follows. In Section 2, we describe the main concepts of *ParaBase* approach, which relies on the concept of service parameters, and offers an innovative service design framework. In Section 3, the use of a dedicated software is presented in a brief manner, where its users can apply the concepts of *ParaBase* service framework in a systematic and effective way. Finally, the last Section 4, concludes the paper with future work.

2. ParaBase – a service design framework

This novel service development framework is based on idea of picking selected service design parameters to furnish the creation of new service, with an aim to improve the quality of service design practices. This service framework as shown in Figure 1, allows service designer to transform stakeholders' requirements into service design artifacts by defining the appropriate service characteristics.

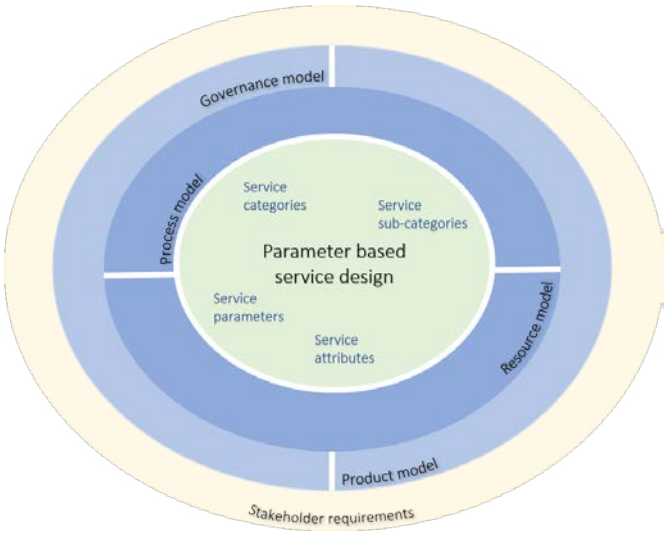

Fig. 1. ParBaSe service framework- a parameterized service development approach.

In this framework, four service dimensions are provided, where each has relevant extensive list of service parameters to select from. These dimension are: i) *Governance model*, for the specifications representing the high level of business requirements [4]; ii) *Product model*, for the specifications representing how the service should be or what a service does [6][7]; iii) *Process model*, for the specifications to represent the activities that needs to be performed to make a service available [6][7]; and the iv) *Resource model*, for the specifications to represent the required resources, which must be allocated for the activities of *process model* to take place [6][7]. Firstly, a service designer with the help of a domain expert, establishes both *governance* and the *product models*, by selecting appropriate service categories. Subsequently, for each chosen category, suitable sub-categories and preferred parameters are selected. For these service parameters adequate values are applied. Once the *governance* and the *product models* of the outer layer are created, based on the available information, the service artifacts of the *process model* in parallel with the *resource model* are design. Thus, this whole approach consists of the three consequent stages [4]: i) identification of the stakeholders' requirements; ii) elicitation of the service design requirements for the *governance* and *product models*; iii) operationalizing of the service design concepts by establishing the service design parameters of the *process model* and thereafter the *resource model*.

3. A dedicated Software

The main purpose of this software is to allow easiness to its user to apply the main concepts of ParBaSe service framework more effectively. Thus, supporting the service innovation using information technology [8]. The functionalities of the software assist its user to apply the overall workflow activities as shown in Figure 2.

