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"HUMANS INSIDE" AS THE KEY CHARACTERISTIC OF SERVICE SYSTEMS

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ABSTRACT

This paper presents a definition of service systems that is simple, comprehensive, actionable, and, most of all, differentiates service from product systems. We propose as the defining characteristic of a service system the significant presence of human beings, either as individuals or as organizations, as part of the service system during the time of use. We hypothesize that the main implication of our proposed definition is that service systems are perceived as having human characteristics, treated (partially) as human beings, and expected to exhibit human-like behaviors. We also show how adding the notion of user intensity creates an interesting categorization of product and service systems.

INTRODUCTION

There are no lack of definitions of services and service systems in the literature. However, often such definitions either are very complex, have too many dimensions, do not cover adequately the spectrum of service systems (too much or too little), or do not provide significant implications, as discussed in detail in the next section. The goal of this paper is to construct a definition of service systems which, in our view, is simple, comprehensive, and actionable. And which differentiates services from products.

We propose as the key characteristic of a service system the significant presence of humans, individuals or organizations as part of the service system during the time of use, not counting the user. Simply put, service systems have *humans inside*. In the next section we will define more precisely all those terms, as well as clean up some technical difficulties, but for now it is suffice to say that a key technical distinction from previous works is our emphasis on the use of the system.

It is somehow surprisingly that simply distinguishing situations where there are humans in the system during use is enough to separate what we call products from services, or more precisely, product systems from service systems. In fact, most of the cleanliness of our definition comes from moving the discussion about product vs. service differentiation from the realm of acts and artifacts to the context of systems. Unfortunately, as we discuss in the paper, to formally define a concept which is already entrenched in people's minds is only possible by enumeration methods, which is beyond the scope of this paper. Instead, in this paper we simply present arguments that our definition of service system is aligned with most systems people regard as so.

We also examine in this paper another important characteristic of some product and service systems, called user intensity, which is defined as a measure of how significant the user inputs — body, belongings, information, choices — affect the process and results of the use of a system, following (Sampson, 2001). However, we diverge from (Sampson, 2001) by agreeing with (Pinhanez, 2009) that, albeit important, user intensity is neither a sufficient or necessary condition of services. We frame user intensity as a dimension of both products and services and then use it to define two types of product systems and four of service systems.

We then present the main implication of our definition and the main hypothesis of this paper: because service systems have humans inside, service systems are perceived by their users as having human characteristics, treated as (partial) human beings, and expected to exhibit human-like behaviors. In simpler terms, unlike products, service systems are always anthropomorphized, often in quite complex and unexpected ways.

The anthropomorphic relationship with service systems applies to all service systems, even the ones without visible human beings during the use. An automatic soda-vending machine is, according to our definition, a service system, because its provision and use heavily depends on the firm that owns it, and provides it as a selling system. Notice that the soda can the vending machine dispenses is often used as part of a product system, the one where the user opens it and drinks it. But it is easy to see that, even from the user's perception, there are people in this system: if the soda-vending machine swallows the user coins and do not dispense the chosen bottle, the user is likely to feel cheated, to demonstrate anger, sometimes even violence, and often contact the organization that owns the machine to ask for a refund. If, otherwise, it mistakenly dispenses two bottles, the user may savior the pleasure of conning the machine and its parent organization. The same user, at home frustrated by a dull knife may possibly experience anger, but will not expect that the knife reacts to that. The user is not likely to feel cheated by the knife, since systems without humans do not gain anything from failing to deliver value, unlike systems with people and organizations.

Albeit anthropomorphization is an important consequence of the presence of humans inside service systems, it is not a defining characteristic of them. People attribute human characteristics to objects, places, and machines even without any trace of real connection to human beings or organizations as shown in (Reeves and Nass, 1996). In fact, the important consequence of our hypothesis is not that service systems are anthropomorphized but that care should be taken to provide the user with an appropriate interface to the perceived human side of the system. This interface we call the *human facet* of the service system. This is particularly important, and often neglected, for service systems which do not have human beings as their "contact face". But even in those where humans are in their interface, the human facet is often underestimated and often left to be dealt by people in the interface without extensive thought.

