

Chapter 2

Service

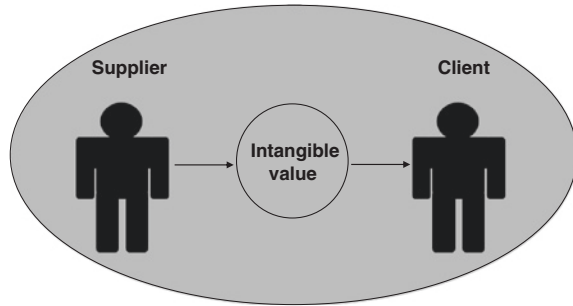
Abstract An intangible product, service is a value that is produced and delivered simultaneously from provider to customer. The delivery and operation of a service rely on a variety of assets, processes and activities that may include, alone or in combination, people, knowledge, resources, methods, processes, and technologies. In addition, the service value is normally co-created jointly and reciprocally in interactions between provider and customer, using a constellation of integrated resources and capabilities that both parties share, combine and renew. Recently, a new paradigm was proposed that aims to overcome many of the limitations inherent in “goods-dominant (G-D) logic” for thinking about commerce, marketing and exchange. Known as “service-dominant (S-D) logic”, it suggests that the focus be moved from the exchange of goods to that of services, and that in fact, all exchanges between producers and consumers are based on services. Finally, as service research has become multidisciplinary, including concepts from marketing, computer science, information systems, and operations as well psychology and sociology, a new discipline entitled service science, whose goal is to create a platform for systematic service innovation, was advanced.

2.1 Definition

Although the term “service” is used extensively today, across the different disciplines, such as marketing, operations, and computer science, it has correspondingly different meanings and connotations [1]. The dictionary entry for “*service*” comprises two main descriptions: the action of helping or doing work for someone and the organized system of apparatuses, appliances, employees, etc., to supply a public need. The search for a more professional and precise definition yielded two other explanations: a type of economic activity that is intangible, is not stored and does not result in ownership and, simply, an *intangible product*.

In general, the concept of service can be described as the transformation of *value*, an intangible product, from the service *supplier* (also termed the *provider*)

Fig. 2.1 Schematic representation of service



to the *client* (also termed the *consumer* or *customer*) (Fig. 2.1) [1, 2]. The process of transformation can be set in motion by a client whose needs can be provided by the supplier, by a service supplier who offers a particular service to the client, or through a combination of the two actions. In contrast to the supply of a good, the consumption of which occurs after production, the supply of a service involves the simultaneous production and consumption of value [3]. Therefore, service is also described in terms of value creation [4]. Usually not an individual action, however, the creation of value entailed in each service delivery is driven by a configuration of people, resources, information, and technology, to name but a few of the important elements of a service. As such, terms like “*value-chain*” and “*service-system*”, which reflect service structure and organization, are often used in service research, innovation, management and marketing [1, 5]. Likewise, because they are not stand-alone entities, services usually achieve their goals more effectively by interacting with other products, i.e., goods or services, and processes, i.e., manufacturing and agriculture. Lastly, delivered and consumed on a daily basis in every sector of the economy, services can be classified by their motivation, theme, type or initiator.

In general, services can be divided into three main groups: (i) *Intellectual and spiritual*, such as the services provided by synagogues and churches, (ii) *behavioral*, for instance, using public transportation, and (iii) *practical or operational*, as in consulting an insurance agency [6]. Table 2.1 lists the themes and types of services.

2.2 Service Characteristics

Although the discussion in the early services marketing literature (up to 1980) was mainly conceptual [7], a few empirical studies later examined how consumers differentiate between goods and services [8] and strived to develop services marketing strategies [9]. Later still, services were proposed to have four main characteristics—intangibility, inseparability, perishability and heterogeneity—to illustrate the unique nature of services, distinguish between goods and services and offer a basis for services marketing and innovation [10–12].

Table 2.1 Representative examples of services

Field	Type	Example
Consulting	Education	Education planning
	Health	Medical opinion
	Economic	Investment
Maintaining	Education	Continuing education program
	Health	Health insurance
	Economic	Loan
Administrative	Education	School registration
	Health	Surgery appointment
	Economic	Bank account open
Information	Education	Online lecture
	Health	Online blade test results
	Economic	Bank account printout

The *intangibility* of services means that in contrast to goods, services cannot be seen or touched or experienced before their delivery. It also dictates that they cannot be stored or owned by either the supplier or the client, although the value of a service can be transferred from a supplier to a client. For example, a flight service that is delivered by an airline to its passengers cannot belong to the passengers, and it is impossible for them to know ahead of time whether their use of the service will be a good or a bad experience.

