Sustainability and Shifting from a 'Person to Person' to a Super- or Self-service

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Abstract

Opportunities born of cutting-edge technologies and new information and knowledge enable the overall resources and effort needed to implement services to be reduced by shifting the service boundary to a service that is operated mainly by the supplier, a super-service, or to a service whose complete operation is the responsibility of the customer, self-service. Shifting the service to the super- or self-service mode also presents an opportunity to check the amounts and types of resources required and the service's effort map and to imbue the service with sustainability. It requires first the responsibility of both the provider and the customer to check the sustainability of the service, but the customer should also choose the most sustainable service opportunity. Moreover, shifting the service to super- or self-service and the main operation to the provider or the customer, respectively, obliges them to institute the proper controls to ensure service sustainability. Finally, the move, in general, toward either a super- or a self-service decreases resource utilization and the corresponding effort required, thereby making the service more sustainable. But it also engenders a different distribution of service resources and effort between the provider and the customer and facilitates the design of new sustainable services.

Keywords: Service science, service system, sustainability, sustainable service, Self-service, Super-service

1. Introduction

Traditionally, service has been defined as an intangible product, i.e., a value, which is transferred from the service provider to the customer and initiated by either the supplier or the end user [1-3]. However, with the increased growth and development of the market share of the service sector, services have become more complex, comprehensive, and interdisciplinary, and value co-creation by both service supplier and customer has acquired greater acceptability [4-10]. Moreover, the co-creation of service solutions is currently one of the most important issues in service design, and in contrast to established consumer-provider relationships, where value is created by exchanging services, i.e., "value-in-exchange", a "value-in-use" perspective that facilitates conceptualizing services as shared and dynamic problem-solving endeavors that create value in multiple dimensions is used [7, 11, 12].

Nevertheless, besides the recharacterization of the service core value, new opportunities driven by cutting-edge technologies and new information and knowledge have also changed the conventional division between the service provider and the customer in terms of the

resources and the corresponding shares in operating services of both sides [13, 14]. Shifting the service boundary from a traditional person-to-person service to a service that is mainly operated by the supplier, thereby making it a super-service, or to a service that is fully operated by the customer, i.e., a self-service, has become common. The shift is motivated mainly by the desire to increase service efficiency, and its success can be measured by the extent to which resource consumption, costs, and physical effort have been reduced (Figure 1).
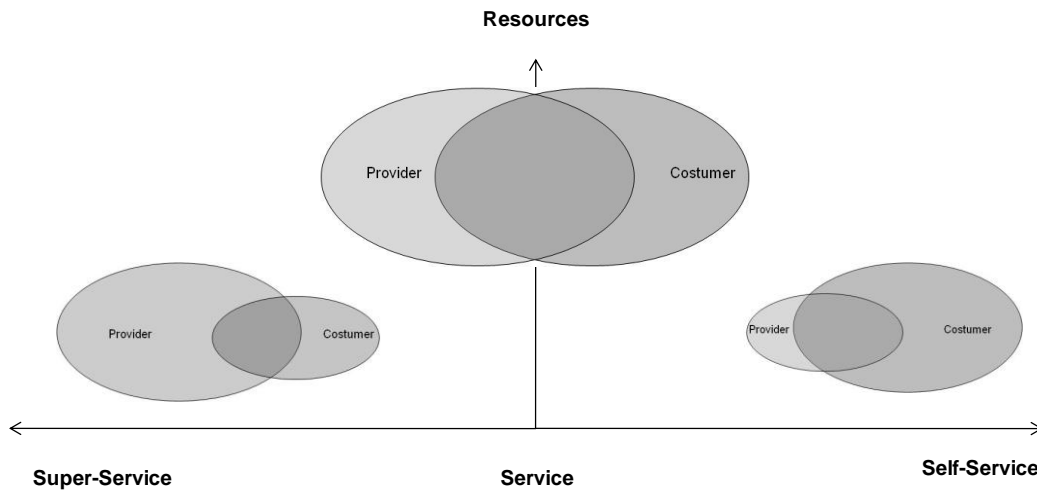

