Information – The Hidden Value of Servitization

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Abstract. Today, in a product-service offering, the product and its related services can represent two main sources of revenue streams for the manufacturer. Tomorrow, information deriving from servitization and exploited on an ecosystem level, could represent the third one, whereas due to their ample potential in sharp market value increase, they could even become the manufacturer's main revenue stream. This article of explorative nature questions the possibility to introduce such disruptive approach. In order to do so, servitization is evinced through a new perspective, through information. In order to exploit this new potential, the concept of an information ecosystem is introduced. Secondly, a new role is proposed, helping manufacturers to span the boundary between product and service. To depict the impact of the introduced concepts while positioning it in relevant literature, a third layer of added value was added to Thoben's representation of servitization levels [1], the information layer.

Keywords: Servitization, product-service, information, product-service boundary spanner, ecosystem, manufacturing

1 Introduction

In the era of the knowledge economy, knowledge can command price premiums over comparable products with low embedded knowledge or knowledge intensity [2]. It is also the economic counterpart of the so called information society, with dozen of labels suggesting that humans are entering into a new phase of society [3]. Wang [4] describes the same phenomenon which she calls "informatization" as a process of change that features among others the unprecedented growth in the speed, quantity, and popularity of information production and distribution". Though this point of view can be debatable, as for instance Webster [5] explains that society is not entering a new phase. Based on the definitions, manufacturing is part of the knowledge economy and information society. It is even gaining on relevance, which is not due only to the informatization of the manufacturing processes, but also due to the servitization of

manufacturing, which is an information intensive process, explained in the continuation.

As services provide in general a more stable source of revenues [6] and represent an additional one to manufacturers, servitization is a more and more pervasive approach, from which multiple questions derive. An essential one is: "What kind of product-service (P-S) to offer, for to indubitably satisfy the needs of existing customers and, concurrently, to attract new ones?" Therefore the often raised question how to create and offer a P-S is not raised, but how to create and offer a P-S that is of high perceived relevance to the customers, meeting and targeting their needs or even creating new ones? While doing so, what kind of additional added value for the manufacturer and other servitization partakers can be discovered and foremost how it can be captured? In order to answer them, the manufacturers have to relate more closely and intensively and on a longer term with their customers, as many are quite disjoint with them. Therefore this proposes: first a new process called informatization, which will enable manufacturers to create more efficient and of higher added value services in relations to products, hence spanning the P-S boundary. Secondly, a new role is proposed, called the P-S Boundary Spanner (B.S.) that helps manufacturers manage and exploit the informatization process on an enterprise level, as a closed information loop. Thirdly, the B.S. transmits the exploitation of the informatization process onto an ecosystem level; therefore the concept of the information ecosystem is introduced. Herein the data and information are shared and traded, overall exploited by different entities such as manufacturers, service providers, advertising agencies and research institutes. Altogether it aims to maximize and especially capture the added value arising from P-S, which was previously mainly overlooked. Besides creating an additional revenue stream, it enables to span an essential boundary that manufacturers face, the manufacturer-customer boundary.

The article goes as follows. First servitization is presented and the process of informatization positioned within it. Afterwards the role of the P-S boundary spanner is introduced and its information ecosystem. Finally the converged effects of the introduced concepts, which cause an increase in the overall added value derived from servitization, are depicted on Thoben's representation of servitization levels [1]. The article offers a short discussion with possible research paths and limitations.

2 Servitization and Informatization

Many different classifications and definitions of service oriented strategies can be found in literature, as for instance servitization [7], servicizing [8], product-service systems [9],functional sales [10], full-service contracts [11] etc. P-S systems have the potential to bring changes in production and consumption that might accelerate the shift towards more sustainable practices [12]. Also they all focus on the customer; this focus was gained attention already in the 1970s, in the marketing field, but the manufacturing field did not yet fully grasp the customer concept; understandably, both fields had different limitations and priorities. Manufacturing to produce a solid product and marketing to meet as much as possible the consumers needs [13]. Marketing

brought up the customer orientation that was later on in the 1980s adopted by the field of strategic management, by Porter and its value chain concept [14], which provided a mean to systematically understand the sources of buyers' value, being one of the essence of service oriented strategies. Only in 1988 the definition of servitization was coined by Vandermerwe and Rada [7], which defined it as "market packages or bundles of customer-focused combinations of goods, services, support, self-service and knowledge". It can be deducted that the manufacturer and customer are more and more connected in time through different approaches and that servitization is only a logical consequence of the evolution of this relationship. Among others, it is a mean that enables manufacturers to relate more closely with customers.