BUILDING A DEFINITION OF SERVICE SYSTEMS

People in most cultures and languages tend to label their engagement with artifacts and systems either as products or services. Most people have no difficult on distinguishing between typical situations of products or services. So in our quest for a definition for service systems, we use as our main criteria that it should include and not leave out all activities and systems which people normally refers as services. For instance, it should define social and charitable work as services. At the same time, it should not categorize do-it-yourself, or slavery, or criminals being caught by the police (from the criminal's perspective) as services. Also, services should not include everyday artifacts or made-to-order, customized products.

Unfortunately, many of the most accepted ways to define services and service systems do not match this popular culture criterion. Even some contemporary proposals such as (Spohrer et al., 2007), (Vargo and Lusch, 2004), (Teboul, 2006), (Sampson, 2001), (Alter, 2006), (Gadrey and Gallouj, 2002) tend to define services in a way that it includes all kinds of situations and activities which people normally do not normally label as services.

On the other side, we have been pursuing a definition of service systems which provides a distinction with manufacturing systems that helps us understand why service systems seem to behave differently and have different properties. We want to provide some clear, simple, and mostly important, actionable way to tell product and service systems apart. This lack of

clear differentiation is a problem with some of the definitions based on value-creation such as (Spohrer et al., 2007) and (Vargo and Lusch, 2004).

We have convinced ourselves that the simplest manner to achieve this breakthrough definition is to avoid focusing on the products and services themselves but instead to try to distinguish between product and service systems. This is the approach taken here: if we can determine which systems are service systems, then we can simply consider services what those systems do for their users.

USABLE SYSTEMS

Our definition of services builds on an initial, fundamental concept which we call *usable systems*. Usable systems are physical systems (i.e., systems which contain physical components such as physical matter/waves, machines, animals, people, buildings, spaces, nature) which can be engaged with by people or organizations to create value. Formally:

> A *usable system* is a physical system that requires the engagement of an external person or organization to produce value for that person or organization.

The key notion embodied in this definition is engagement: a usable system is not permanently connected to the external person or organization, but instead is engaged and disengaged as value needs to be created. This is a key distinction with Spohrer et al.'s notion of *value-creation systems* (Spohrer et al., 2007) and allows us to clearly distinguish between the time of production of the usable system and the time that they are effectively used, i.e., engaged with. Similarly, usable systems are intrinsically different from Alter's *work systems "…in which human participants and/or machines perform work using information, technology, and other resources to produce products and services for internal or external customers."* (Alter, 2006) first because they are used for other purposes beyond work, such as pleasure, time-killing, etc., but more fundamentally because of our emphasis is on engagement and use instead of production. As discussed later, our focus on time of use instead of production significantly simplifies the distinction between products and services.

Before moving forward, we need to define some auxiliary terms:

- *user* : the person or organization that engages with the usable system;
- *use*: the process and results of the engagement between the user and the usable system;
- *utility* : the value obtained by the user when using the usable system;
- *face*: what the user is exposed about the usable system before the engagement;
- *contact face*: the components and processes by which user and usable system engage with each other;
- *customer*: person or organization who pays or give rewards to the usable system to engage with the user.

Examples of usable systems are abundant: cars, roads, gas stations, beaches, maids, restaurants, newspapers, churches, saltshakers, houses, schools, soda-vending machines, and so on. Almost all systems around us are usable, although there are important exceptions. For example, a person's body and organs are not usable systems for that person, since they are permanently engaged. But counter-examples of usable systems are rare, the reality is that we are mostly surrounded by usable systems and the key issue is whether we engage with them or not, and how and when. Figure 1 depicts the concept of usable systems pictorially and some of the related definitions and illustrates the engagement and disengagement process.

