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## From the classical concept of Services to Service Systems

Fernando Jorge Fonseca<sup>a\*</sup>, Carlos Sousa Pinto<sup>b</sup>

<sup>a</sup>*IESF-Instituto de Estudos Superiores de Fafe, Rua Universitária, Fafe 4824-509, Portugal*

<sup>b</sup>*Centro Algoritmi, Universidade do Minho, Campus de Azurém, Guimarães 4804-533, Portugal*

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### Abstract

The “service” concept, which is very comprehensive and diversified, has changed over time and according to the knowledge area where it is used. The integration of technology in personal and professional routines of everyday life has changed its importance, number, variety and, consequently, its defining characteristics. In order to address the new emerging reality, it was necessary to evolve the concept incorporating new “services” and changing paradigms. From the observation of the services, to the abstraction that enables its systematization, there is a set of steps that can be taken and that will contribute to a better understanding of the term. According to Service Science, a Service System definition could be a starting point, which seems to be the actual research trend. This article presents an exploration of these and other related concepts, aiming to establish a set of characteristics/properties capable of clarifying the differences and similarities between the classical concept of Services and Service Systems.

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\* Corresponding author. Tel.: +351-960-147-727.

E-mail address: [jorgefonseca@iesfafe.pt](mailto:jorgefonseca@iesfafe.pt)

## 1. Introduction

The clarification of what lies within the concept of service, considering the changes introduced by technological development, has become more relevant due to the importance that this sector represents to the most significant economies. The changes in the paradigms and the growing diversity of services, the importance of the knowledge and the services associated to the information (creation and sharing), justify the need for this study. Since it is a transversal concept, it is particularly important to both the economy and the Information Systems (IS). The current trend of such an intrinsic link between these fields of knowledge, has led to the emergence of new fields and disciplines of study. Concepts such as Service Management, Service Science, Service-Oriented Architecture (SOA) or Service Innovation, have emerged and are trying to provide an answer to the previously mentioned changes.

Starting from the classic paradigm (IHIP-intangible, heterogeneous, inseparable, and perishable), which aimed to establish specific service characteristics, mainly trying to distinguish them from goods [1][2][3][4], this study aims to verify the pertinence of the Service System concept. According to Spohrer [5], “Service systems are value co-creation configurations of people, technology, internal and external service systems connected by value propositions, and shared information. So, a service system is a complex socio-technical system”. The emphasis is placed on the collaborative characteristic of the act of service. Service is defined as the application of skills to the benefit of others, suggesting that service is a commitment between a provider and a customer that has as a result, an exchange of value, commonly referred as a co-creation of value [6][7][8][9][10]. Since it is the result of what was previously mentioned, a Service System is more broadly defined as a Service. On the contrary, it is secure to say that Service may be seen and studied as a Service System, however, it cannot be confined to just that.

The evolution in the field of services follows a well-defined trend with the incorporation of technology in the processes. The emergence of different fields of study related to the services comes naturally from the creation of more services which are interesting to be studied. The objectives of this study are revisiting the definitions, redefining some concepts, and finding the core element of the service. Therefore, it starts with a historical revision of the Service concept, followed by a search for the definitions of Service, Processes and Systems. Then Service System is defined and Service and Service System are related. It concludes with a set of considerations with the aim of building a possible classification framework with a complete set of characteristics as a starting-point.

## 2. Services - A Historical Perspective

The tertiary sector of Economy, also known as the service sector, includes the developed activities leading to the provider’s knowledge and time to increase the productivity (in a broader sense) of the organization. It is still common to refer to services as “intangible goods” in contrast with the tangible nature of “good” in the economic theory. But is this definition sufficiently comprehensive to consider all the panoply of operations referred to as services? Maybe it has been in the past, however, the increasing use of technology in organizations and the possibilities that this provides to high consumer demand, has led to its diversity and complexity ceasing to be considered part of that definition. Therefore, others have been emerging overtime, maintaining a bigger or smaller agreement and adding more or less concepts. One thing in which people agree on is that it is a process. A process, more specifically a business process is referred by Lindsay [11] as a set of ordered activities, performed with the purpose of serving a client, to attain a goal.