Figure 1. Representation of Resources in Different Service Modes

Self-service, generally defined as any service whose system is operated by the customer and for which the service provider supplies the know-how and the platform, has grown in popularity in recent years due, in part, to the widespread use of new technologies such as computers and the internet [14]. The principal driving forces behind adopting the self-service mode, such as at the gas station where customers fill their own tanks or paying one's bills via the internet, include saving time, providing the customer with greater accessibility and flexibility, and reducing the costs associated with manpower, facilities, and resources required by the supplier to operate the service. In addition, self-service also allows the customer more control as s/he does not have to be in direct contact with the provider, thereby shifting some of the responsibility to the customer.

In contrast to the switch to self-service, the service boundary can also be shifted toward the service provider, such that the service becomes a super-service as in the case of home-delivery from the supermarket or other stores [14]. In this case, the supplier performs activities that were traditionally the responsibility of the customer. Again, it is usually associated with savings in time and effort for both provider and customer, and it requires certain levels and types of technology and knowledge. Campbell and co-authors [13] suggested that the shift in the service boundary vis-à-vis provider and customer should only be done after re-defining the value of the service, mapping its current design opposite that of the new offer, and identifying the resources that will be required by both provider and customer to co-create the new boundary. However, even if the primary incentive for shifting the service boundary to super- or self-service is increasing the efficiency and flexibility of the service and though it is usually associated with reduced expenses for both sides, it is also an opportunity to conscientiously determine the sustainability of the service and to reapportion the responsibility for its operation between the provider and the customer.

We recently published a new model incorporating novel rationale and perspectives for the mutual relations between sustainability and service [15, 16; Figure 2] where we argued that sustainability should be an integral part of all the components of a service. Those elements range from the supplier's supply chain, technologies, knowledge, and manpower through the design of the core value to the integration of the service with other services or operations, while encouraging the customer to become a provider of sustainability to the next generation, i.e., to make sustainability a super value.
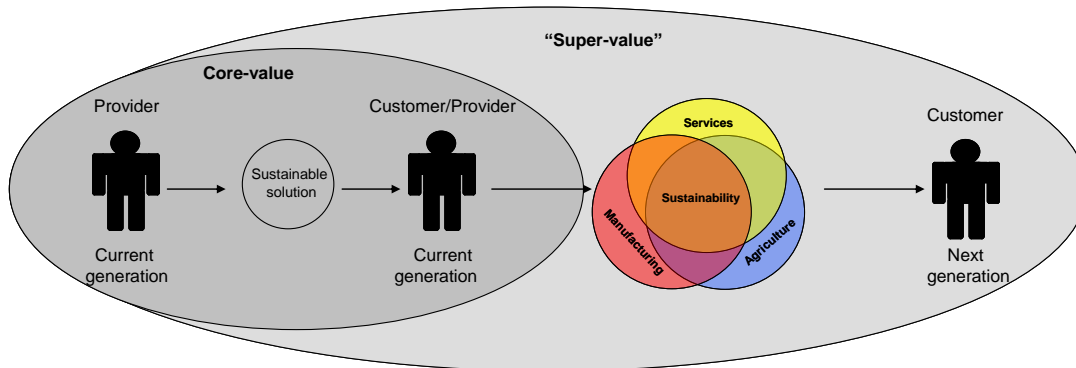

Figure 2. Sustainable Service [16]