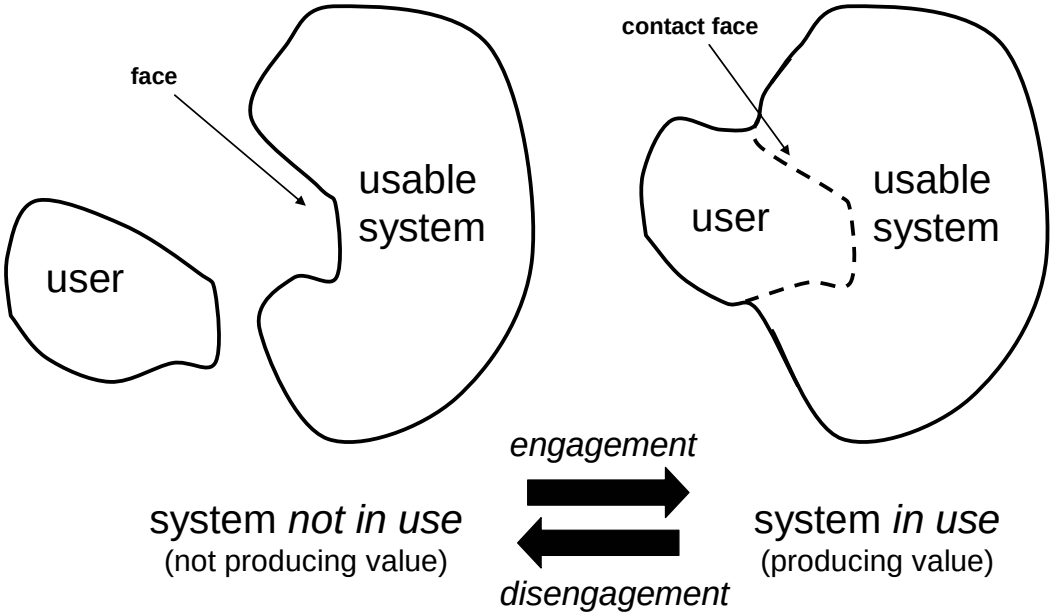

Figure 1 Usable systems and engagement.

We discuss later how the concept of engagement and our definition of usable systems avoid some of the definitional troubles often encountered in attempts to define services. But before going ahead in our task of differentiating product and service systems within the usable systems framework, it is important to examine different types (or dimensions) of usable systems. We can differentiate usable systems by:

WILLINGNESS OF ENGAGEMENT:
- user engages voluntarily: *voluntary* usable system;
- user is engaged independently of will: *coerced* usable system.

Presence of HUMANS INSIDE the system during use:
- no people or organizations inside system during use: *nonhuman* usable system;
- people or organizations inside system during use: *human* usable system.

Type of USER:
- person: *personal* usable system;
- organization: *business* usable system.

Level of USER INTENSITY:
- system does not changes behavior according to user: *passive* usable system;
- system changes behavior according to user: *interactive* usable system.

Following, we show how those dimensions differentiate, albeit in a continuum, between product and service systems as well as determine diverse types of service systems.

A DEFINITION OF A SERVICE SYSTEM

Is the police doing a service to a thief when detaining him? Most people would say no, and therefore we find important to distinguish service systems from usable systems in which the user is coerced to use it, as captured by the *willingness of engagement* dimension presented before. The other, more important dimension in differentiating products from services is the presence of *humans inside* the usable system during use. Figure 2 depicts the four basic