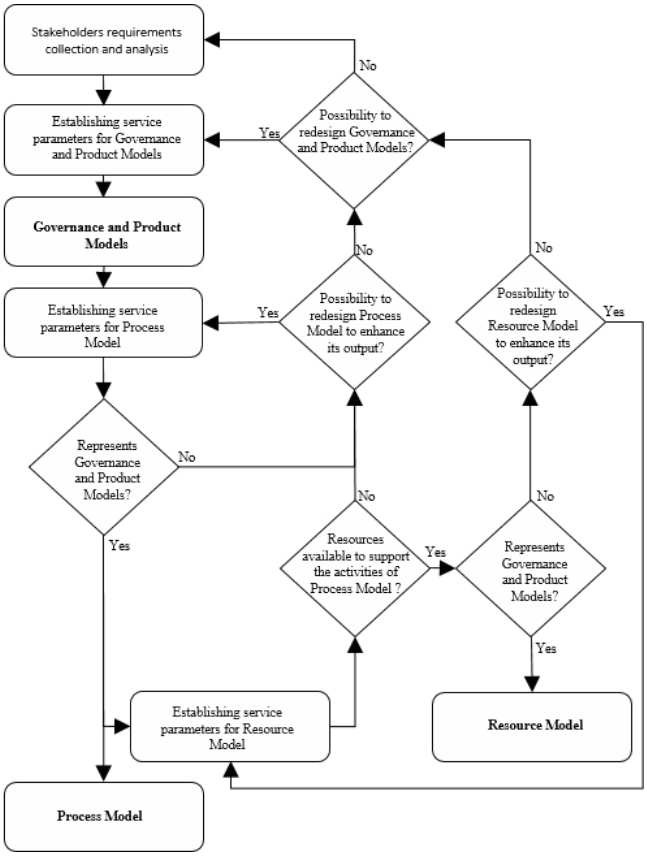

Fig 2: Workflow activities of the ParBaSe service framework

Typically, the workflow activities start with the collected requirements from different stakeholders are analyzed and are refined according to the selected service parameters of *governance* and *product models*. Once these two service

models are established and therefore represents the needs of stakeholders, the process of service design flows to the next activity. At this stage, based on the available information the *process model* is designed, and in case if the established service parameters of the *process model* do not comply with the parent *governance* and *product models*, then it is suggested to redesign the *process model*. However, there might be a situation in which sufficient information is not available to properly design the *process model*, then it is suggested to go back to the stakeholders to ensure all requirement details. Thereafter, the required resources are allocated for the corresponding activities of the process design, by selecting the corresponding service parameters of the *resource model*. However, once again if sufficient data is not available to establish the required service parameters of the *resource model* in accordance to the *product model*, then all three preceding models needs to be redesigned before approaching again to the stakeholders. Thus, at every stage of service design process, it is important to make certain that each of the resulted service model stands for its prior activates and confirms transformation of requirements into service design artefacts.

Furthermore, the use of software allows its user to effectively apply this extensive parameter based approach in a step by step manner. Other than the benefits of offering online access, the software enables all the information data, gathered during the service innovation process to be stored centrally and available to be recalled when required. The software offers built-in templates with many fields representing each of the four service design models, which holds specialized information to support specific aspects of the service development. In addition, the template offers more than 800 possible attributes to select from, to reflect in depth on the details design of the proposed service. Furthermore, software enables the feature to create additional service design categories along with their respective parameters and attributes, depending on the service type to meet service design needs. It offers the functionality to store metadata information on the service design artifacts such as their relationships with other service concepts, ability to set relevant attributes by either selecting the proposed values or by entering user defined values.

The software design is based three-tier architecture model, containing: a user interface; processing logic; and database layer. The web-based user interface provides the graphical interface, where through the predefined models representing the service design concepts, domain expert may apply the prospective service concepts. This includes, based on the service requirement specifications setting of different levels of service categories and their perspective service parameters. Hence, the user-interface of plays an essential role in promoting the service designer engagement and interest. There is a menu-bar available that allows user to navigate around the application, and the list of relevant sub-menus with various options to access required functionality or the information.

The middle tier would specify the logic behind the service models and how they should be integrated, so to make sure that the service developments stages are followed and appropriate service concepts are applied. Finally, the third layer is data persistence layer, where data for further manipulation of information is saved and retrieve as per specific model requirements. On the selection of technologies for the development of this software tool, we have used only open-source technologies, which includes Java based development platform, MySQL database and Apache web server.

