

All activities are interpretive: The end of the debate about service characteristics?

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Abstract

Purpose – The paper aims to clarify the concept of service at the product level with the help of the fundamental elements of any business process, such as inputs, activities and outputs. The terminology used in this paper has previously shown its applicability for analyzing the elements of different products, e.g., under the ideology of Activity-Based Management (ABM), for instance.

Design/methodology/approach – The paper presents a conceptual analysis supported with empirical examples representing different types of products both in business-to-business and business-to-consumer settings.

Findings – In this paper, product represents the fundamental unit of exchange. The elements of the product include the inputs, activities and outputs that are of importance to the parties involved. The supplier and the customer are both free to choose and highlight specific inputs, activities and outputs within a product. During the analysis, the versatility of different elements within the products became obvious. Moreover, it was noted that the IAO model enables the analysis of the products from the viewpoints of the supplier and the customer, thus offering a solid basis for further development of those products.

Originality/value – As a complement to the strategy-oriented service logic stream, the paper operates at the level of a single product and/or the underlying process. Its analytical power stems from the explicit connections to the widely accepted business terminology. Importantly, the paper offers a basis for further studies contributing to the understanding about the elements of profitability in various business settings.

Keywords: Service, Business process, Product, Activity, Value.

Paper type: Conceptual paper.

1. Introduction

This paper seeks to contribute to the current debate on the concept of service and the service characteristics in the literature. The paper questions the common prejudices concerning the differences between goods and services, as well as the commonly cited success factors of service operations, such as value co-creation with the customer and long-term customer relationships. Instead, this paper adopts the concept of product as the generic unit of exchange between economic actors. In other words, the concept of product represents anything that the supplier sells and the customer buys across business sectors. As a result, a product can be used as the fundamental unit of analysis for various managerial purposes, including the analyses regarding an industry, a company and a customer relationship. For us, it also serves as a template for discussing and making sense of the notion of service.

The task of defining service is far from complete, either at the micro or the macro level (Gadrey, 2000, Djellal and Gallouj, forthcoming). At the macro level, the service sector includes a heterogeneous set of businesses, excluding agriculture and the industrial sector (Miles, 1998, Grönroos, 2000). Moreover, it is noteworthy that in statistical classifications all service activities among the industrial companies are excluded from the service sector. At the micro level, in the services marketing literature, service has traditionally meant activities: “[Service] is a process where someone, for example a service firm, does something to assist someone else, for example a customer.” (Grönroos, 2008). This definition may be interpreted to refer to the overall helpfulness of a service firm and, as a generic definition, does not provide a manager with a clear structure to follow in order to use it in practice. Instead of elaborating an exact service definition, the primary focus for research efforts in this field has been on describing the so-called IHIP characteristics: 1) intangibility, 2) heterogeneity, 3) inseparability of production and consumption, and 4) perishability (see, e.g., Shostack, 1977). The recent service literature has criticized the IHIP characteristics for their complexity and inability to make a clear distinction between goods and services (Lovelock and Gummesson, 2004, Vargo and Lusch, 2004b). Many influential scholars have abandoned the complex IHIP characteristics and have invited fresh perspectives on service research, in general, and a new definition for the service concept (Lovelock and Gummesson, 2004, Edvardsson *et al.* 2005, Vargo and Lusch, 2004a, 2008).

Although the variety of different perspectives on service contributes to understanding the true nature of service, they seem to nevertheless leave the door open for a variety of different interpretations. The actual relationship between service and the several interrelated concepts, such as “product”, “process”, “solution,” and “customer value,” still remains unclear. Moreover, unless the service definition is clearly connected to the operational terms widely in use in practise, e.g., in management accounting, production economics or R&D, the results of the service research may not be taken full advantage of among the practitioners. From the viewpoint of this paper, in particular, there seems to be a need for neutral product level considerations, with a generally applicable framework.

The infusion of services into manufacturing, mainly among machinery manufacturers in the business-to-business contexts, has been justified with very strong words in the service literature (Vandermerwe and Rada, 1988, Brax, 2005). Although many manufacturers aim at becoming

service providers, they are rarely able to achieve their ambitious financial objectives, such as extra invoicing, more steady cash flow, better corporate image – and better profitability (Brax, 2005, Gebauer *et al.*, 2005, Malleret, 2006). Part of the problem is the ambiguity of the notion of service among manufacturers, thus highlighting the need for analyses without prejudices concerning the nature of service business and its economic consequences (Laine, 2009). Araujo and Spring (2006) stated quite provocatively, although reasonably, that “recent contributions suggesting that the balance should be swung towards services have shied away from examining why, how and when particular [products] should be deployed to address particular types of demand.” In-depth analyses of new products developed by the manufacturers or the transformation process of machinery manufacturers in general are still lacking (cf., Gebauer *et al.*, 2005, Brax, 2005). The content of the “servitization” and its potential economic consequences have so far been only superficially grasped.

The objective of this paper is to clarify the concept of service at the product level with the help of the fundamental elements of any business process, such as inputs, activities and outputs. The paper presents a conceptual analysis supported with empirical examples representing different types of products both in business-to-business and business-to-consumer settings. The paper is structured as follows: First, we discuss the predominant service interpretations based on the literature (Section 2). Second, the IAO model, representing the framework for the product analyses, is introduced and justified with the identified shortcomings in the literature (Sections 3.1-2). Third, the predominant service interpretations are further examined in light of the IAO model (Section 3.3). In Section 4, three product examples are characterized in light of the IAO model. Finally, preliminary implications in the service literature, and the managers in different business contexts, are drawn based on the analysis presented in this paper. The discussion includes topics such as the subjectivity with relation to products and underlying activities, the versatility of the inputs, activities and outputs within a single product, and the importance of the viewpoints of different stakeholders to the product (Section 5).