Moreover, the new model distinguishes two steps comprising a sustainable decision followed by a sustainable choice (Figure 3). The first step entails the service's core value and is associated mainly with the supplier's resources, which should support a sustainable solution. The second step, however, deals with a super value and the resources and effort of the customer who should choose between different service modes or types based on the ability of each alternative to provide the most sustainable solution while integrating with other services or manufacturing processes and enabling the customer to supply sustainability to future generations.
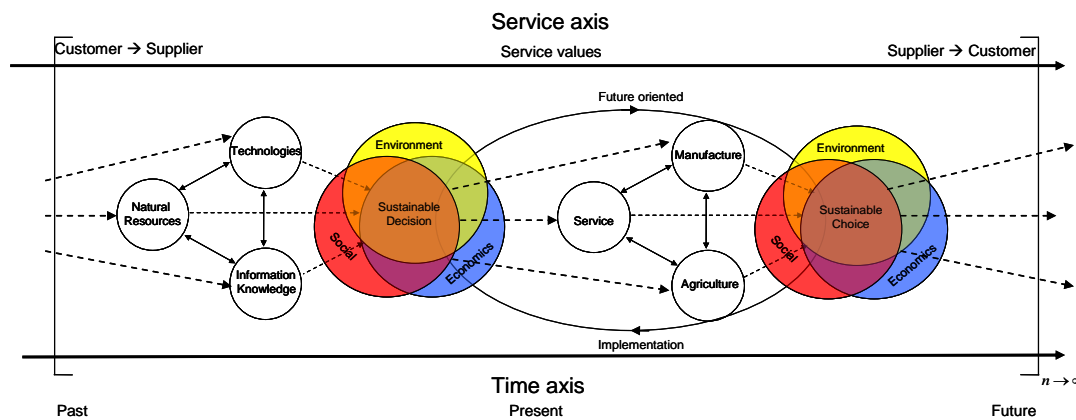

Figure 3. Sustainable Service Model [15]

This paper deals with sustainability when shifting the service boundary from a traditional service to a super- or self-service. The shift entails not only mapping the resources, the core value, and the super value of the new services, but also redistributing the responsibility for

operation of the service between provider and customer to imbue each possible solution with sustainability.

2. Service-value

The heart of each service is its value [9]. For a sustainable service, two values—its core value, or the essence of the solution being offered, and the super value, which makes other solutions redundant and replaceable by the present solution—should be co-created by the supplier and the customer [15]. For example, if the customer requires transportation from his/her home to the city center, several equitable super-services may be proposed, such as a train, bus, or taxi, a car pool, or a self-service such as a bicycle rental or sharing scheme. Each service offers a different solution for public transportation, and as such, each depends on different resources, technologies, and knowledge and entails a correspondingly different cost, travel time, and influence on the environment.

In general, shifting the service boundary in the direction of a super-service or of a self-service effects changes mainly in the resource arrangement and in the effort required to run the service, but it does not necessary change the service's core value [13]. Yet implementing the change can lead to novel opportunities and new support services that contribute to the solution's sustainability, and therefore, any shift in the service boundary of an existing service requires that the service itself be fundamentally redesigned to incorporate, and sometimes integrate, super- and self-service elements. For example, a sustainable combination of self- and super-service could entail offering free parking at the train station to encourage people to use their cars only for travel to and from the train station, thus reducing the number of cars on city streets. In addition, passengers could also be allowed to bring their bicycles with them on the train to use them in the city center.