The growing relevance of knowledge has led to the creation of the quaternary sector (which includes knowledge-based services). As a consequence, new centres of growth of the secondary sector have emerged in developing countries or in others that share the characteristic of having rather low wage levels. This reality radically altered the international structure of commerce and industry and created unbalances that still persist [12]. Information creation and sharing (and associated technologies), Research and Development, Education and Consultancy, constituted themselves as fundamental aspects of affirmation in modern economies. The concept of Service Economy appeared to designate the economies of the countries where the level of employment in the service sector surpasses the level of the secondary sector [13]. The process of transforming societies into service economies started in North America and then quickly spread to Europe and Japan [13].

As an outcome of the previously mentioned transformations, Management suffered an inflection in the sense of ceasing to be oriented to goods and becoming oriented to services. It seems that the redefinition of paradigms in Service Management have been justified in order to address this change of values. The term “paradigm” will be used in its contemporary formulation of standard thought adopted in each discipline or context of application. In the case

of the organizations, the paradigms represent the company culture. Gumesson [14], identified the Service Paradigm, whose typical characteristic is the interest in the consumers and in their interaction with the provider. Becker [4], defines Service more within a value creation perspective than in a category of market offering. The emphasis is placed on the consumer's point of view. The co-creation of value with the consumer is crucial and the nature of this relationship (interactive, procedural and experimental) is the basis of service characterization. The importance of customer-oriented services for the customer has increased and has justified the creation of service management. It "combines the overall management perspective of service management with its customer-driven and quality-oriented facets, employee-oriented concerns and its long-term perspective" [15]. Emphasis is placed on the strategic vision of the organization's action. With the possibility of obtaining the exact desired service, the customer becomes more demanding. The ability to customize this new reality of services becomes a differentiating factor within the service providing organizations. Models which are capable of answering the service requirements in this wider perspective have emerged. They emphasize not only on the relation between the consumer and the provider (and the collaborative perspective between both of them) but also on the way those services are approached, either by structuring simple services, or by decomposing complex services [16][17][18]. Should the relation with the consumer outside the usage period be dismissed? Given the fact that, the customer is expected to access the service more than once, it is clear that those aspects cannot be neglected.

Maintaining the focus on the client and customer satisfaction, the concept of Service Innovation emphasizes the importance of creating new standards for distribution, customer interaction, quality, control and security [19].

Service Science emerges as a multidisciplinary field, which aims to include the knowledge of different areas, to improve the operation of the service industry, its performance and innovation. It represents the fusion of technology with the comprehension of processes and organization of businesses [20].

The perceived need to alter the service paradigms led to the introduction of the so called Rental/Access Paradigm [21], based on the characteristic of non-property, where it is assumed that services involve some type of rental or access which is beneficial to the customers. The payment of services in the exact measure of their needs is a desirable idea for all the customers and represents a business opportunity for the organizations. An example of this reality in Computing which is driven by technological advances is the concept of "cloud computing". "A Cloud is a type of parallel and distributed system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and consumers" [22]. Associated to this, the concepts of Market-oriented Cloud Architecture, Service-oriented Computing (SOC) [23], or Service-Oriented Architecture (SOA) [24], have emerged. We underline here the trend to present the entire technological infrastructure of organization support as a service, such as computing utilities.

The emergence of different areas of study, related to the services, comes naturally from the creation of even more services with characteristics of interest to be studied. New disciplines such as Service Science or Services Computing, contribute to the study, the aggregation of trends and the variations that appear in the field of services. It is also evident that the alteration of the way the interaction with the consumer is processed has become a core element of problems that arise with services, and this has been stressed by others who have studied this phenomenon. Since the market depends on customer satisfaction, it becomes of extreme importance to consider everything that may influence the perception that one may have on a service and its quality.

### **3. Services, Processes, Systems and Service Systems**

Over time, various classifications emerged and sought to respond to the growing number of new service types. This was the way found to characterize the services, thus evading the difficulty of defining its multiplicity. In 1989, Wemmerlöv [25] proposed a taxonomy for service processes, emphasizing the characteristics that differentiated service systems from Manufacturing systems. Approaching the subject from the point of view of the service provider, he highlighted the importance of behavioural and psychological aspects of the interactions between consumers and service workers. It is surprising to see the interest in technology and the way it influences and acts upon the organizations. This author also stresses its relevance in the processes of services. Meanwhile, Lovelock [26], not satisfied with the two-dimensional array classifications, and the difficulty of their empirical verification, proposed a set of characteristics related to the perception of the service consumers, highlighting among others the tangibility, the level of customization, the contact type and the differentiation. Hill [27] proposes the separation of tangible goods, intangible goods and services. This taxonomy not only shows the nature of intangible goods, but it

also proves the difference between them and the services. Although most goods are material objects, this is not a prerequisite: there are intangible entities which share all their economic characteristics. A good example of this is a document which is created by someone (writers, composers, architects, etc.) that could be stocked, sold, whose property can be transmitted, etc. They do not necessarily have to have a material existence and unlike services, it is possible to separate the distribution/use from the production. Services involve relations between producers and consumers and may not be available without a consumer. Hill defines service as "a change in the condition of a person, or a good belonging to some economic entity, brought about as the result of the activity of some other economic entity, with the approval of the first person or economic entity" [28].