2. The predominant service interpretations

The nature of service is under constant debate in the service literature. The existing service interpretations in the literature may be divided into three categories (quite analogous to Edvardsson *et al.*, 2005 and Grönroos, 2008): a) the IHIP characteristics as differentiators between goods and services, b) service as a process or an activity, at the same level as products, and c) service as a perspective for the business, e.g., service(-dominant) logic. These three service interpretations with their potential shortcomings are discussed in the following sections.

2.1 The IHIP characteristics as differentiators between goods and services

As already noted, service research has been mainly based on IHIP characteristics in order to differentiate between services and physical goods. Typically, when referring to IHIP characteristics, scholars refer to Shostack (1977), who described the recognized differences between products (goods) and services from the viewpoint of marketing management. Based on the (ambiguous) differences between goods and services, different strategic decisions are stated

to be favourable in goods-dominant and service-dominant businesses (e.g., Vargo and Lusch, 2004a, Grönroos, 2008).

Accordingly (Grönroos, 2000), instead of constantly debating the actual meaning (i.e., a definition) of service, one may concentrate on the distinctive characteristics of services to contribute to the service literature. Each of the characteristics requires further studies to be understood and used properly. Intangibility, for instance, can be seen as a multifaceted concept (see e.g., Laroche *et al.*, 2003, 2004) and divided into immateriality, referring to the absence of any materials and the abstract character of a process.

A few decades ago, Rathmell (1966) had already questioned the distinction between goods and services. He highlighted the fact that people use technocratic terms when talking about goods, while services are described in humanistic terms. Meanwhile, many traditional manufacturers have started to describe the intangible “soft” features of their products (see e.g., Djellal and Gallouj, forthcoming).

Over the last decade, the IHIP characteristics have frequently been criticized both for being randomly introduced in the first place as well as for the complexity and subjectivity of each of the different variables (see Grönroos, 1998, Lovelock and Gummesson, 2004, Vargo and Lusch, 2004b, Edvardsson *et al.*, 2005, Laine *et al.*, 2005). Edvardsson *et al.* (2005) invited the most influential scholars within this research field to critically comment on these characteristics, on which only a little earlier Vargo and Lusch (2004b) had commented with criticism. In Laine *et al.* (2005), the list of IHIP characteristics was further developed in the business-to-business context to fit the process model, and some pitfalls were subsequently found.

In sum, as far as the IHIP characteristics are concerned, the key problem concerning its misuse seems to be as follows: The IHIP characteristics are presented and often treated as the pure definition of services, though they are only a set of loosely coupled characteristics. Nevertheless, Edvardsson *et al.* (2005) have been successful in separating this question into two completely different issues: 1) the different definitions of service, and 2) opinions concerning the adequateness of the IHIP characteristics. Moreover, *product*, as a concept with relation to goods and services, seems pretty versatile. In light of the IHIP characteristics, there is no straightforward way to define service in relation to products.

2.2 Service as a process or an activity

Service is fairly widely interpreted as processes, actions or series of actions (activities), in contrast to “pre-produced” physical products (outputs) (Grönroos, 2000, 2008). Consequently, the actions taken as a whole result in a solution to the customer’s problem. According to Hill (1977), service means “a change in condition or state of an economic entity (or thing) caused by another.” Quite similarly, according to Hill (1977, in Araujo and Spring, 2006), “a service activity is an operation intended to bring about a change in the status in a reality C that is owned by [customer] B effected by service provider A” (Gadrey 2000, Araujo and Spring, 2006). In this definition, service seems to be well-defined in relation to processes and customer needs. It is the service provider’s processes that enable the changes desired in the customer’s world. Significantly, the reality C, owned by the customer, may consist not only of goods but also of certain statuses, which could be enhanced by the service provider.

Gallouj and Weinstein (1997) use the Consumer theory (cf. Lancaster, 1966) as the basis for their analysis. They identify the following three elements in the service processes: 1) the process characteristics, which refer to the activities and underlying resources, 2) the internal characteristics, which refer to the technical features of the output, e.g., goods, and 3) the final characteristics, which refer to the value-in-use of the output. Regarding internal characteristics, Gallouj and Weinstein (1997) make a distinction between technical characteristics and competencies. Significantly, in the service business, the competencies of the customer are involved in the process. Obviously, the involvement of the customer may take different forms during the process, such as managing or monitoring the process or acting as a co-producer.

In practice, the processes may differ significantly in terms of the aforementioned elements. In the service triangle (Gadrey, 2000, Araujo and Spring, 2006), there is a set of elements that are processed (enhanced) during the activities, namely material objects, information, knowledge and individuals. Morris and Johnston (1987) argue that there are fundamental differences in material processing operations, information processing operations and customer-processing operations. Consequently, the outputs of the processes may take different forms.

