

# A process oriented approach to the service concepts

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## ABSTRACT

This article seeks to consider the service concepts currently used from a process oriented perspective. We examine service definitions of well know authors and offer a new goods-services continuum definition. A new process oriented service classification is proposed which helps authors to test the validity of the service characteristics.

**Keywords:** service definition, good-service continuum, service classification and characteristics (IHIP), inseparability

## 1. SERVICE DEFINITIONS

Before presenting our service concepts, we prefer to give some of well known authors' definitions.

"A service may be defined as a change in the condition of a person, or of a good belonging to some economic unit, which is brought about as the result of the activity of some other economic unit, with the prior agreement of the former person or economic unit." (Hill, 1977).

"Any purchase of services by an economic agent B (whether an individual or organization) would, therefore, be the purchase from organization A of the right to use, generally for a specified period, a technical and human capacity owned or controlled by A in order to produce useful effects on agent B or on goods C owned by agent B or for which he or she is responsible." (Gadrey, 1992).

"Service is a transformation of existence mode and/or dispositions of the person him self, of his body and his mind. While goods modify the existence conditions,

services modify the existence modes, where goods are only supports." (Zarifian, 2001).

"An elementary service is the result or the output of the servuction system, in other words, the result of an interaction between physical support, personnel and customer." (Eiglier & Langeard, 1975).

"A service is any act or performance that one party can offer to another that is essentially intangible and does not result in ownership of anything. Its production may or may not be tied to a physical product." (Kotler, 1987).

"A service is an act (or a succession of acts) of duration and localization defined, achieved thanks to human and/or material means, implemented for the benefit of an individual or collective customer, according to processes, codified procedures and behaviors." (Dumoulin & Flipo, 1991).

Table 1. Authors' definitions

	What?	For Whom?	By Whom?	Why?	How?	Characteristics underlined
<b>Peter T. Hill</b>	A change in the condition of a person or of a good	For a person or for good	By an economic unit	On a prior agreement		Intangibility
<b>Jean Gadrey</b>	Some useful effects	For an agent or for his goods	By an organization		By technical and human capacity	
<b>Philippe Zarifian</b>	A transformation of an existence mode	For the human person			By transforming dispositions of the person	
<b>Pierre Eiglier &amp; Eric Langeard</b>	An output of the servuction system				As a result of an interaction	Coproduction
<b>Philip Kotler</b>	An act or a performance					Intangibility
<b>Chistiane Dumoulin &amp; Jean-Paul Flipo</b>	An act of duration and localization defined	For a single customer or for a group of customers	By humans and/or by materials		Some processes, procedures or codified behaviors	
<b>Christian Gronröös</b>	An activity or series of activities	For the human persons	By service employees and/or by systems of the service provider		By providing solutions to the customer problems	Intangibility and coproduction
<b>Vincent Giard</b>	Providing products or information, a resource state modification	For a person or for his goods	By personnel or by machines	following to the customer demand	By providing products or information, modifying resource state	

"A service is an activity or series of activities of more or less intangible nature that normally, but not necessarily, take place in interactions between the customer and service employees and/or systems of the service provider, which are provided as solutions to customer problems." (Gronröos, 1990).

It's almost impossible to provide a short definition of the service which is valid for the whole of the service sector. Regarding to the various types of service (using a vendor machine, healthcare consultation, sending letter, air transport, computer maintenance, renting a car...), such attempts have always failed. However, under a precise attack angle, it's possible to gather some common aspects of services in one definition.

Vincent Giard (1988, 2003, 2005) defines services under a process oriented attack angle. A service can consist on:

- products provision to the customers by the means of operators or of machine,
- providing simple or complex information to the customer following his request, where the material support of this information is not essential,
- modification of the state of certain resources (equipment, person...).

## 2. PROCESS ORIENTED CLASSIFICATION

We review, complete and discuss the service classification proposed by Vincent Giard (2005). It allows us to distinguish different service production processes. A customer point of view, which requires a particular attention to the front office operations, is adopted. The production processes in back office and those of production of the products are similar, from a generic point of view, their coordination with front office operations can be analyzed using supply chain management methods. In this classification given hereafter, we added also process outputs, which will help us later to analyze service characteristics, is given in table 2.

These classes allow us to mobilize the space-time analysis grid (same or different space/time) of Robert Johansen (1988). Under this groupware grid, new subclasses can be created by taking in consideration the relations between customers and personnel. Thus, we can analyze services which require or not the presence of the employee and the customer, as well as the synchronization of the service operations. This analysis makes possible to discuss some service concepts like "coproduction" or "separability between front office - back office operations".