2.1 Informatization as Part of Servitization

As the stability of service revenues for many enterprises is higher than from the product [15], this could indicate that manufacturers in order to stabilize their revenues should integrate services into their business models. Though, to provide an innovative P-S is not necessarily satisfying, as the customers have to perceive it also of high relevance. Indubitably, the manufacturers have to relate more closely and on a longer period with their customers. As such the needs of its customers have to be first identified, so the right ones are being met. This can be achieved through longitudinal product or P-S usage observation. The data are then collected, analyzed and the initial offering can be enhanced. The following process is called informatization, which actualizes itself during servitization. More exactly it enables to collect and store data from customers, analysis the data about their habits of product or P-S usage with the goal to discover new needs or identify changes in pattern usage. Those information can be used to enhance the existing offering in terms of product, P-S or their SLAs back to their customers. This means that new information for its customers are generated in form of an enhanced product or P-S; such an example of information of form of a service, can be the offering of personalized best practices related to a product usage based on the analysis of customers' product usage patterns. The figure bellow represents informatization on the enterprise level with its data flow.

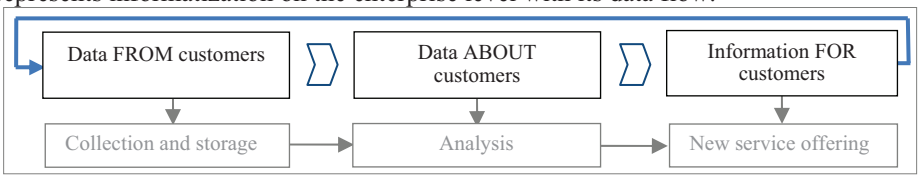

Fig. 1. Informatization on the enterprise level as part of servitization

During the informatization process, the collection of information can be effectuated in two ways at least: a) firstly by creating a smart-product, an example of which can be the monitoring of a refrigerator in its Middle of Life (MOL) sending data to the manufacturer in order to perform predictive maintenance services [16]; in the informatization process, the information are automatically retrieved and collected onto a server; b) secondly by designing such customers incentives that will motivate

them to give their information to the manufacturer by themselves (e.g. the customer describes its wardrobe and makes it available to a cloth manufacturer); this possibility can be complementary to the first one (e.g. the usage of an RFID chip integrated into clothes could be additionally used in the latter example, enabling additional retrieval of information). Such collected data can be of the highest quality, as they are collected directly and are longitudinally linked to real customer profiles, making the data even more valuable (e.g. a large data set from a specific segment of customers over a period of time). Afterwards the data are analyzed using data mining techniques to uncover hidden patterns and also business intelligence techniques can be applied. Those information can for instance be relevant to assess machine risk failures, which would increase the capabilities to determine risk, possibly influencing the profitability of a P-S [17]. Consequently, manufacturers can get an incredible glimpse into usage pattern of their products or P-S. It also enables to see in what way the usage habits have changed when the manufacturer is shifting its offer from product to P-S, hence being able to swiftly adapt its value proposition, especially its Service Level Agreements (SLAs). This capability is essential, as otherwise manufacturers can offer a P-S, that will be largely accepted by its customers, while seeing their margin decreasing over time, as it was the case with a manufacturer of printing equipment that moved into services [18]; namely the usage habits of its customers changed when the manufacturer changed its offering from product to P-S; it even prompted a non sustainable product usage.

As seen, informatization depicts servitization from an information point of view, while elucidating that this is an information intensive process prompting the creation of time and contextually relevant information and integrating them into the servitization value creation process. As the offered services around the product target more the needs of customers, they should be perceived of higher added value; as such spurring the creation of additional services. Consequently spurring the informatization process contributes to spanning the product-service boundary. By spanning this boundary through informatization, the manufacturer can more easily, strongly and enduringly relate to its customers, as such spanning the boundary between the manufacturer and customer. Therefore, the next section deals with the question of how to prompt the intensiveness and exploitation of the informatization process.

2.2 The P-S Boundary Spanner and its Information Ecosystem

In order to help manufacturers exploit the informatization process and span the both boundaries, the P-S one and the manufacturer-customer one, a new role is introduced, called the P-S Boundary Spanner (B.S.). The outputs of informatization are information, which can be exploited through the servitization on the enterprise level. The new role can contribute in helping a manufacturer: a) creating the “smartness” of products, hence enabling the extraction of data, b) collect and store the data; c) to analyze the data according to the manufacturer’s objectives using data mining and business intelligence techniques. However, the exploitation possibilities of informatization on an enterprise level as a closed information loop are quite limited, therefore transmitting the exploitation of informatization on an ecosystem level.

Namely, the networked economy represents the next economic evolution, where the economics of scale stem from the size of the network - not the enterprise [19]. Hence the concept of the information ecosystem is introduced, where multiple closed information loops from servitization are opened among the ecosystem partners.

The ecosystem members are united in the ecosystem by the information from the informatization process and by their high exploitation potential, thus making this an information ecosystem, not a P-S ecosystem or a manufacturing one. It is managed by the B.S. and supported by ICT infrastructure. Its objective is to give additional relevance and value to the data and information, which do not depend solely on their role in informatization on the enterprise level, but also on the demand for those information from the ecosystem partners. The collaboration in the ecosystem is in theory nonhierarchical and global, therefore differing with Camarinha-Matos's [20] definition of a business ecosystem. The information ecosystem is very close to the definition of a service ecosystem embodying the essence of service and is a customer driven ecosystem [21].