Grönroos (2008) argued recently that the customer may buy the products of the supplier either as goods (outputs) or as processes (service). The provider should be aware of the customer's preferences, in order to properly facilitate customers' value creation process. A distinction is made between goods-logic, which maintains that products are interpreted as resources to the customer's process, and service-logic, which maintains that products are interpreted via processes and activities. The distinctive characteristics of these two logics still remain unclear. According to Edvardsson *et al.* (2005), the true nature of service is still case-dependent, including both supplier-specific and customer-specific service portraits.

2.3 Service as a perspective to the business

A recent approach, i.e., the service-dominant logic approach, broadens the service interpretation. According to Vargo and Lusch (2004a), "new perspectives are converging to form a new dominant logic for marketing one in which service provision rather than goods is fundamental to economic exchange." Moreover, customer relationships, intangibles, and the co-creation of value with the customer form the basis of the service business (Vargo and Lusch, 2004a). In this interpretation, all businesses are service businesses, and all companies obey the service-dominant logic, that is, they essentially give value promises to their customers.

Vargo and Lusch (2004a, 2008) define services as "the application, of specialized competencies (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself." In this approach, service (rather than product) is the generic term for giving benefit to the customer and, as a result, goods are interpreted as mere appliances in the service delivery. As a result, because specialized competences are needed in every business, all businesses become service businesses.

Following this approach, Edvardsson *et al.* (2005) concluded that service represents a perspective on value creation rather than a category of products or market offerings. Moreover, services focus on value from the customer's viewpoint, thus raising the importance of the co-creation of value

with the customer (Edvardsson *et al.*, 2005). Interestingly, Edvardsson *et al.* (2005) conclude that, on a lower abstraction level than that discussed above, no general definition for services exists (Edvardsson *et al.*, 2005).

Stauss (2005) criticized the broadening of the definition of service to encompass all businesses. A definition that includes everything does not actually exclude anything. The risk of the “Pyrrhic victory” described by Stauss (2005) highlights the need for an exact and applicable service definition. We agree with Stauss (2005) that interpreting service to cover even “the value of goods” might lead to strange situations. “In making this contrast, an impression is conveyed that traditional marketing has previously assumed that people seek to possess goods as property, independent of the benefits of such goods” (Stauss, 2005). Moreover, Stauss (2005) states quite importantly that “the fact that physical goods and [intangible] services both bring about value does not necessarily imply that both are also produced in the same way.” “Activities” and “things” are not similar economic units either.

Grönroos (2008) criticized the service-dominant logic for merely emphasizing what the service-logic means to the customer. As a basis for further research, he highlights the need for both a “logic of consumption” and a “logic for service provision.” Moreover, according to Grönroos (2008), the customer is not a co-producer of value but the main (and the only?) value-creator (Grönroos, 2008). For him, it is the customer that allows the provider to participate in its processes and not vice versa (Grönroos, 2008). In a service business, the provider may become a value co-creator by providing processes and activities. By providing resources (goods), the provider is merely a value facilitator.

Based on the literature, no clear applicable definition exists for the concept of service. Obviously, the properties of an applicable service definition and the service framework should be assessed critically, which was highlighted by Stauss (2005), for instance. Significantly, any acceptable definition should capture the phenomenon at hand. Moreover, the key concepts in use in this study should have analytical power to analyze business processes in various real-life business contexts. The logical connection of the concept of service to the generic process terminology, such as resources, activities, outputs, and value, seems to be under debate in the literature. As one line of thought, the aforementioned concepts could be used as primitive concepts, that is, the concept of service could be defined based on those concepts.

3. The IAO model for product considerations

In this chapter, the IAO model is introduced as the basis for the product considerations of the paper. First, the IAO model is outlined. Next, the focus is on the micro structure and use of the model. At the end of the chapter, the relationship between the IAO model and the existing service interpretations is discussed.

3.1 Outlining the IAO model

According to Ackoff (1971), a system is a purposeful set of interrelated elements; companies need a certain structured set of activities in order to reach the desired set of outputs to be

provided to the customers (Ackoff, 1971). These should, eventually, help the customer to reach the ultimate status change desired by the customer.

“Product” represents a system that contributes to the fulfilment of the customer need in one way or another. As noted, traditionally, products refer to the goods and services that a company sells and the customer buys (Ulrich and Eppinger, 1995, p. 2). Further, products can be seen as entities composed of different elements (traditionally such as goods and services). Importantly, the customer is not interested in the product entities *per se*, but in the benefits to be derived through them. Therefore, it seems relevant to recognize the approach of Lancaster (1966), who defined products as a complex set of characteristics; a product typically possesses certain characteristics that cannot be directly derived from a certain good or service, but only from the product entity as a whole, giving utility to the customer. The approach of consumer theory, examined by Lancaster (1966), for instance, leaves the door open for a variety of different interpretations regarding the process or series of activities underlying the utility of the product.

The business processes underlying the product entities deserve further examination. The processes, in general, consist of different types of activities which, in practise, take different forms on a case-by-case basis. In the processes, six generic process phases may be identified based on the literature: 1) recognition of a customer need, 2) development, 3) acquiring of the resources, 4) production, 5) sales, and 6) distribution. In this respect, Value Chain (Porter, 1985) and Value Shop (Stabell and Fjeldstad, 1998) structures have much in common. The Value Chain approach is typically used in the manufacturing context, whilst Value Shop is more often connected to professional service businesses. Obviously, the structure of the processes used by a company to fulfil customers’ needs may vary and may sometimes be iterative. For instance, contrary to the sequential process of the Value Chain, the Value Shop technique allows what is described as cyclical or even spiralling processes to uniquely reach the desired state. Silvestro et al. (1992) proposed a classification of traditional service processes into professional services, service shops and mass services, based on the intensity of the customer contact and the volume of the business.

