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Product-Service Systems across Life Cycle

Process standardization to support service process assessment and re-engineering

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Abstract

Service Engineering (SE) discipline is currently supporting companies during the engineering and re-engineering phases of their service offering. With the support of SE methods, companies can undertake their servitization journey with the best premise to gain as well as deliver value to their customers. For this purpose, the Service Engineering Methodology (SEEM) has been proposed. The SEEM entails methods to design service concepts and processes capable of balancing value between customers and the company. Some industrial cases, carried out in collaboration with ABB, a leading provider in power and automation technology, demonstrate the effectiveness of such methodology in the re-engineering of existing services in B2B context. Despite that, the cases show that the SEEM application is time consuming, especially in the validation of the service provision process. Thus, in order to facilitate and speed up the implementation of the methodology, a standard process for service provision becomes relevant. Then, starting from the re-engineering of the existing product-oriented services offered by ABB, this paper aims at laying the foundation for the definition of a reference model and a standard process model for product-oriented service delivery. The results will support the SEEM adoption and the definition of service processes avoiding the design of customized models, that cannot be compared and adapted to different realities. In line with what has been found in literature, the definition of a possible reference model and a preliminary standard process model are presented.

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Keywords: Service Engineering; PSS Design; Process Standardization; Reference Model

1. Introduction

Business complexity can be seen as the direct consequence of the globalization phenomenon that led to continuous changes in customers' demand. In order to face this evolving market and to fulfill the different requests, companies are seeking to provide bundles of products and tailored services, the so-called Product-Service Systems (PSS). Therefore, the materialistic value is nowadays replaced by an intensification of the service contents leading to the consequent dematerialization of offers [1, 2].

In such a context, companies that in the past were mainly focused on product engineering, are now striving to develop new services and/or improve the existing ones. However, the availability of proper methods and tools to support the service design is currently limited especially due to the intangibility of services. Indeed, existing engineering methodologies are more product-oriented and cannot be adopted in the case of intangible "product" (service). Therefore, in order to support companies in the design of the service components of a solution, Service Engineering (SE) emerged as a technical discipline, proposing structured methods for service design and development. Far from being a marketing-oriented approach, as the new service development is, the SE is a more technical-methodological approach that inherits and adapts (when possible) the traditional know-how to develop innovative services [3].

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In spite of the great success of the SE as an academic discipline, only few authors have proposed methodologies and tools, which can be easily adopted in the industrial context as they are usually customer-centric during the design of a solution [4,5,6,7,8,9,10]. For this reason, [11] proposed the Service Engineering Methodology (SEEM) as a useful framework to design solutions able to technically satisfy customer needs and considering, at the same time, the operational excellence during the service delivery. Fig. 1 shows the SEEM and the two main areas: i) left hand part regarding the analysis of customer requirements and needs and its comparison with the company current offering (if any) ii) right hand part focusing on the definition of the provision process optimizing company performance fulfillment.

Although this methodology provides a detailed description of each step along with the methods to be applied, its application [12], turned out to be time consuming, especially in the process validation phase. In fact, the methodology envisages the use of discrete event simulation model to validate the service delivery process prototype and to perform what-if analysis. This means that all the needed activities have to be detailed and data related to timing, demand, and resources involved have to be gathered or assumed.

Thus, in order to facilitate and speed up the implementation of the methodology, a standard process for service provision becomes relevant. In this way, a company when (re)-engineering its service portfolio does not have to start from scratch in the designing and validating the delivery process. Obviously, different standard processes should be defined for similar service categories. Service category refers to the classification made by [13], that distinguished between i) *product-oriented* services that are performed on the product itself and primarily requires deep technical knowledge of product functioning and operation, and ii) *customer-oriented* services addressing broader customer needs beyond product functioning and operation.

This paper focuses on product-oriented services and aims at laying the foundation for the definition of a standard process. In particular, starting from the re-engineering of existing product-oriented services offered by ABB, the goal of this paper is the definition of a process reference model and a possible standard service provision process for ABB.

Hence, Section 2 describes ABB and the main requirements in terms of standard process. Then, in Section 3, a standardization procedure is proposed to address the main gap identified in the SEEM with the objective of building up a standard model suitable for the application in different ABB units. Finally, Section 4 summarizes the main insights of this work and proposes further research prospects.

2. ABB: Identify a proper balance between product complexity and standardization requirements

2.1. ABB Company

ABB is a global leader in the power and automation technologies and its product range varies from robots to low voltage breakers, household appliances and high voltage motors. Two important goals of ABB are generating value for customers and enhance company value. Indeed, if on one side ABB has to beware of the customers' requirements, on the other side internal efficiency is crucial to ensure a profitable business. As a consequence, the portfolio of offered services is extremely heterogeneous to adequately address the different needs expressed by customers. Moreover, this complexity is further increased by the fact that ABB is split in several divisions spread all over the world. As a result, the different geographical locations, the different value propositions offered, and organization settings lead to the implementation of diversified delivery processes.

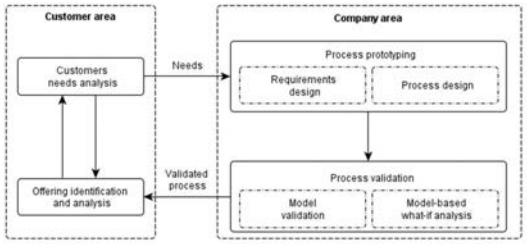

Fig. 1. SEEM framework [11]

With the aim to align the existent services to the changing customer's requirements, the SEEM has been adopted in several ABB units to re-engineer the current service offering. Among the variety of ABB services, those related to low voltage products (breakers and switches), robotics, and motors and generators have been analyzed [12,14].

The applications helped to identify the drawbacks of the current offering in satisfying customer needs and to highlight the main problems of the current service delivery processes. In particular, the process validation phase, carried out with a simulation-based approach, showed the bottlenecks of the current process and the possible issues in the future scenarios undermining the customer satisfaction and, at the same time, the company profit.

All the SEEM applications in ABB confirmed that the methodology provides valuable insights from company point of view. However it is very time consuming since every implementation requires the creation of highly customized service delivery process models. For instance, the SEEM implementation in the Motors and Generators (MG) division in Italy showed that the defined service delivery process model cannot be extended to other Motors and Generators units spread around the world or to other ABB divisions because every units has its own taxonomy and its own features. Thus, starting from this SEEM application, this paper aims at defining a standard service delivery process and a standard process model for ABB. In particular, the analyzed process is related to the delivery at worldwide level of product-oriented services (technical support, installation, commissioning, diagnosis, preventive maintenance and corrective maintenance).

The following section presents a brief review of existing works related to process standardization and reference model construction then, the procedure adopted for ABB case is presented.