The software allows its user to select from the extensive list of service design categories falling under each of the four service design models. Following the service design structure, once the appropriate categories are selected, user can provide further refine information relevant to these service categories. The software facilities four possible ways to input information: either entering user specific information on the values of the service parameters' attributes; choosing multiple values from the given checkboxes; selecting a single choice value from the given radio buttons; or picking single option from the drop-down option. Furthermore, in each service model, there may exist directly for each service category a set of service parameters or are divided into sub-categories, where each service category has service parameters along with the choice to enter values to its attributes. As show in Figure 3, the *Hardware* is the category, and *Measuring device* and *Quality* are its sub-categories. The sub-category *Measuring device* has a service parameter Material, with two possible attributes: *Metal* and *Plastic* to select from. Thus, the structure of these models may consist of list of service categories, sub-categories, parameters and attributes.

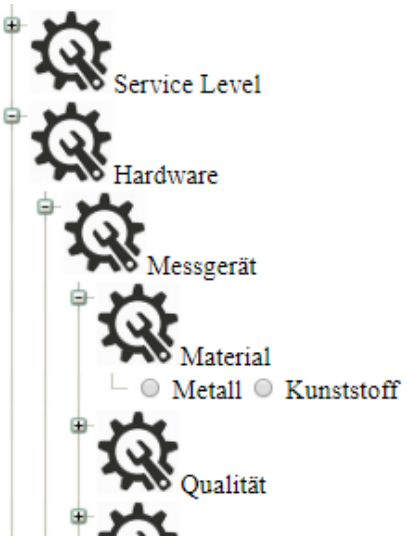

Fig 3: Service category, sub-categories, parameters and their attributes

Thus, in a systematic way the use of the software allows service developer to apply proper information on the design artifacts serving to express the prospective service that is to be developed. Figure 4 presents a snippet of the selected service categories applied for the *process* and *resource models* with the use of this software. The relationship between these two service models are represented through links, where for each category or subcategory of the *process model* the respective *resource* categories or subcategories are allocated.

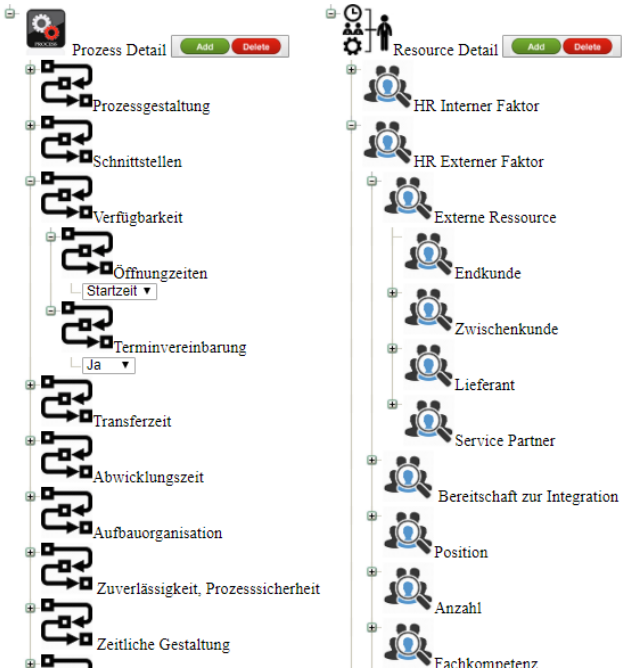

Fig 4: Process Model and Resource Model Tree

In addition, the software provides an option to add new categories, subcategories and their parameters as needed along with the option to delete at every level of the structure. All the data made available through the use of this software is stored in the database, and can be made available to assist in similar type of service design.

4. Conclusion and Future work

The paper presents in detail the workflow of ParBaSe service framework, with an aim to provide better understanding on the activities involved in the initial phase of product service development. Furthermore, the use of the software to apply the concepts of this systematic service designing approach greatly enhance the capability of service designer to effectively and efficiently carry-out the service designing activities. Thus, paving the path to engage service designer more deeply and support service innovation with the aid of software.

However, the adaption of this service design approach demands comprehensive service requirement analysis. The use of the software with even limited functionalities requires prior training, prior understanding of the ParBaSe service framework. Thus, the outcome of this research aims to considerably enhance the knowledge on the initial phase of the product service development. In future work, it is important to perform more case studies related to different product service innovation and suggests developing more specialized and enhanced software applications to aid service creation.

Acknowledgements

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