By synthesizing the model of Gallouj and Weinstein (1997) and the ideology of the Value Chain (Porter, 1985), Laine *et al.* (2006) have introduced a simplified model of any business process (Figure 1). In the IAO model, the inputs, activities and outputs of the processes are separated and classified. Basically, inputs are resources needed during activities, resulting in new (or altered) resources as outputs.



Figure 1. The IAO model

In the IAO model, importantly, products are sets of inputs, activities and outputs, subjectively identified and emphasized by the parties involved. Similarly to the model of Gallouj and Weinstein (1997), the IAO model is also based on the interpretation of its user, who answers the

following questions on a case-by-case basis: What is the scope of the process? Which elements are included in this case and which are not? In other words, the supplier and the customer are both free to choose whether they interpret some products primarily via inputs, activities or outputs. Moreover, the parties involved are free to name the key processes they are involved in and the key products at hand. For instance, a customer may put emphasis on the spare parts (goods as outputs), provided by the supplier or the overall ability of the supplier to keep the machinery available for the customer (a series of activities including a complex set of inputs and outputs).

3.1 The micro structure of the IAO model

It is noteworthy that the resources of a process can be classified in several ways. Seppänen (2008) classifies resources into seven categories for the business model concept: physical, financial, legal, relational, human, organizational and informational. In the IAO model, the inputs and outputs refer to six forms: 1) goods, 2) people, 3) information, 4) rights, 5) energy, and 6) capital (adapted from Laine *et al.*, 2006). By regarding people as a form of output, for instance, we refer to the possibility that people may learn something new during the process, or they may feel better or worse due to the process. Sometimes a company may provide its customers with its own employees as resources for customers' processes. Moreover, in the IAO model a process may also be interpreted as mechanisms that result in changes in capital (consider banks, for instance) or in energy (a power plant or any company). Significantly, the outputs of a process are interconnected, and they cumulatively result in a new status, i.e., a reasonable combination of outputs, which may be used by the customer (and the supplier) in the forthcoming processes. Any combination of outputs is unique by nature. The real value of each output and its combinability is determined during its use in the forthcoming processes.

The IAO model can be further developed by including the a) conditions, b) features and c) functionalities of the set of outputs, which can be seen as determinants of the value created during the use of the outputs. A tractor serves as an example of using the model. Consider a tractor that is of good quality and has a specific condition at a specific point in time. When the tractor is equipped with certain features, it can carry out specific tasks and, consequently, it has certain functionality. This tractor example includes the following elements connected with the IAO model: as an artefact, its form is predominantly material. The condition of the tractor is "OK," the features of the tractor include its power and fuel consumption, and the functionality is the ability of the tractor to carry loads. Importantly, any considered stakeholders are free to make subjective interpretations about the elements included in the IAO model. The owner of the tractor, for example, is free to ignore the production activities needed to assemble the tractor and focus solely on the resulting material output. In this vein, the IAO model can be used to illustrate a number of different interpretations possible with regard to a single product. Each possible interpretation also represents a potential unit of further analysis. From the viewpoint of accounting, each variable represents a potential accounting object in itself. The R&D function, for instance, could see each element as a potential basis for product refinements and innovation.

In the domain of accounting, the idea of the IAO model is in line with that of Activity-based Costing (ABC), where activities are the core accounting objects (cf. Kaplan and Atkinson, 1998, Sievänen *et al.*, 2004). Any activity uses resources to reach the output. The use of resources during the activity is due to the cost drivers of the activity (e.g., machinery hours, orders

processed) (Kaplan and Atkinson, 1998). The costs of certain products or customers may be calculated by allocating the use of the resources to the activities and, furthermore, the use of the activities to the products and the customers. The profitability of a product or a customer may be calculated, if both the revenues and activity costs of those products and customers are known. Carú ja Cugini (1999), for instance, used the ABC when analyzing the difference between the perceived customer value and the activity costs of a certain product to the parties involved. The analysis was made in the “service” context in a software company, but it is, in principle, applicable across businesses.

Despite its simplistic structure, there are a number of different interpretations regarding even a simple product. Let us consider an example of six inputs, one activity, six forms of outputs, three conditions and features (3 + 3) and three functionalities. Depending on which elements are recognized by a particular stakeholder and which are not, we end up with 4,194,303 ($= 2^{(6+1+6+3+3+3)} - 1 = 2^{22} - 1$) different possible combinations, if the presence of at least one element is required in the interpretation. More than four million alternatives to the interpretation of a single activity highlight the complexity of each product as an accounting object. In practice, there are perhaps only a limited number of significantly different types of interpretations that managers should be aware of, when identifying potential customer segments, for instance.

If the viewpoints of different stakeholders are taken into account during the analysis of a product, the number of different interpretations can be multiplied by the number of stakeholders at hand. The interpretation of the customer of a material output, for instance, is always unique and different from the interpretation of the supplier. From the viewpoint of management accounting, it is now somehow understandable how huge are the challenges we have in front of us. We must limit the number of options, or else somehow automate accounting object definition and implementation. Some discipline is needed, for example, to formulate standards for the accounting objects at the product level.