This analysis grid, which allows to mobilize a process approach, is essential for service engineering. Service production process can be analyzed as a sequence of operations including processed objects, queues, resources... Consequently, it's possible to inspect some production concepts (like processing time, added value per operation etc.) to mobilize a process improvement or reengineering techniques.

Eventually this classification helps us to reexamine some of the most recurrently discussed service characteristics: "intangibility", "heterogeneity", "inseparability" and "perishability" (as known as IHIP).

Table 2: Our process oriented service classification

<p><b>I. Services consumed by persons (B2C)</b></p> <p><b>I.1 Providing products or information to the customers</b></p> <p>I.1.1 <i>Product provision</i> (example: supermarket; output: ownership of a new product)</p> <p>I.1.2 <i>Transportation</i> (example: post office; output: location change)</p> <p>I.1.3 <i>Providing information to the customers</i> (example: consulting; output: acquired information)</p> <p><b>I.2 Using individually or collectively a resource of the service provider</b></p> <p><b>I.2.1 Using collectively a limited-capacity resource of the service provider</b></p> <p>I.2.1.1 <i>Customers arrive and depart at the same moment</i> (example: cinema; output: mental changes on customer)</p> <p>I.2.1.2 <i>Customers arrive and depart at different moments</i> (example: museum or public transport, output: mental changes, entertainment or location change)</p> <p><b>I.2.2 Using temporarily resources of the service provider</b></p> <p>I.2.2.1 <i>In favor of the customer's good</i> (example: maintenance, repair; output: physical changes on customer's good)</p> <p>I.2.2.2 <i>In favor of the customer himself</i> (example: hair dresser, beauty cares; output: physical changes on customer)</p> <p>I.2.2.3 <i>Rent an equipment</i> (example: rent a car; output: equipment utilization)</p> <p><b>II Services consumed by enterprises (B2B)</b></p> <p><b>II.1 Providing information</b> (example: audit; output: acquired information)</p> <p><b>II.2 Using temporarily resources of the service provider</b></p> <p>II.2.1 <i>In favor of equipment</i> (example: maintenance; output: physical changes on customer's equipment)</p> <p>II.2.2 <i>In favor of personnel</i> (example: training programs; output: mental or physical changes on personnel)</p> <p>II.2.3 <i>Rent an equipment</i> (example: rent a machine; output: equipment utilization)</p> <p>II.3 <b>Logistics</b> (example: transportation; output: location change)</p>
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## 3. GOOD-SERVICE CONTINUUM

Economists consider mostly this concept as a continuity between goods and services. This consideration requires necessarily a "continuum axe" on whose extremities are situated "pure goods" and "pure services". A term, which encapsulates both goods and services, is also necessary to define this axe. The answer is different among authors; Peter T. Hill (1977) uses the term "entity", Jacques de Bandt (1995) prefers "product".

Marketing authors consider it like a relation between goods and services. Goods constitute "physical supports" or "resources" of the service system. But, this representation is not suitable because the term of good is used in the sense of equipment. For many authors, goods constitute the "servisecape". According to the Pierre Eiglier & Eric Langeard (1975), goods are the showroom of the service system. Lynn Shostack (1977) hold a position closer to the economists, she encapsulates goods and services in a molecular model.

For us, the good-service continuum may have a meaning in two contexts: "service package" and "added value creation by services".

- Let's examine how to "have" a car. If you buy it, the salesman does what is necessary to you to deliver the wanted vehicle, of which you become owner after the payment. To reduce the trouble or risk related to the product use of the customer, some supplementary services can be added to that initial transaction, like insurance, loan etc. It can continue until the dematerialization of the good, customer can make leasing or rent the car for a long time, insurance and all the expenditure of maintenance being including. He can also rent it just when he needs or can take a taxi. Therefore, the service will become "using resources of the service provider".