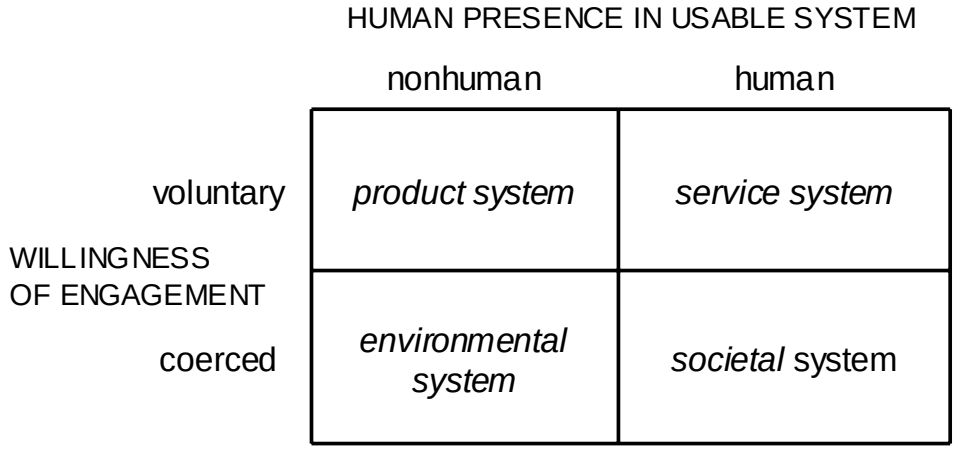

Figure 2 The four basic types of usable systems.

types of usable systems determined by these two dimensions: product systems, service systems, environmental systems, and societal systems.

First of all, our definition for nonhuman systems requires the engagement with a product system to be voluntary, reinforcing the notion of choice often associated with products. Our everyday engagement with the environment around us and with the global environment in general is hardly avoidable and therefore we distinguish those systems from product systems, naming them *environmental systems*. Similarly, usable systems with humans inside it that coerce their users into engagement, named here as *societal systems*, are outside our definition of service systems, including the case police systems (from the criminal's point of view), taxation systems (as perceived by the taxpayers), and even parental systems (from both the parents and the children's point of view). Engaging with your parents is not voluntary when you are a child and therefore the family is not a service system but a societal one. Notice that societal systems are complex systems which also can be perceived as service systems by other users with a different perspective in the issue: the examples above are clearly service systems from the point of view of law-abiding citizens, governments, and the society in general, respectively.

It is also fundamental for our definition that we look for the presence of people in the usable system during the moments of engagement and use. While the manufacturing and selling systems of most everyday objects (such as coffee mugs, soap, or a soda can) certainly include humans inside, such objects as part of systems engaged with by the user do not require the presence of any human being besides the user during their use. In summary:

> A *product system* is a voluntary and nonhuman usable system, that is, a usable system which mostly does not contain people or organization as components during use; and needs the voluntary engagement of an external person or organization to produce value.
>
> A *service system* is a voluntary and human usable system, that is, a usable system which contains a significant level of people or organizations as components during use; and needs the voluntary engagement of an external person/organization to produce value.

Notice that in many ways, the willingness of engagement dimension is mostly used to remove fringe examples of what people perceive as products and services. Therefore, the

key distinction between product and service systems is provided by the presence of humans inside the usable system during use.

It is somewhat surprising that the notion of product vs. service can be captured simply by (mostly) distinguishing between having or not humans inside the system when the user is engaged with it. We want to note that this apparent simplicity is only possible because the focus on use, instead of production, removes the manufacturer or producer (in the case of agriculture) from the system when the user engages with it. In some aspects, our definition agrees with Vargo and Lusch view that *"Goods are appliances (tools, distribution mechanisms) that serve as alternatives to direct service provision. […] Goods are a special case, or at least a special method, of service provision."* (Vargo and Lusch, 2006), pg. 43. But we take an alternative approach where instead of elevating service to the level of a super category, we use the concept of usable systems as our main category and doing so we acknowledge the current popular use of the words "product" and "service". Further, our definition clearly states what the differentiating characteristic between products and services is the human presence in the usable system.

However, notice that the distinction between product and service systems is not binary but a continuum along a spectrum, as suggested by the use of the phrases "mostly" and "significant level" in the definitions. This continuum is best understood by considering usable systems are composed of human and nonhuman sub-systems and that a usable system is used often in temporal (sometimes intermittent) manner, with both the user and the usable system often changing during and after the use. Therefore, the degree of product vs. service in a voluntary usable system depends on the human content in the use of the system through time, i.e., the level of participation of the human sub-systems of the usable system in the production of value through time.

For example, the use of a car (owned by the user) still needs people or organizations to assure the production of value through time: gas stations, oil changes, mechanics, etc. However, the level of participation of these sub-systems is relatively small and our definition tends to classify using a car mostly as using a product system. Of course, that changes if we consider the use of a car in the context of borrowed, rent, or shared cars. A television system is a good example of a midway product-service system, whose use can happen independent of an external organization, such as when playing a DVD, or heavily dependent on service providers such as cable providers and TV stations.