3.3 Service interpretations in light of the IAO model

It is noteworthy that the concept of service was not used in the context of the IAO model. Here the existing service interpretations are examined in light of the IAO model in order to explicitly connect the concept of service to the widely accepted process terminology used in this paper.

First, connecting the IHIP characteristics to the IAO model elaborates our understanding of those characteristics. Quite often, incomparable elements such as inputs and outputs are compared with each other using the IHIP characteristics. Intangibility, for instance can be associated with the lack of material resources (input) during the production phase of a certain product, or with the abstract character or the immateriality of the output of the process.

In Laine *et al.* (2005), the authors attempted to build a model that combines in detail the recognized characteristics of goods and services with the phase structure of the business processes. The findings suggest that the IHIP characteristics can more easily be connected to the inputs and the outputs than to the activities (Figure 2). Essentially, the resources are either material or immaterial, but the activities just consume those resources. Moreover, unless resources are taken advantage of, their status may change, and they cannot soon be utilized anymore (perishability). Regarding heterogeneity, there are, of course, standard processes and

more unique series of activities. However, the notion of heterogeneity in the literature depicts the uniqueness of the output, thus fulfilling the one-of-a-kind customer need. Simultaneous production and consumption refers to the presence of the customer, who uses the output of the process immediately as an input for the following process:

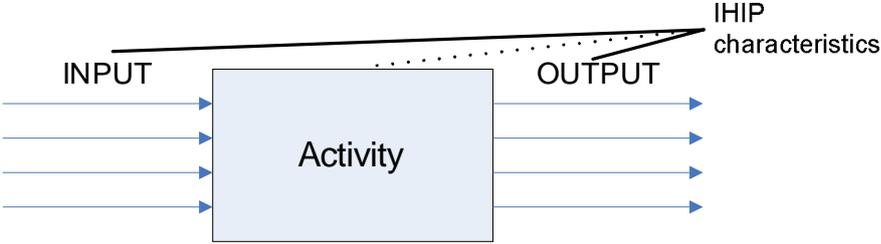


Figure 2. IHIP characteristics in the IAO model

It is noteworthy that, regarding intangibility as one of the IHIP characteristics, there is the possibility to distinguish changes in goods (tangible) and the rest of the outputs as two separate categories. This is, however, a relatively vague categorization. Changes in people, for instance, are quite often both tangible and intangible. Moreover, the IAO model potentially holds analytical power to analyze the different forms of outputs in a more detailed manner due to its versatile micro structure.

Second, in the literature, concepts of services and service are sometimes distinguished (see e.g., Edvardsson *et al.* 2005). “Services” refers most often to the immaterial forms of outputs, i.e., “service outcomes,” whereas “service” represents the procedures and the abilities to fulfil customer needs in the company. In other words, in light of the IAO model, service means activities, whereas services can be connected to various categories of inputs and outputs. Quite importantly, the IHIP characteristics therefore represent the characteristics of services, but not those of service.

Analogously, the authors of this paper have separated the outputs from the activities and asked whether these services refer mainly to activities, while goods always refer to outputs. Moreover, importantly, the activities of the processes can be divided into two groups: a) activities that are done for oneself (the company itself), and b) activities that are done for someone else (another company). A car manufacturer, for instance, may be seen to produce cars for its customers, not for itself. As a result, somewhat analogously to Section 2.2, it can be proposed that service means activities undertaken for someone else (Figure 3).

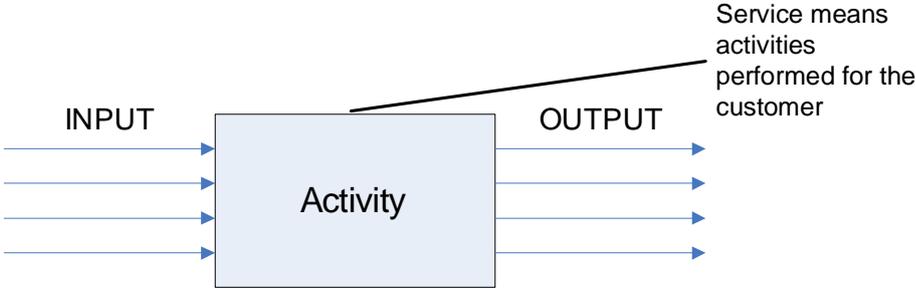


Figure 3. Service means activities performed for the customer

The service definition presented above is an agreement in nature. The advantage of the definition is the explicit and easily understandable connection to the IAO model. The pitfall of this definition is its inclusive nature. If service is defined as any activity performed for the customer, there are no such activities that cannot also be interpreted as services. With relation to the concept of product, in service products the emphasis is mainly put on the activities.

Third, as Edvardsson *et al.* (2005) proposed, in service the emphasis is on cooperation with the customer as opposed to “pre-produced” physical goods. Quite analogously, Gallouj and Weinstein (1997) made a distinction between services and other products based on the presence of the customer in the process. In light of the IAO model, the parties involved take part in the processes through the inputs (Figure 4). Sometimes the customer himself/herself is an input of the process, as in certain processes the raw materials or the infrastructure are provided by the customer. The inputs of the customer are either committed to the process (e.g., raw material, personnel) or they enable the process (e.g., buildings, information).