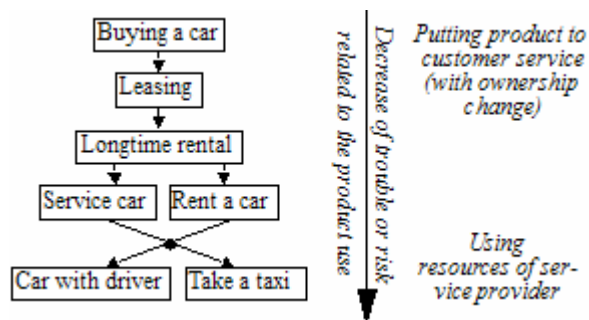


Figure 1. Good-service continuum and trouble/risk decrease

- Some services can be added to the good production to create more value. With this added value perspective, a continuum can be established between "product provision" and "using resources of the service provider". Let's consider vegetables that you buy, prepare and cook for diner. If you want to decrease your work, you can buy vegetables ready to cook (frozen...), or a cooked dish ready to cook, or to heat, or make you deliver a hot dish, or to go to the restaurant.

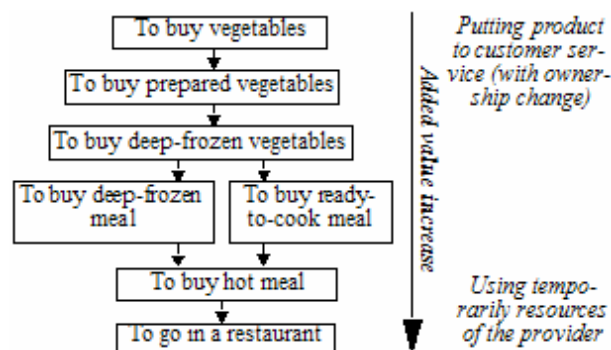


Figure 2. Good-service continuum and added value increase

#### 4. SERVICE CHARACTERISTICS

In the Sixties, researchers started to enumerate distinctive characteristics of services, in order to distinguish them from the goods. The tendency was more to make a distinction to be able to develop strategies or methods in marketing and in production management. The four most cited characteristics were "intangibility", "heterogeneity", "inseparability" and

"perishability" (named "IHIP") of services. But, these characteristics are not always specific to the services. We give in following tables the views of well known authors and we use our service classes (B2C) to show where their views fail.

We will keep our process oriented position to discuss these characteristics. For the "intangibility", we will consider the "service production system" and judge its intangibility through the output of the production (Table 3).

Table 3. Authors' views and their limits about the intangibility of services

Authors	Views	Not Valid for
Rathmell (1966), Shostack (1977, 1982) De Bandt (1995)	Intangible: immaterial, not corporeal	I.1.1, I.2.2.1, I.2.2.2
Berry (1975) Kotler (1977) Zeithaml & al. (1985)	Intangible: inaccessibility to the senses	Output is always perceived
Bateson (1977) Shostack (1977) Flipo (1985) Schmenner (1995)	Intangible: untouchable, impalpable	I.1.1, I.2.2.1, I.2.2.2
Bowen D. & al. (1989) Lovelock (1983) _____, Yip (1996) _____, Gummesson (2004)	Intangible: absence of ownership	Possible through pre-payment
Gadrey (2000)	Intangible: observable (not physical) materiality	I.1.1, I.2.2.1, I.2.2.2
Hill (1977,1999) Shostack (1982)	Goods exist in both time and space, services exist in time only	I.1.1, I.1.2, I.2.1.1, I.2.1.2, I.2.2.1, I.2.2.2
Bateson (1977) Gronröos (1984, 1988) Laroche & al. (2001)	Add mental intangibility: difficult to have a clear and concrete image before purchase	I.1.1, I.1.2, I.2.2.3
Brievik et al. (1998) Laroche et al. (2001)	Add general intangibility: how general and/or specific a consumer perceives a product	I.1.1
Kotler (1977) Bateson (1977) Zeithaml et al. (1985) Bowen D. (1989) Bitner (1992)	Physical intangibility is a distinctive characteristic of services	I.1.1, I.2.2.1, I.2.2.2
Rathmell (1966) Hill (1999) Shostack (1977, 1982) Gummesson (1995) Vargo & Lusch (2004)	Intangibility can be a continuum dimension between goods and services	Valid only between I.1.1 and I.2.12/ I.2.2.3

For the "heterogeneity" of the services, we precise four different author positions. For each one, we give as examples our service classes for which they are not valid (Table 4).

The "inseparability" of the services, and the "perishability" which is related to this characteristic, are the ones which interest us the most because of our process

oriented position. They will be discussed more explicitly at the next paragraph. We give here below different authors definitions for those characteristics and precise some of our service classes for which of they are not valid (Table 5 and 6).