Services are also characterized by *inseparability*, as they are simultaneously delivered and consumed, which also requires client participation in the process, thereby allowing or even obliging the client to have an effect on the process. For example, while concrete goods (e.g., furniture, automobile, etc.) can be purchased after their production and without meeting their producers, in contrast, the use of a service such as a personal consulting service requires that the consultant produce the information and knowledge at the same time that it is delivered and consumed by the client.

Related to the intangibility of services is their *perishability*—i.e., because services cannot be stored and all tangible and intangible resources and systems involved in their realization are assigned for a definite time during service delivery, services are therefore irreversible, which suggests they are also time dependent. For example, while groceries can be purchased at a certain time but used later or even returned to the store, a service such as that delivered by a diet consultant is produced and delivered simultaneously, and regardless of whether the information was used, it cannot be returned to the dietitian.

Finally, services are also characterized by *heterogeneity* or *inconsistency*, reflecting the potentially wide variability of any service. As such, the delivery of a service can never be repeated in exactly the same way, as the supplier, the customer and the place and time change from one delivery to the next. For example, the manufacture of a computer, whether done by people in Israel or in the US, yields exactly the same product. The quality and characteristics of the service later

delivered by the computer salesperson, however, will depend both on the knowledge and skills of the service supplier and on the knowledge and needs of the customer, and as such, the potential for variability is high.

2.3 Service Structure

Taking the whole process point of view, the phases of a service can be illustrated based on a life-cycle structure, from its initiative and design stage through production and delivery to maintenance and retirement. Each of these phases, in turn, comprises several activities or processes [13]. Portrayed linearly, the *service life-cycle* at its most basic entails the phases of initiative (initiation and requirements), design (modeling, identify values and evaluation), construction (build and compose, integration and processing), testing (validation and evaluation), operation (deployment, provision and management), maintenance and retirement (Fig. 2.2).

The service life-cycle is a strategy that supports service organizations and helps them undergo healthy growth and development and to recognize their operational potential. As an indicator of overall service development, the life-cycle assessment can be used to analyze the service from a variety of different perspectives, such

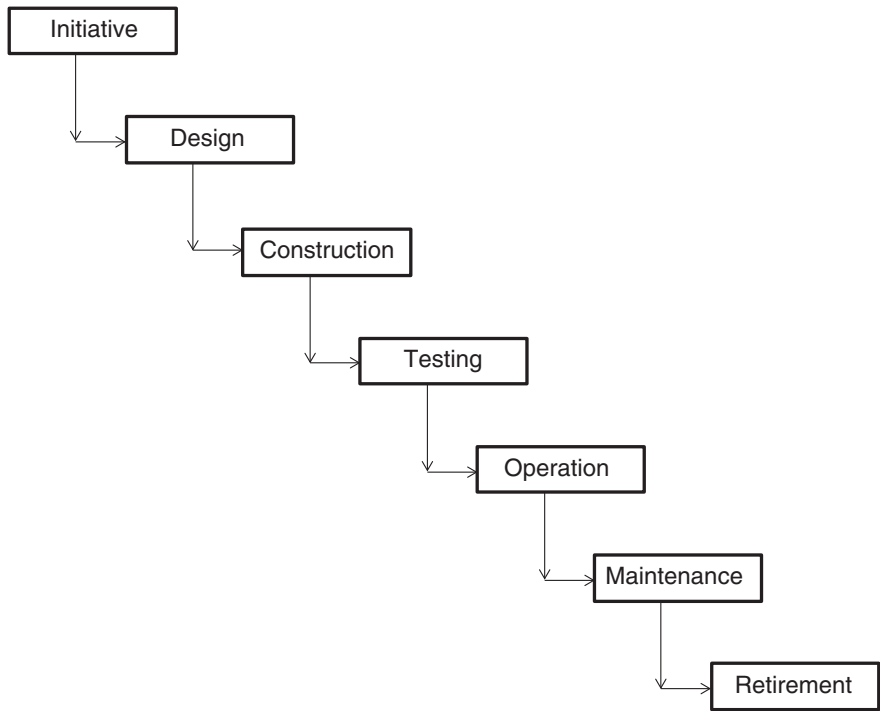


Fig. 2.2 Service life-cycle

as economics or cost minimization, optimal performance or quality, and based on behavioral elements as well as resource utilization (for more on the concept of life-cycle assessment, see Sect. 1.3.2). Thus, initiative and design, the preliminary phase of the service life-cycle, has as its goal the planning and optimization of the service strategy to support the service's goals and objectives. The service production and delivery phase guides the service to facilitate its efficient and effective transition from its planning and strategy phase to its operation phase, while simultaneously integrating with other services or processes. Finally, the service maintenance and retirement phase describes the practical aspects of day-to-day operations, maintenance and support that keep things running smoothly, reliably, efficiently and cost-effectively.