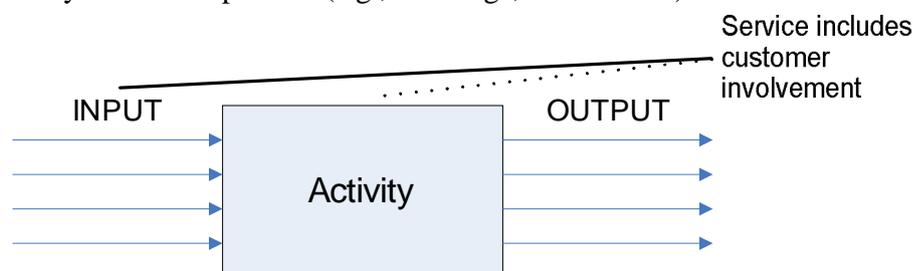


Figure 4. Customer involvement in the IAO model

Customer involvement does not necessarily imply active participation in the series of activities at hand. Customer involvement can take several different forms in the process, from distant monitoring to active participation. In other words, activities can be done in close cooperation, or by dividing tasks strictly between the parties, with no deeper involvement necessary. Noteworthy, this is closely related to supplier segmentation, which seems to also be a fairly valid framework in the service business. The intensity of the cooperation increases when arms-length relationships turn into strategic alliances. In sum, it is not easy to find product categories where the customer involvement or the co-creation of value among the parties involved represent distinctive characteristics.

With relation to service-dominant logic (Vargo and Lusch 2004a), the focus of the IAO model is on the product entities and their underlying processes. The limitation of this approach is the fact that no strategic considerations can be straightforwardly made based on the product analysis in light of the IAO model. Therefore, the success factors in the adoption of the service-logic and other mechanisms underlying the competitive advantages of the products are excluded in this paper. Edvardsson *et al.* (2005) acknowledge the service logic, and conclude that service represents the perspective on value creation with both supplier-specific and customer-specific service portraits. In Figure 5, these service portraits are visualized in terms of the IAO model. The core of the value creation can be seen on a case-by-case basis. It is subject to the interpretations of the parties involved, which elements are highlighted and values are attached to.

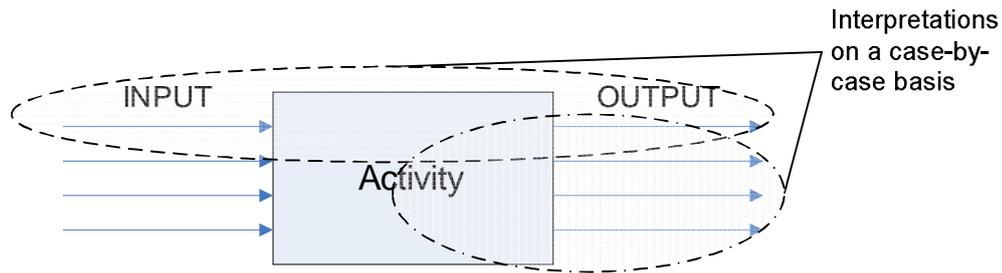


Figure 5. The case-dependency of the service portrait (cf., Edvardsson *et al.* 2005).

In sum, the discussion of the service interpretations in light of the IAO model revealed the need to examine the inputs, activities and outputs of the processes separately in order to yield exact categorizations of different types of products. It is noteworthy that the adoption of the IAO model does not yield an exact, unquestionable service definition. On the other hand, many of the service interpretations can relatively easily be understood via the IAO model, the case-dependency suggested by Edvardsson *et al.* (2005) included. It seems fair to recommend that the elements of the products may first be examined based on the IAO model as such. After that it can sometimes be useful to highlight the aspects present in a certain service interpretations. The rest of the paper focuses on the product examples without any prejudices concerning the nature of the products at hand, either as goods or services, for instance.

4. The IAO model in action: product illustrations

In this section, the IAO model is used to examine three different kinds of products. First, the examples of a spare part and a driver's license are used to illustrate the complexity of simple products that are either tangible (spare part) or intangible (driver's license). Essentially, with the help of the IAO model, the complexity of the same products can be reduced by identifying the key statuses those products yield. Second, the IAO model illustrates the example of a salable warranty contract in order to examine the different viewpoints of the supplier and the customer as the key stakeholders of the product.

4.1 The IAO model reveals (or reduces) the complexity within a product

The case of a spare part (of a car or any machine) represents a relative simple tangible product, which is needed to repair the car or the machine. Regarding the spare parts, there is always need to get the right part in the right place, for the right time, of the right quality.

In Table 1, the key activities underlying the successful delivery of the spare part are illustrated by the IAO model. It is noteworthy that it is usually the customer who tends to oversimplify the task of the supplier in order to fulfill his/her need. However, the identification of the actual customer need, acquiring all the required information about the spare part needed, and the production and the delivery of the part all require capable personnel and a lot of information to succeed in the process. Especially in multinational companies, the delivery of a spare part to the other side of the globe represents anything but a simple task. One should note that both material and immaterial resources are required in the process, along with capable personnel.

Table 1. A spare part from the viewpoint of the IAO model.