Table 4. Authors' views and their limits about the heterogeneity of services

Authors	Definitions	Not Valid for
Kotler (1977)	Variability between services	I.1.1, I.1.2, I.2.1.1, I.2.2.3
Lovelock (1983) Bowen D. et al. (1989) Vargo & Lusch (2004)	Inability to standardize the service output	I.1.1, I.1.2, I.2.1.1, I.2.1.2, I.2.2.1, I.2.2.3
Rathmell (1974) Sasser (1978) Zeithaml et al. (1985)	Variability in personnel performance	I.1.1, I.1.2, I.2.1.1, I.2.1.2, I.2.2.1, I.2.2.3
Eiglier & Langeard (1975) Gronröos (1984)	Variability in service quality	I.1.1, I.1.2, I.2.1.1, I.2.2.2, I.2.2.3.

Table 5. Authors' views and their limits about the inseparability of services

Authors	Views	Not Valid for
Kotler (1977) Sasser et al. (1978) Zeithaml et al. (1985) De Bandt (1995) Bowen J. & Ford (2002)	Simultaneity of production and consumption	I.1.3, I.2.2.1
Hill (1977) Gronröos (1984, 1988) Czepiel et al. (1985) Bitner (1992) Schmenner (1995) Lovelock (1983) ____, Yip (1996) ____, Gummesson (2004)	Customer interaction or his presence in service production (co-production)	I.1.1 (online shopping), I.1.2, I.1.3, I.2.2.1
Chase (1978)	Front-back office separation	I.1.3, I.2.2.2, I.2.2.3

Table 6. Authors' views and their limits about the perishability of services

Authors	Views	Not Valid for
Kotler (1977) Zeithaml et al. (1985) ____, Bitner (2003) Edgett & Parkinson (1993) Bowen J. & Ford (2002)	Service can't be saved, stored for reuse at a later date, resold, or returned (which yields marketing problems).	I.1.3, I.2.2.1, (Inventoriability of the output)
Sasser (1978) Lovelock (1983) ____, Gummesson (2004) Darmon et al. (1996) Pride & Ferrel (2003) Fitzimmons & Fitzimmons (2004)	Unused service capacity of one time period cannot be stored for future use (which yields capacity management problems).	I.1.1, I.1.2, I.1.3, I.2.2.1, I.2.2.2, I.2.2.3

### 3. INSEPARABILITY

A production process is conceived to produce, in a more or less regular way, a flow of goods or services. If one is interested in a set of products or services to be produced by this process for a given period, the

problem can be analyzed under the angle of scheduling. To define without ambiguity inseparability, one can use the formalization of scheduling problems which make it possible to lay down precise rules of decomposition of activities. A problem of scheduling, defined at the most detailed level, is characterized basically by a set of tasks of which the duration depends on the resources necessary to their execution, by a set of precedence constraints and by a set of resources constraints. The resources concerned are shared between several tasks and they can not be inventoried (hours of machines or operators). To convert a problem of detailed scheduling into a problem of aggregate scheduling, one must call upon rather obvious rules of aggregation and several conventions necessary but contestable. Three obvious rules must be used:

- The precedence constraints between elementary tasks belonging to the same macro-task disappear in the process of aggregation.
- The precedence constraints between macro-tasks are inherited from the precedence constraints between elementary tasks: the precedence constraint between two elementary tasks belonging to two different macro-tasks is transmitted to the macro-tasks; it is then necessary to soften the relations of anteriority by authorizing overlap between macro-tasks. The exact calculation of the overlapping between macro-tasks requires an explicit resolution of the problem of scheduling formulated on the level of the elementary tasks.
- The resources mobilized by the macro-task correspond to the meeting of the resources mobilized by the elementary tasks of the macro-task. The definition of the intensity of the use of each resource mobilized in the execution of a macro-task depends on adopted conventions.

It is necessary to add two more rules which imply the use of conventions:

- The execution time of a macro-task is calculated as the minimal duration of execution of the project consisted the elementary tasks of the macro-task and in which all the resources taken into account in the cumulative constraints are dedicated to the macro-task.
- The traditional convention of a constant use of a resource mobilized in the execution of a task is generally acceptable in a scheduling problem defined in a detailed level. The scheduling of the project corresponding to a macro-task leads mechanically to an irregular use of the resources used by the macro-task. This irregularity is very difficult to take into account in the formulation of the problem of scheduling but the assumption of a regular use of the resources by a macro-task can be unrealistic and make contestable the formulation of the problem on the level of the macro-tasks.