An important observation to be made is that user ownership is often a fundamental mechanism to "remove" other organizations and people from a usable system and therefore, to productize it. However, ownership is not a reliable marker to differentiate products from services because often a service system happens in the context of ownership of some of its sub-systems as, for instance, in the case of listening to a radio: the ownership of the radio device is not sufficient for its use, since the content is provided by radio stations. Conversely, the use of a book and other information media (such as CDs) happens in the context of lack of full ownership of its contents (copyright), albeit the user has guaranteed access to them.

Another way by which we avoid some of the common problems faced by other definitions of services, as for instance, in Sampson's *Unified Services Theory* (Sampson, 2001), is that we focus on users instead of customers, that is, on the people or organizations which are engaging to receive value instead of whoever is paying for it. This avoids technical complexities such as in the case of advertising-based systems like broadcast radio and TV where a focus on the customers often makes difficulty the understanding of service systems beyond the marketing perspective. This emphasis on customers instead of users, very common in traditional services research, can probably be rooted its origins in Service Marketing which, understandably, have been chiefly concerned with the purchasers of services and how to reach them.

According to our view, both viewers and advertisers are users of a broadcast radio service system, with different goals and behaviors. In practice, many service systems are multi-user (and, for that matter, similarly are most usable systems), and often there are multiple levels of users, especially in the case of organizations as users. Understanding how to systematically design, engineer, and manage such multi-user, multi-level service systems is one of the greatest challenges of Service Sciences as discussed in (Glushko, 2008).

USER INTENSITY IN THE CONTEXT OF PRODUCT AND SERVICE SYSTEMS

As we discuss later, the proposed definition of service systems as voluntary usable systems which have people and organizations inside during use, although theoretically sound, addresses only partially the challenges currently faced by service firms. A very important dimension of usable systems, with strong implications for service systems, is *user intensity*, defined as the measure of how significant the user inputs (body, belongings, information, and choices) and/or labor affect the use of a usable system, including its processes and results. Notice that our definition explicitly includes labor as being part of user intensity, expanding Sampson's proposal in (Sampson, 2001).

Most researchers in services tend to agree that user intensity is a very important characteristic of service systems, although Sampson argues that it is a sufficient and necessary condition (Sampson, 2001). However, as observed in (Pinhanez, 2009), user intensity is not a strong characteristic of a range of activities traditionally regarded as services, such as news, performance-based entertainment such as movies, theater, publishing, etc. Also, as observed in (Pinhanez, 2009), products like everyday tools and interactive shrink-wrap software are also user-intense.

We consider the user intensity dimension as very significant to service systems but we frame it as a dimension of the most generic class of usable systems. Figure 3 shows a matrix that plots the user intensity dimension against the human presence in the usable system dimension. It also subdivides further the human presence dimension by differentiating whether the human presence is *visible*, i.e., whether the user contacts the service system through people. We also provide in Figure 3 some simple examples of each category, all from the same domain, children's education and entertainment. For simplicity, we omit the word "system" from each category listed.

Figure 3 defines 2 types of product systems, *passive* and *interactive*, and 4 types of service systems, *static*, *performance*, *automatic,* and *contact*; the latter are grouped into 2 super categories, *passive* and *interactive*. The distinction between passive and interactive product systems is quite straightforward and reasonably understood in terms of design, engineering and business, so we do not discuss it in detail here.

We do think that differentiating passive from interactive service systems is important, mostly because the majority of the most challenging research and business issues are in the interactive category. Also, low levels of user intensity in systems tend to simplify their design and management, as some of the most dreaded characteristics of services —perishability, simultaneity, and, most of all, heterogeneity — have less impact on the delivery of passive services, as extensively discussed in (Sampson, 2001).