A list of activities in the process	Form of output/input	Key inputs	Key outputs
<i>Identifying the customer need</i>	1) Goods	Spare part (or needed raw materials and components),	Right part in right place, of right quality
<i>Acquiring the needed information</i>	2) People	supplier personnel, customer representatives	the satisfied customer
<i>Purchasing / producing the spare part</i>	3) Information	information about machinery, parts, and the spare part process, the supplier becomes responsible for the process,	information about the status of the process
<i>Warehousing, sending and delivering the spare part</i>	4) Rights	N/A	ownership of the spare part to the customer
<i>Managing the process as a whole.</i>	5) Energy	the customer pays for the spare parts.	N/A
	6) Capital		<i>supplier</i> : the price of the spare part vs. the costs of the process as a whole, <i>customer</i> : the value of the spare part in use vs. the price of the part

The value of the spare part for the customer is neither a self-evident issue, nor can it be easily estimated. The supplier compares the price of the spare part to the total cost of the spare part process. Due to the need for several activities underlying spare part delivery, the supplier perhaps highlights the costs of the process as a whole. The customer should, instead, compare the value-in-use of the spare part to the purchasing price. There are several different ways to interpret this value. The spare part may enable a repaired, usable machine. On the other hand, awareness of the price and the lifetime of the spare part makes the part comparable with other alternatives.

In sum, the IAO model can be used illustrate the spare part process. Whether the status of the spare part, “sufficiently at the customer” is enough or whether the information intensive process phases deserve attention of the parties involved is case dependent. Sometimes the customer primarily gets knowledge about the car or machine in use and the delivery of the spare part is just a byproduct of the process.

The example of the driver’s license, instead, represents a primarily information-based product (Table 2). By passing the exam, the customer gets the right to drive a car. Any product that involves the learning of the parties involved is complex in nature. The customer obtains new information about cars, traffic, laws and regulations. Moreover, the customer gradually acquires experience about driving the car under various different circumstances. Based on both theoretical and practical lessons, the customer becomes capable of managing the situation he/she confronts in traffic. Once all the lessons have been taken and the exam has been passed, the customer is given a driver’s license, and thus given permission to drive a car according to the laws and regulations. Not only the possession of a driver’s license, but the information gained during the driving school affects the customer, in one way or another, when he/she drives a car in the future.

Table 2. A driver's license from the viewpoint of the IAO model

A list of activities in the process	Form of output/input	Key inputs	Key outputs
<i>Theory lectures</i>	7) Goods	car, lecture rooms, facilities	
<i>driving lessons</i>	8) People	teacher, students, the customer	the customer learns how to drive a car in a feasible manner,
<i>written exam, test drive</i>	9) Information	law, guidance of the teacher, books other learning material	information about the cars, traffic, etc.
	10) Rights	the authorities have the right to admit driver's licenses	the right to drive for the customer
	11) Energy	N/A	N/A
	12) Capital	the customer pays for the lessons and/or exams	<i>supplier</i> : the price of the license vs. the costs of the process as a whole, <i>customer</i> : the value of right to drive vs. the price of the license

Quite often the acquisition of driver's license as a product can be reduced to a simple change in status: "the obtained right to drive a car." Similarly to the example of the spare part, however, the value of the product cannot be easily estimated. The driver's license can be used (let's say) for up to 50 years, and its value is a function of several contingencies. Some customers need the license to work as truck drivers, for instance. Sometimes, the guidelines learned during driving school can save the lives of the parties involved in a car accident.

In sum, the examples of the spare part and the driver's license show that beyond the simplistic prejudices concerning the nature of products, deeper analyses can reveal the nature of the activities underlying the product. Sometimes there is a need to reduce the product to a simple change in the status of the system. Sometimes more detailed level information is needed to understand the mechanisms underlying the product characteristics or, especially, the value-in-use of the products.

4.2 The IAO model helps in understanding the viewpoints of the parties involved

In the example of the extended warranty product, the supplier takes responsibility for the maintenance costs (i.e., specific spare parts and maintenance work) for a fixed price after the normal warranty period. This is an insurance which guarantees a fixed cost level regardless of the actual maintenance costs.

Regarding the analysis of the extended warranty product, there are several alternatives for interpreting the scope and the actual content of the product. The user of the IAO model presented in this paper needs to decide the viewpoint of the product taken and the relative importance of each of the elements included in the product. In Table 3, the extended warranty product is analyzed through the IAO model. It is noteworthy that the viewpoints of the provider and the

customer(s) are separated. A single extended warranty period is selected as the unit of analysis. In the following paragraphs, the inputs, activities and outputs are analyzed selectively by conveying the idea of the use of the model.

Table 3. The viewpoints of the customer and the supplier to the extended warranty contract

Activity	Form of output/input	Input	Condition of output	Feature of output	Functionality of output
<i>Customer's viewpoint:</i> Warranty consumption	13) Goods		Usable machine,	Reduced risk	Production enabled
	14) People		feeling of reduced risk, less need for repairmen	comfortable feeling	effective use of resources enabled
	15) Information		awareness of the costs,	fixed costs	cost estimates enabled
	16) Rights	The warranty contract (incl. responsibility)	the contract	contract in force	warranty claims enabled
	17) Energy 18) Capital	fixed costs	variable costs changed to fixed costs	fixed costs	cost estimates enable cost efficiency
Activity	Form of output/input	Input	Condition of output	Feature of output	Functionality of output
<i>Provider's viewpoint:</i> Warranty provision	1) Goods	Spare parts (if needed)			
	2) People	warranty and maintenance personnel			
	3) Information	awareness of the machinery lifetime use	Sharpening awareness of the machinery lifetime use, responsibility for the machinery (to some extent)	Personified, gradually sharpening	E.g., pricing, selling and R&D efforts enabled, warranty claims → repair required
	4) Rights			contract in force	
	5) Energy 6) Capital	abandonment of certain spare part sales (profits)	new revenues and costs	fixed revenues, variable costs	cost estimates required, learning enabled