The idea that this is a process, is transversal to all definitions of services. To generate them, the service provider must prepare resources - people, equipment or knowledge. The resource must be transformed in order to meet customer needs. The process, especially the business one, appears to be associated with the idea of service. Lindsay [11] analyzed the business process and provided the basis for what will be assumed as the process definition: it is a set of activities, partially requested, resulting in some added value to the addressee, for the product or process, or in the achievement of a defined objective. Sampson [29] established as the core foundation of the Unified Theory of services that: "With service processes, the customer provides significant inputs into the production process. This statement simultaneously defines what services are and what makes them services. The presence of customer inputs is a necessary and sufficient condition to define a production process as a service process".

In a broad sense, we can say that a system is a collection of objects with some form of interaction or interdependence. Laszlo [30] states that "a system is a group of interacting components that conserves some identifiable set of relations, with the sum of the components plus their relations (i.e., the system itself) conserving some identifiable set of relations to other entities (including other systems)". Hall [31] stresses the importance of the environment. Corroborating the importance of the environment, particularly in social systems, Ackoff [32] refers to three levels of purposes: the goal of the system, its parts, and the system in which it forms parts (supra-system). According to Carvalho [33], adapted from Le Moigne, "a system (in general or in abstract) can be defined as an active (does something), stable (has a structure ...) and evolutionary (... that changes over time) thing or object that operates in an environment (it interacts with other things) with some purpose (from the point of the view of the modeller, there is a reason for the system to do what it does)". The "systems" can arise in two different ways, however, adopting similar settings: emerging (as bottom-up); or the result of planning (in top-down). The following system levels are usually considered: supra-system; system; and sub-system. At each level, all the individual or grouped elements (systems) are arranged to form a functional whole that immediately reflects the level above.

Having defined the basic concepts, it is important to define and characterize the term "Service System", from the point of view of Service Science, in order to compare it with services as they are perceived by the organizations. To Alter [34], "Service Systems are Work Systems" and defines work system as a system in which human participants or machines perform work using information, technology and other resources, to produce products and services, for internal or external customers. Consequently, it seems that goods and services are combined, forming a "package" that is provided to the customer. Conversely, Spohrer et al. [35], referred to Service Systems as an abstraction that consists of a set of people, technologies, and other resources that interact with other services by creating value mutually. This concept of co-creation of value is the pivotal element of Service Science. The relevance that services have gained in global economies has led to a change of paradigms from a goods-centred dominant logic (GD-Logic), to a service-centred dominant logic (SD-Logic) [36]. The creation of the abstraction called "Service System", which now operates as unit of study, has been essential for the pursuit of this change.

It is important to verify whether the classical concept of "services" collides or is surpassed by the "Service System". On the other hand, the analysis of this trend initiated by Spohrer and Maglio [10][37], provides a future perspective of this important area for the economy. Considering the classical classification of services (IHIP-intangible, heterogeneous, inseparable, and perishable), the change of paradigms proposed by the creators of Service Science [8][9][10][34][35][36][37] and an intermediate vision somewhere between the two, would be set as the basis for a service reference. This would relate the classical realist's perspective and the abstraction proposed by the school (Service Science) founded by IBM (International Business Machines). The result would be the inclusion of consumer participation in IHIP, mingling with the main feature of service invoked by Service Science: co-creation of value or, as we prefer, co-production. A co-production lies in the various forms of customer inputs found in the service process [29]. That way, we have a set of services that include three from the classical paradigm (heterogeneity, inseparability, perishability - the intangibility is no longer considered as an important characteristic

of service) and co-production of service that is a contribution from the Service Science of IBM, as seen in Fig.1.

Therefore, it is our understanding that the coexistence of the two concepts is harmonious and mutually enriching. Maintaining classic features as service classifiers continues to be preferred by those who have to legislate or economically classify goods and services. The abstraction proposed by Service Science appears more attractive to academics or scholars of organizations, because of the possibilities of reality modelling that offer.