By exploiting the informatization process as part of servitization through the B.S.'s ecosystem the following potential benefits per type of member are identified. The first type of member is the manufacturer that performs the informatization: a) selling its data to other members, hence creating a new revenue stream; b) getting an insight into its customer's habits and needs and being able to enhance its products or P-S. The second kind represents manufacturers that acquire the information from other manufacturers, using them to enhance their product or P-S. The third kind are service providers selling or buying information about customers' usage habits and patterns, enabling them to: a) create new independent services or related to an existing product, therefore creating a P-S with another manufacturer, exemplifying that multiple service providers can built a P-S around one product; b) create an additional revenue stream by the exploitation of data. The forth kind are advertising agencies, which by acquiring those information gain access to a very rare and valuable type of information; this enables them to target and segment more efficiently consumers. This would represent an important step in CRM. The fifth kind of members represent research institutes that: a) gain access to an unprecedented type of information, b) increasing the possibility to cooperate with the industry.

2.3 Impact on the Added Value Created During Servitization

Looking at the basic idea behind the concept of the extended product, it is constituted from the tangible part, being the kernel of a product and the product itself, and also from the intangible part, being the service [1]. This means that the benefits for the P-S providers, as also for their customers, derive from the product and its service(s). How much added value is provided by the product or services in different levels of servitization is also depicted by Thoben et al. [1] with its 4 levels, ranging from pure manufacturing of parts on one side to the provision of pure benefits, whereas the level of service relevance in the P-S bundle is rising. As elucidated previously, informatization is part of servitization and through its exploitation on the ecosystem level it creates an additional flux or layer of added value for the P-S providers, cus-

tomers, as also for other members of the information ecosystem. Those data and information, being the basis for of the informatization process and of the new added value, are consequently inherent with the product and P-S layers (circles) in Thoben's representation of servitization levels. As such, the data and information represent an additional layer of added value; this signifies a new source of added value during servitization. The impact of information exploitation (visible on the figure bellow in orange squares) during servitization is represented using Thoben's representation of servitization levels [1]. The figure bellow depicts the added value from the P-S providers' perspective.

Fig. 2. Information as the nucleus of additional added value in servitization

Insofar the added value for the P-S provider as for the customers derived from the product and its services converged into a P-S offering; whereas, now, an additional layer of benefits is added to this convergence, the information layer. The same concept of adding information as an additional layer of added value, could be depicted also on the Extended Product Concept [22], where the shell is represented by the product and the outer shell by different kind of services; hence the information layer surrounds the existing ones.

3 Discussion

As information potentially represent a third revenue stream, besides products and services, the manufacturer could target more specific customer niches' that otherwise from a financial perspective would not be sensible. This higher level of P-S customization can be seen as a mass customization enabler. This research path could be further on explored.

Regardless that informatization is omnipresent, there probably also exists cases when it is not carried out; the main reasons could be: a) that customers' needs and habits are already known and the product is far from being commoditized, b) the nature of its business does not allow it and c) law (privacy) related restrictions.

Informatization and the exploitation of data and information through the information ecosystem have together the potential to create an additional revenue stream for the information ecosystem's members, including the manufacturer. Accordingly the following questions for future research appear:"Could the exploitation of data and information from informatization through the ecosystem enable a manufacturer to offer its products and P-S with a much lower price that its competitors, while keeping the quality and functionalities unchanged and increasing it overall revenues? Could for instance a car manufacturer offer its product or P-S 10 % cheaper and in return the

customers would allow intensifying the informatization process during the usage of their car? What such a model could mean for the European manufacturing industry? Does it mean that this potentially disruptive business model could lead a manufacturer to sustainable competitive advantage and enabling the reach of sustainability if he would so desire?" Obviously, this paper is a conceptual one and explorative in its nature. Though it is based widely approved concepts like Thoben's representation of the servitization levels, its main limitation is that it has not yet been applied to a real use case from the industry.

4 Conclusion

The article first positioned servitization into a wider context, starting with the knowledge economy, passing by the information society and finishing with the networked economy, while depicting it from an inform point of view. For that, a new procedure had to be introduced called informatization, which is performed on the enterprise level. This closed information loop between the customer and manufacturer has been opened afterwards and the exploitation of data and information has been transmitted onto the ecosystem level. In order to ease the process of data creation and their exploitation, besides introducing the concept of informatization, a new role of P-S B.S. was introduced, as also the concept of an information ecosystem. Consequently, this article directly contributes in spanning the main manufacturer-customer boundary through the spanning of the P-S boundary. In order to depict and position the impact of the introduced concepts, Thoben's representation of servitization was enhanced by adding an additional layer of added value, the information layer. Based on the findings, it would be sensible to call information the nucleus of the third layer of added value in servitization.

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