The extended warranty period (an extra year) may be interpreted as a process of sharing the machinery risk with the customer. During the warranty period, the manufacturer obtains information about the use of the machinery and performs warranty events for the customer on a need basis. The customer gets this service for a fixed price, although the costs to the manufacturer are variable in nature due to the uniqueness of the machinery and its use in the customer's process during the warranty period. To simplify, if the machinery operates without

interruption, the customer gets (only) a feeling of the shared risk. Otherwise, if there are problems with the machinery during the warranty period, the manufacturer needs to take good care of the warranty events, in order to sustain the feeling of the shared risk of the customer (“warranty consumption” in Table 3).

The provision of the extended warranty product requires better understanding about warranty costs, component lifetimes and appropriate terms of warranty contracts (R&D project). If the company is willing to avoid the risks associated with the spare part consumption, this knowledge is a prerequisite to set a warranty contract with any customer. During the warranty period, the necessary inputs include the warranty personnel and spare parts maintenance resources (if needed). Based on the contract, the customer pays the fixed price and grants access to the use information of the machinery required by the provider.

Regarding the outputs, changes in machinery, people and capital deserve closer attention. Based on the contract, the customer gets a usable piece of machinery, which enables the use of the machinery for production purposes. In terms of human resources, the warranty releases resources from the customer’s own maintenance and, perhaps, brings the comfortable feeling of reduced risk to the key personnel involved. From the viewpoint of the capital, the product reduces uncertainty related to the maintenance costs of the customer.

From the viewpoint of the customer, the question of uncertainty is turned upside down. The provider gets fixed revenues according to the contract, whereas the variable costs connected to a particular warranty contract (and to all of the warranty contracts) need to be estimated. On the other hand, the warranty contract enables learning from the cost of the machinery in use among the customers. It seems fair to say that the information about the use of the machinery is personified and sharpens only gradually as the extended warranty contracts diffuse among the customers. In the future, however, this information may turn out to be helpful, when finding arguments for selling (or pricing) new warranty contracts, new maintenance contracts and new machinery. The implications of this information to the R&D function of the company might also deserve further attention in the future.

5. Discussion

In this paper, product represents the fundamental unit of exchange. The elements of the product include the inputs, activities and outputs that are of importance to the parties involved. The notion of product represents the basis for the IAO model in use in this paper.

The need for the IAO model was highlighted by examining the existing service interpretations, which can be interpreted to operate at different parts (levels) in the light of the IAO model. As a result, no widely applicable product-level notion for the concept of service seems to exist. However, the case-dependence of the notion of service (Edvardsson *et al.*, 2005) seems to offer a good starting point for product level considerations. In other words, the supplier and the customer are both free to choose and highlight specific inputs, activities and outputs within a product. The awareness of the supplier of its customers’ preferences is a basis for further development of the products.

Based on the analysis on the IAO model through the examples of a spare part, a driver's license and the extended warranty, the versatility of different elements within the products became obvious. Products contain a complex set of inputs, activities and outputs which are subject to the subjective interpretations of the different stakeholders. It is noteworthy that the IAO model enables the analysis of the products from the viewpoints of different stakeholders. In the context of the extended warranty project, it turned out to be useful to separate the viewpoints of the provider and the customer from each other. Due to the abstract nature of "risk sharing" in the extended warranty, the customers may not be able to assess the value or the opportunity costs with relation to the product. The provider needs to be aware of the customer's viewpoint and his/her valuations in order to communicate the content (and perhaps the price level) of a new product.

This paper shares the concern of Stauss (2005) that too inclusive service definitions perhaps prohibit analyses of the true nature of some processes. Instead of vague service characterizations, future research seems to require more specific typologies for the different forms of inputs, activities and outputs of the processes. It is noteworthy that the concepts of "service" or "services" (cf. Edvardsson et al., 2005) did not need to be used during the analysis of the products at hand, but a more detailed level IAO model was suggested and preliminarily elaborated upon in this paper. Based on the analysis of the illustrative product examples, the IHIP characteristics, for instance, do not serve as the fundamental differentiators between goods and services, but perhaps need to be taken into account in one way or another as contingencies affecting a specific product.

According to Edvardsson *et al.* (2005), service refers to the perspective of value creation in business. Value creation is a fundamental, yet multifaceted concept, which is not, however, exclusive to any business process or product category. An analysis of the value creation mechanisms with relation to a single product requires an understanding of the elements within the product. A manager who seeks to take advantage of the service logic (Vargo and Lusch, 2004a), among other strategic management ideologies, needs to operationalize this ideology to find sources of competitive advantage. No generic sources of competitive advantage exist, but one may suggest instead that the sources of competitive advantage may stem either from a single element of the product or from an appropriate combination of several elements within the product. The IAO model, as used in this paper, might serve as a means to identify and to elaborate upon the sources of competitive advantage the products would enable (cf., Gallouj and Weinstein 1997). Finally, as a managerial implication, it is suggested that the IAO model might help to identify the actual contents and economic vitality of the products at hand, to enable further development of the product offerings of companies.

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