Finally, we highlight here the distinction between services in which the human presence is visible, either passively, such as in the case of *performance* services such as TV and news, or interactively, such as in *contact* services like schools, health care, and sales, from services where there is no human being in contact with the user, either in *static* services such as roads and traffic signs, or in *automatic* services such as ATMs and most of the services provided through the WWW. The importance of this distinction is better understood

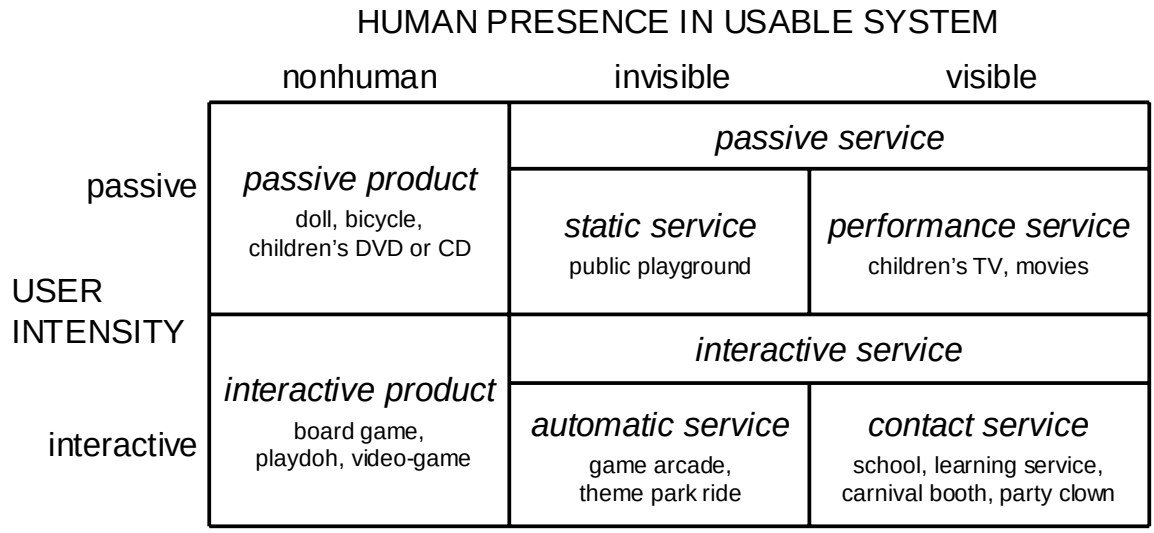

Figure 3 Types of usable systems according to user intensity, to human presence, and to human visibility in the contact face, with examples from the children domain.

after we discuss in the next section our main hypothesis and the issue of how services, especially static and automatic, need to have some sort of human "face".

"HUMANS INSIDE" ANTHROPHOMORPHIZES SERVICE SYSTEMS

What are the implications if, as we argue, service systems are defined by having humans (people or organizations) inside during use? Unlike product systems, we believe that there is an inescapable human presence in all service uses, often direct as in the case of performance and contact service systems, but many times in the backstage, lurking over the engagement process, as in the example of a soda-vending machine discussed before; or in the feared presence of the police monitoring a road for speeding violations; or in the benign assurance that a large number of people in *Google* are working to prevent spurious and malevolent websites to climb to the top of their rankings (a.k.a. *Google-bombing*).

Similar observations led us to postulate our fundamental hypothesis about the implications of human presence in service systems to the way users perceive and interact with them:

> *Hypothesis: Because service systems contain people or organizations inside them, service systems are perceived by their users as having human characteristics and goals, treated to some degree as human beings, and expected to exhibit some level of human-like behavior and responses.*

Notice that the hypothesis does not state that some level of anthropomorphization is a sufficient condition for being a service system but only a necessary consequence. Research has shown that people attribute human characteristics and behaviors to all sorts of objects and media. For instance (Reeves and Nass, 1996) discusses how people treat computers, television, and new media like real people and places. Similarly, traditional arts such as puppetry and animation thrived on the human willingness to perceive humanity in even the simplest expressions of movement.