The desegregation process yields problems simpler than those evoked for that of aggregation because the analysis at a finer level makes it possible to define without ambiguity the relations of anteriority and the resources consumption. Arises only the difficulty of the

decomposition to retain, as usually several possibilities can be found. The analysis of a production process of services can make it possible to separate the tasks carried out without intervention from the customer, often in back office, of those carried out in front office, with an mandatory participation of the customer considered then as a resource of the process; what which concerns a coproduction clearly. This decomposition has interest only if the elementary tasks obtained by the process of decomposition are sufficiently important. Under these conditions, inseparability is related to the fact that the lack of the resource "customer" prevents the complete execution of the task. For the services where one can separate the production and consumption, the production can be done in a back office, which allows a more effective use of the productive resources and the technology transfer of the production of the goods to the production of services in back office.

Inseparability not being specific to all the services, it is necessary to know for which service classes it is valid. To perform this analysis, we mobilized our service classification and widened our analysis by including the concept of "inventoriability". In the literature, it's discussed mostly the inability to inventory the service output. This concept is related to the inseparability of the services by the simple fact that it is often possible to introduce inventories between two operations when they are separable. We tried to separate back office operations which are realized in the absence of customer. This separation reflects a process point of view and allows performing efficiency analysis. We considered not only the "output inventories", but also the "order inventories" and "intermediate inventories". back office operations can be separated from the front office operations by such inventories. The monthly subway coupon corresponds to an "order inventory", sorting office in transport sector to an "intermediate inventory", a stock of repaired products to an "output inventory".

**1.1.1 Good provision** - In a supermarket, shelves are filled before the customer begins shopping. These operations correspond to a part of the services delivered by the supermarket and are carried out without the customer having to be present. Customer fills the basket himself without intervention of any personnel; this operation can be separated by the previous one and by the payment. The interaction with the cashier is not exactly a coproduction. Customer will empty his basket, subsequently the cashier will scan the products, and he will fill his bag. The only interaction will occur during the payment. This fine level of analysis makes possible to find out overlaps between the customers. The merger of these elementary operations must be followed by an explicit recognition of the overlapping. The customer queue corresponds to a "job stock" for the cashier.

**1.1.2 Transportation** - The "transport of the good" is always realized without any customer interaction and it's separated from the preceding operations by

inventories of the goods to transport. These inventories are created following to the front office operations which may involve customer interaction (post office) or not (mail boxes). For the big enterprises, deliveries are often done from the sorting offices. The sorting office corresponds to an intermediate inventory and helps to optimize the transport cost.

**1.1.3 Providing information to the customers** - Providing the information can be done verbally, during a face-to-face discussion or by telephone; or by written ways (like consulting, preparing a contract). The customer not only expresses his needs, but information is created during this discussion in coproduction with the personnel. At the end of the discussion, the customer is informed, the service is delivered. All the operations are interwoven, none of them can be separated. The customer can also receive recurring information resulting from a contract. In this case, the contract corresponds to an "order inventory" and allows separating the "information production", which is carried out at the back office, from the front office operations. Information is often standardized for the B2C services and sometimes personalized for the B2B ones. Produced information can be stored on the hard disk of a computer, on CD, DVD or in a file.

**1.2.1 Using collectively a limited-capacity resource of the service provider** - The operations "expression of needs" and "payment" can be done in customer-personnel interaction or not. If the service is prepaid, "expression of needs" can be omitted; if not, these two operations will be necessarily merged. The prepayment gives to the customer the possibility to store his right of use and better capacity management possibilities to the service provider. The realization of the service not requiring any presence of the customer, there is no coproduction. However, it is not possible to separate the consumption and the production of the service because of the potential constraint. These two operations are realized mostly at the same time and at the same place.

**1.2.2 Using temporarily resources of the service provider** - This utilization can be performed in favor of the customer's good (maintenance, repair). The repair of the good can be carried out in the back office without any customer presence requirement. It can be separated from the front office operations by an inventory of goods to be repaired and by an inventory of repaired goods. If this utilization is performed in favor of the customer himself, his presence is necessary. This coproduction makes impossible to separate the performing, consumption and the delivery of the service. On the other hand, it is possible to separate them from the front office operations by appointments. This service class can still consist of renting an equipment. The delivery of the equipment requires always the presence of the customer but his utilization is done by the customer alone. It is possible as well to introduce "order inventories" in front office to match better the demand and the supply.

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