However, the main consideration that should be taken into account when altering the service mode toward a super- or self-service is the responsibility of both sides, provider and customer, in operating the service sustainably and how that responsibility is divided between them. Generally, the service provider should provide the customer with opportunities and clearly define the borders of its service to supply the most sustainable solution. Likewise, the customer should also consider the economic, social, and ecological effects when choosing between the alternatives to take a sustainable choice. Hence, even if the service boundary shifts from the service provider to the customer or vice versa, both sides should assume responsibility in making the service sustainable. In other words, in both cases it is the primary responsibility of the customer to check the sustainability of each service when choosing a super- or self-service, while the service provider should be responsible to deliver the most sustainable platform. Moreover, to use a self-service, the customer should have the knowledge and tools to imbue the service with sustainability, and for a super-service, the customer should be convinced that the provider can supply those resources. Nevertheless, although the responsibility of ensuring that a service is sustainable is shared by both the service provider and the customer, shifting the boundaries of a service toward those of a super- or self-service and, respectively, its main operation to the provider or the customer, requires that the service operator supply the necessary information, knowledge, skills, and tools. In so doing, the service provider can control how the service is run and the extent of its sustainability, and in fact, s/he is obliged to do so (Figure 4).
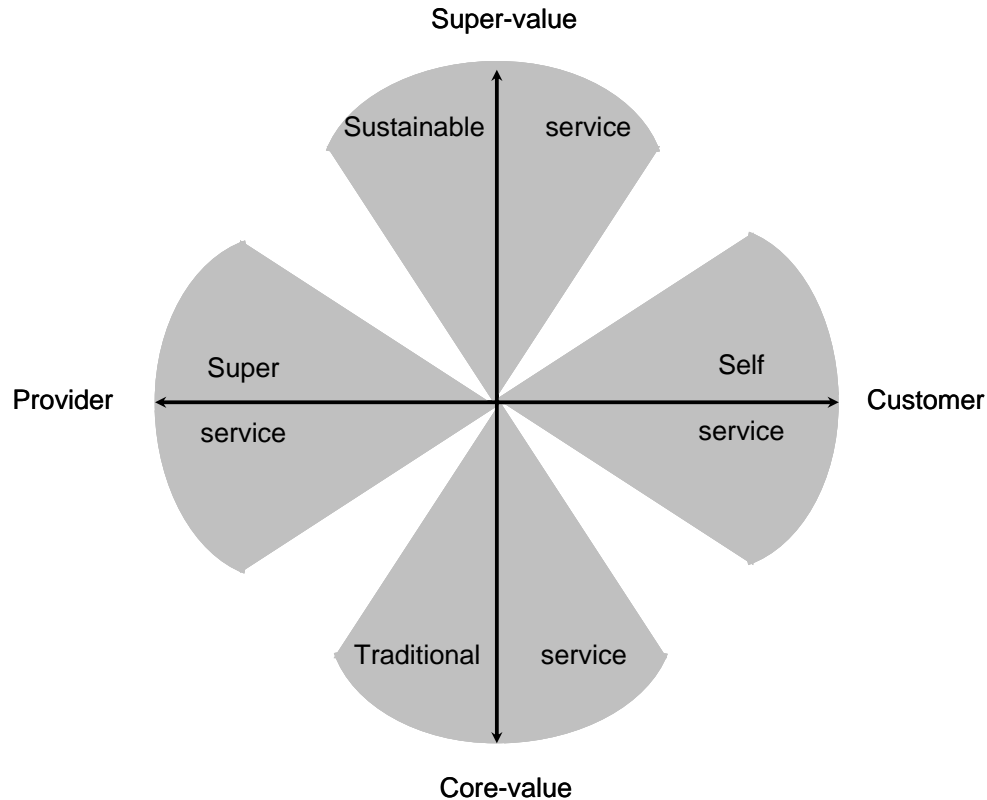
Figure 4. Sustainable Service Compass

Comparing, for example, bicycle rental and bus transport as representative self- and super-services, respectively, for city travel can illustrate the shared responsibility of service provider and customer. Under both solutions, the provider should not only offer the most sustainable solution in terms of resources and technologies, but it should also encourage the customer to use its solution in the most sustainable way. The operation of either service, therefore, would require the provider to make its service both highly accessible, by situating enough bicycle or bus stations in central locations, and reliable, by scheduling appropriate bus frequencies or by ensuring there are enough bicycles in every station to lend the service credibility.

Again, to ensure that a service remains or becomes sustainable when shifting the service boundary toward the super- or self-service mode, the service's ability to communicate with other services and manufacturing processes must also be evaluated, e.g., re-design the service's super value. The emphasis here is a service's sustainability oftentimes relies on the services of other providers. For example, a more sustainable alternative to driving one's car to work is the car pool, which requires a suitable support service such as a car pool internet site or email or SMS alert, but the use of car pooling should also be encouraged by the government, which can construct express lanes exclusively for car pool users.