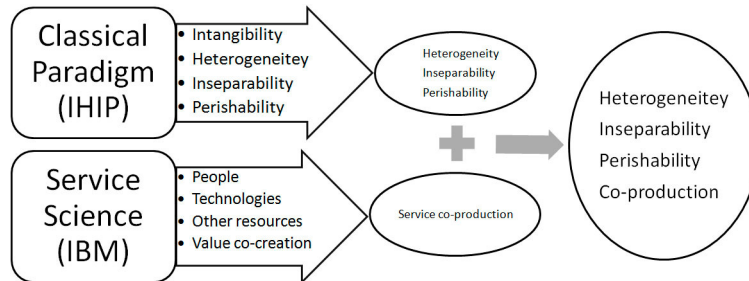


Fig. 1 - A possible complete set of service characteristics

#### 4. CONCLUSION

Hill [28] states that “a service is a change in the condition of a person, or a good belonging to some economic entity, brought about as the result of the activity of some other economic entity, with the approval of the first person or economic entity”. Chesbrough [8] adds the collaborative aspect of the stakeholders in the service (provider and consumer) and the notion of value co-creation. Between these two definitions, the difference lies in consumer participation in the service process.

The focus on consumer participation arises from the need for service differentiation imposed by a new economic order, where the services cannot be seen as a cost but as an opportunity, and also, as a crucial element in the strategy of organizations.

To generate services, the provider must prepare resources - people, equipment or knowledge. Resources must be transformed, to meet customer needs.

Corroborating the essential participation of the client, Sampson [29] established as the core foundation of the Unified Theory of Services that: “With service processes, the customer provides significant inputs into the production process” and “The presence of customer inputs is a necessary and sufficient condition to define a production process as a service process”.

To Wemmerlöv and Laszlo [25][30] a system is “a group of components that interact with each other, which retain an identifiable set of relationships with the assembly of components over their relationships (i.e., the system itself), maintaining a identifiable set of relationships with other entities (including other systems)”. Broadening the concept, Carvalho [33] apud Le Moigne, states that “a system can be defined as an active, stable and evolutionary thing or object that operates in an environment with some purpose”.

Spohrer [35] defines “the service system, which is a configuration of people, technologies, and other resources that interact with other service systems to create mutual value”. It is always possible to find two interacting entities and they are entitled Service System.

The evolution of the concept of services, which led to the establishment of Service Science, devalued the classifications based on the characteristics of services and focused more on customer participation in the process. The concept establishes the Service System as a unit of study and that unit as an abstraction of service.

Abstractions exist as a way to model reality, to simplify the processes of analysis and not to hide the reality. In this context, we understand the Service System’s coexistence with the classical paradigm IHIP to be complementary and potentially enriching to each other. We consider the inclusion of a feature on the classic paradigm that embraces the importance given by the Service Science to the customer participation in the service process. A framework that reflects this idea is presented in Fig. 2.

In the framework of Fig. 2, “service system” can be seen as an abstraction of a real “service”. We can observe that this entity (“service”), involves two entities (the service provider and customer). The provider uses as inputs, goods and a simple or complex service, resulting in the delivery of a service to a customer. This is an interactive

process in which value co-creation occurs. The “service” used as input by the service provider, is in itself, a recursively defined instance of the service described previously.

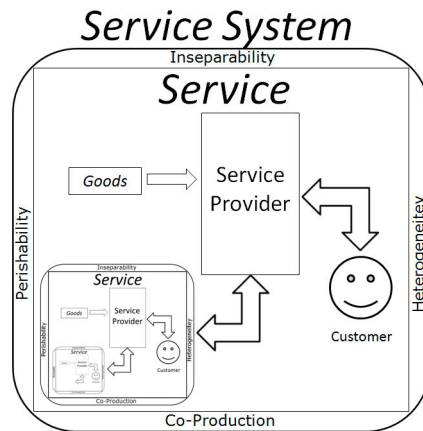


Fig. 2 - A recursive framework of service processes including both classical and service system perspectives

This article is a result of a work in progress that will lead to a complete classification of services. This classification, in the form of taxonomy of services, will be an important contribution to the clarification of the concept of "service" as it is perceived by people as well as for the study of the processes that constitutes it. It also contributes to the establishment of new marketing strategies in services approach, by standing a new evidenced reality and promoting its adoption.

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