Our hypothesis simply states that some sort of anthropomorphization is always present in the use of service systems. Anecdotal evidence for this hypothesis is a plenty. We have all experienced situations where we think a service system is greed, helpful, or lazy. We argue

with service systems through phone calls, e-mails, or letters and we believe that someone inside the service system is going to be susceptible to them. If argumentation fails, we try to inflict pain by not using the service again, or to avenge through sabotage or bad-mouthing. Conversely, service systems sometimes apologize, thank, or reward their users, as well as argue back, fight against, or even punish their users, such as when they impose fines or simply decide not to have any further business with customers they believe are troublesome.

Product systems just do not do this kind of things or entail this range of emotions. We may get angry with the performance of product systems such as when a tool breaks in the middle of a job. But everyone knows that screaming to a broken vacuum cleaner is not going to make it recover from a malfunction. Contrarily, in a service system, it is always possible that the human being inside will react to our anger and fix whatever problem we have with the system or, at least, apologizes for the inconvenience.

The real danger, in our opinion, is to ignore or dismiss the importance of anthropomorphization in a service system and therefore failing to understand the nature of the relationship expected by users and customers. Traditional contact services and, to some extent, performance services more easily handle those issues because the visible human presence tends to naturally perform some of the "human" functions expected from a service system. However, in static and especially in automatic services, too often the user is left with no way to express herself or to interact with a human presence she believes is in the system. This problem is even more acute in the fast growing segments of e-commerce and IT services.

To clearly address this issue we introduce here the concept of the human facet of a service system:

> The *human facet* of a service system is the set and configuration of elements that create and control the perception of and the interaction with its human characteristics.

The human facet of a service system often needs to combine elements on its face, contact face, uses, and internal processes to effectively control perception and interaction with its users. It requires design, engineering, and adequate management. In the case of contact services, it also involves training front stage personnel properly and often empowering them. Quite often, the human facet of a service system is loosely dispersed along different segments of the system, such as front stage, branding, marketing, sales, customer relationship management, recovery services, and even the back-end systems, with very flimsy connections among them. The result in such cases is a service system with what resembles a multiple-personality disorder, engendering little trust and fostering user anxiety.

Notice that the concept of human facet is related to issues such as customer-centricity and the value of customer experiences, but it focuses on the anthropomorphization issues unique to service systems. The human facet has to include the interface mechanism and the internal processes that allow an effective relationship with the user which, we claim, are always framed around the assumption that there are humans inside the system. Therefore, the human facet of a service system often has to address issues such as how the user is going to communicate with, read the intentions of, negotiate with, ask for favors, and communicate emotions to the service system. Similarly, the human facet also has to create ways for the service system to show respect to its users, motivate good behavior, apologize, gain trust, negotiate, show compassion, etc.

We are assuming here that creating and managing adequately the human facet of a service system is important because users tend to perceive service systems as having human characteristics behaviors. In fact, there is a lot of related evidence, such as the value of

having friendly front stage practices to service quality and loyalty, the importance of understanding the total user experience, etc. Understanding the impact of the efficiency and the quality of the human facet on service systems, and on user and customer behavior, is clearly an open question and, in our view, a fundamental research topic in Service Sciences.

FINAL DISCUSSION

We argue in this paper that we can differentiate product from service systems by simply looking whether there are or not humans inside the system during use. We have also shown how our definition, combined with the notion of user intensity, categorizes product and service systems in six fundamental types of systems: passive product, interactive product, static service, performance service, automatic service, and contact service.

Our definition seems to match the usual linguistic distinction between products and services, as used in everyday life. As we aimed for, this definition of service systems clearly includes social and charitable work as services and excludes from the notion of service systems such as do-it-yourself (no human besides the user), slavery (not voluntary), criminals being caught by the police as services (not voluntary), or customized, made-to-order products (no humans inside during use, only during sales and production). Throughout 2008, we have presented this concept to a wide variety of audiences and so far no significant exception has been raised.

We are now actively exploring three main lines of derived work. First, we are looking for experimental evidence of our key hypothesis related to the anthropomorphization of service systems. Second, we are exploring concepts and methodologies to support the construction of the human facet of a service system, with ideas and techniques borrowed from psychology and theater. And third, we want to understand how our definitions and hypothesis propose new research questions for the different disciplines of Service Sciences.

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