3. Resources and Effort

As previously mentioned, the main incentive to shift an existing service toward a super- or self-service is to save in the amount of resources and effort, including time, materials, energy, manpower, and/or facilities, needed to operate the service. In general, reducing the use of natural resources makes the service cheaper and greener, but the cut in manpower may cause

the service to have an unintended negative social impact as jobs are lost. However, in the design of new platforms and/or values to adapt the service core value to the new mode or to ensure that it can communicate seamlessly with other services, i.e., its super value, lies an excellent opportunity to institute the rational use of natural resources, new, efficient, and clean technologies, and state-of-the-art knowledge. In addition, moving toward a new service mode may also change how resources are managed, resulting in a shift in responsibility for them from provider to customer and vice versa. Indeed, because altering the mode of a service may also require an investment in new resources, such as infrastructure and knowledge, the potential impact of those resources should be considered in an effort to prevent any negative effects on either our social or natural environment.

Consider, for example, the payment of an electricity bill: it can be done using more traditional, person-to-person methods like paying the bill in a bank or post office or by telephone to the electricity company itself. Alternatively, a self-service mode of payment is available, over the Internet, or via a super-service by arranging a direct debit through one's bank to pay the regular (e.g., monthly, bi-monthly) payments directly to the electricity company without asking for permission prior to executing each payment.

The diamond graph in Figure 5 illustrates the averages in resource use and effort invested (on a scale of 1, minimum to 5, maximum) by the provider and the customer when using the different service modes. As could be expected, the switch from a traditional service mode to a super- or self-service changes the corresponding investment required of each group in resources and effort, showing a general trend toward reductions in natural resources, facilities, manpower, and effort. Returning to the utility bill scenario, neither payment over the Internet (self-service) nor by direct debit from the bank to the electricity company (super-service) requires a bank branch or a clerk. An added, albeit inherent, benefit of the super- and self-service modes is their increased flexibility (i.e., time and place of payment) over the traditional service. The move to a super- or self-service, however, will only succeed if suitable facilities and infrastructure are in place and both sides have the relevant information and knowledge required to operate the new service modes. For example, a customer who lacks internet access and/or a computer will not be able to take advantage of the more sustainable service option.
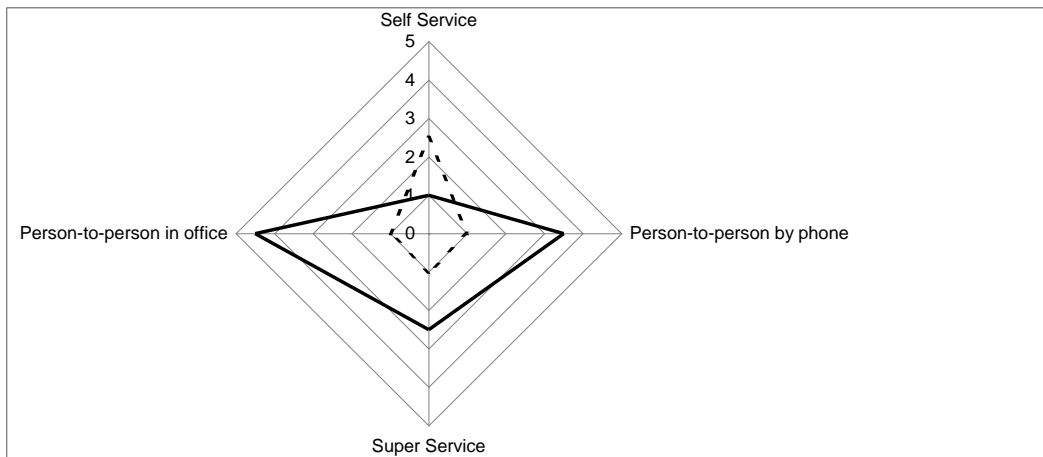

Fig. 5: Diamond Graph of Service Modes (customer- dashed line, provider- solid line)

4. Example

Changing the service mode to that of a super- or self-service first requires that the core and super values of each alternative be clearly defined. Then a resources and effort map should be constructed for each solution to evaluate its sustainability and to choose the most sustainable solution. Finally, the integration of each solution with other services and processes and the ability of the customer to become a provider of sustainability to the next generation should also be considered.

To illustrate the procedure, consider a hotel reservation, where the main product of the service, e.g., the core value, is the hotel voucher given by the provider to the customer, and the super-service is hotel type and location, which together refer to the services offered by the hotel and its proximity to other, potentially desirable city services such as transportation, shopping, tourist sites, and more. As previously mentioned, both service provider and customer are responsible for the sustainability of the service, i.e., whether it executes a rational use of resources and clean technologies, but they are also responsible for verifying the sustainability of the super value, such as whether the hotel operates sustainably, is centrally located, and is accessible to all its potential clientele. Yet while the provider supplies the opportunities, the customer is responsible for first defining sustainability indicators and then using them to assess each service alternative. Finally, the customer's decision should reflect the most sustainable service alternative.

Table 1 summarizes the resources and effort map of both service provider and customer across four different service modes available for ordering a hotel reservation: self-service via the internet, traditional service through a travel agency by phone or by visiting the agency itself, and super-service by giving an agent, preferably from a small home-agency, the reservation details and expense range. As mentioned earlier, the provider is responsible for supplying the most sustainable solution while the customer should make a sustainable choice, and in choosing a self-service mode, the customer should also consider and have the knowledge and tools to appraise the sustainability of the service. In choosing a super-service he should be convinced, but also demand, that the provider has the knowledge and tools to evaluate the sustainability of the service. For comparison, the resources and effort in the table were rated from 1, the minimum, to 5, the maximum, and average scenarios were considered.

Table 1. Resources and Effort Map for Hotel Reservation*

Resources and effort	Self-service		Agency-phone		Agency		Super-service	
	P	C	P	C	P	C	P	C
Materials and energy	1	2-3	3-4	1	4-5	1	2-3	1
Technology	3-4	4-5	4-5	1	4-5	1	4-5	1
Information and Knowledge	4-5	4-5	4-5	1-2	4-5	1-2	4-5	1
Facilities	1	1-2	4-5	1	4-5	1	2-3	1
Price	2-4	2-4	2-4	2-4	2-4	2-4	2-4	2-4
Time	1	4-5	4-5	2-3	4-5	3-4	4-5	1
Flexibility	5	5	3-4	3-4	3-4	3-4	5	5

*Ranking from 1-5 corresponding to minimum-maximum. P-provider, C-customer.

As illustrated in Table 1, moving toward a super-service usually increases the shares in natural resources, facilities, and effort of the provider and reduces those of the customer. In contrast, moving to a self-service increases the shares in natural resources, facilities, and effort of the customer and reduces those of the provider. The exception is knowledge, which increases for the provider in a super-service and increases for the customer in a self-service. Regarding effort, it is clear that the shift to a super-service transfers most of the effort to the provider while choosing a self-service puts most of the effort on the customer. However, when examining the whole service arrangement and the total resources and effort used to execute a super- or self-service, the overall investment required by either side is normally lower for both parties than for a service that requires the active efforts of the two sides.

With regard to the super value, the customer, for example, may decide that in addition to the hotel fee and the proximity of the hotel's location to public transportation opportunities, that the environmental policy of the hotel is also important. This means that if the hotel reservation service is a self-service, then the customer is the one who assesses those points when searching for a hotel. On the other hand, if the hotel reservation is done via a super-service, then the customer should state his/her desired conditions to the provider while trusting that the provider will check that they are fulfilled. But if the customer opts for a more traditional service mode, such as using an agency to book a hotel (i.e., both customer and provider search for a suitable hotel), then both sides will be involved in considering the customer's conditions.

5. Conclusions

The market share of the service sector has grown considerably in recent years, and services have become more complex, comprehensive, and interdisciplinary. Likewise, the new opportunities generated by technological developments and increases in information and knowledge have changed the conventional division between the service provider and the customer in terms of the corresponding resources and effort required from each side to operate a service. Shifting the boundary to redefine a service as one that is operated mainly by the supplier, a super-service, or one that is operated in full by the customer, a self-service, is principally motivated by the desire to increase the efficiency of the service. Whether the change will actually improve a service's efficiency is shown by evaluating its resource consumption and costs and the physical effort required for the service's operation, all of which should decline for the shift to be justified. However, changing the service mode to that of a super- or self-service is also an opportunity to assess the resources and effort map of the service and to imbue it with sustainability.

In the first step, the obligations of both provider and customer to ensure the sustainability of the service should be considered, with the two sides sharing in the responsibility. As such, the service provider supplies the opportunities associated with, and draws the borders of, the service, to supply the most sustainable solution while the customer considers the economic, social, and ecological implications of each alternative to make a sustainable choice. Yet it is the primary responsibility of the customer to appraise the sustainability of each service when h/she is choosing a super- or self-service. Nevertheless, a boundary shift that changes the mode of a service to that of a super- or self-service and that transfers the responsibility for general operation of the service to the provider or the customer, respectively, obliges the service's main operator to control the setup (provider) and the sustainability (customer) of the service.

Finally, the move to either a super- or self-service reduces resource consumption, thereby making the service more sustainable, but it also entails a new distribution between the

provider and the customer of the resources required by the service, such that the respective share of provider or customer is higher in a super- or self-service, respectively. A shift in the service boundary is ultimately an opportunity to design new, sustainable services.

References

[1]   Brown AW, Delbaere M, Eales P, Johnston S, Weaver R, "Realizing service oriented solutions with the IBM rational software development platform", IBM Systems Journal, vol. 44, no. 4, **(2005)**, pp.727-752.

[2]   Fitzsimmons JA, Fitzsimmons MJ, "Service management: operations, strategy, and information technology", 5th Ed. McGraw-Hill, Boston, **(2006)**.

[3]   Hefley B, Murphy W, "Service Science, management and engineering: education for the 21st century", Springer, New York, **(2008)**.

[4]   Alter S, "Service system fundamentals: work system, value chain, and life cycle", IBM Systems Journal, vol. 47, no. 1, **(2008)**, pp. 71-85.

[5]   Basole RC, Rouse WB, "Complexity of service value networks: conceptualization and empirical investigation", IBM Systems Journal, vol. 47, no. 1, **(2008)**, pp. 53-70.

[6]   Karmakear U, "Will you survive the service evolution?", Harvard Business Review, vol. 82, **(2004)**, pp. 100-107.

[7]   Krcmar H, "Information management", Springer, Berlin, **(2010)**.

[8]   Maglio PP, Srinivasan S, Kreulen J, Spohrer JC, "Service systems, service scientists, SSME, and innovation", Communications of the ACM, vol. 49, no. 7, **(2006)**, pp.81-85.

[9]   Maglio PP, Kieliszewski CA, Spohrer JC (eds.), "Handbook of service science", Springer, New York, **(2010)**.

[10] Rust R, "A call for a wider range of service research", Journal of Service Research, vol. 6, no. 3, **(2004)**, pp. 211-212.

[11] Lusch R, Vargo S, "The service-dominant logic of marketing: dialog, debate, and directions", ME Sharpe Inc, Armonk, NY, **(2006)**.

[12] Vargo S, Lusch R, "Evolving to a new dominant logic for marketing", Journal of Marketing, vol. 68, no. 1, **(2004)**, pp. 1-17.

[13] Campbell CS, Maglio PP, Davis M, "From self-service to super-service: How to shift the boundary between customer and provider", Information Systems & E-Business Management, vol. 9, no. 2, **(2011)**, pp. 173-191.

[14] Glushko RJ, "Seven contexts for service system design", In: P.P. Maglio, C.A. Kieliszewski, J.C. Spohrer (eds.) Handbook of service science, Springer, New York, **(2010)**, pp 219-248.

[15] Wolfson A, Tavor D, Mark S, Schermann M, Krcmar H, "S3-Sustainability and services science: novel perspective and challenge", Service Science, vol. 2, **(2010)**, pp. 216-224.

[16] Wolfson A, Tavor D, Mark S, "Sustainable service: the natural mimicry approach", JSSM, vol. 4, no. 2, **(2011)**, pp. 125-131.

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