2.4 Service Design Methodologies

Although services have already been produced and used for many years, the systematic and organized design of services has been incorporated into a relatively new discipline [14]. While service design must comprise creativity, innovation and artistic ability, on the one hand, on the other, it should be practicable and applicable, and it should also consider the economic, social and psychological ramifications of the service. In general, however, like any other design scheme, service design is a set of guidelines, principles and techniques that can be effectively (re)organized and (re)deployed to support and enable strategic plans and productivity [15–17]. In addition, the design process should consider the entire life-cycle of the service. As such, it should usually begin by identifying a need or a problem and then continue by generating a solution, i.e., consolidating knowledge, capabilities and resources to deliver high-quality, workable, service-oriented solutions. In addition, the maintenance of the service, its integration with other services and products, and its evolution and re-design should also be considered from the life-cycle perspective.

2.5 Service Delivery and Use

The process of service delivery, and especially the operation of a service, relies on a variety of assets, processes and activities that may include, alone or in combination, people, knowledge, resources, methods, processes, and technologies. For example, consulting with a doctor can be delivered either in the *person-to-person mode*, through an appointment at the doctor's office, or via a dedicated Internet site. In addition, each service is a composite of several important factors and of defined, measurable, and practicable values and methods and the alignment of intangible and tangible products. Thus, each value can be described as a chain of entities that connects the supplies and the end-user or customer, i.e., *supply-chain*.

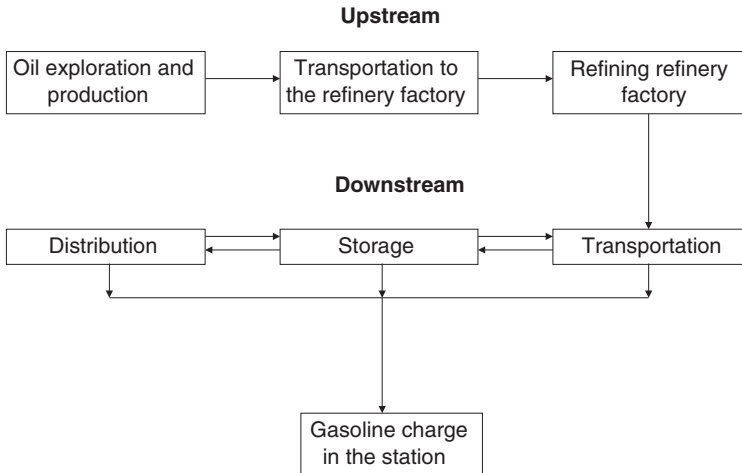


Fig. 2.3 Fuel supply-chain

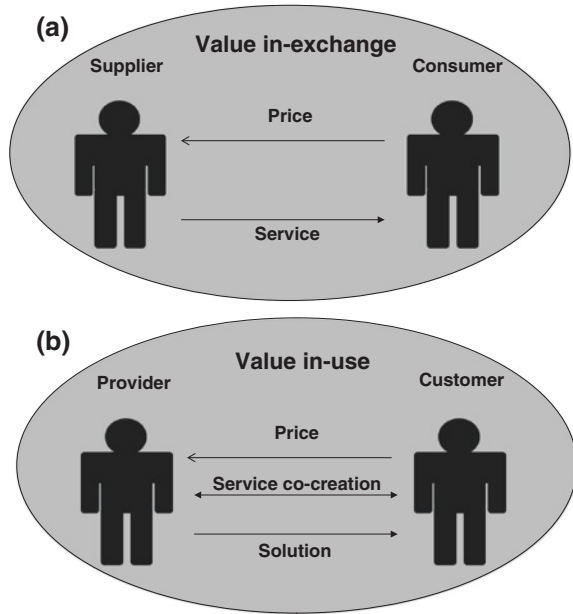
Figure 2.3 illustrates the example of an automobile fuel supply-chain, from oil exploration and production through transportation to the refinery, where it is refined for use in transportation, and on to its distribution and storage until it is delivered to the gasoline station and supplied to the customer. Of course, this is a generalized scheme, and one should bear in mind that it can be extensively elaborated by expanding each of the building blocks into their detailed entities.

Finally, in many cases, a certain process, such as service delivery or the production of a good, can be divided into several actions/entities, each of which can be described as a basic service. Known as *service-oriented architecture*, this approach has gained increased attention in recent years in terms of the innovation, research and management of businesses. Today, the service-oriented architecture is implemented mainly in the design of computer software [18, 19].

2.6 Value Creation

The nature of value and its creation has been discussed and debated for many years. As the essence of each service entails the delivery of value from the supplier to the client, the various types of values must be defined. In general, two approaches to the creation and delivery of value, *value in-exchange* (Fig. 2.4a) and *value in-use* (Fig. 2.4b), are recognized. In a value-in-exchange model, the value is created by the supplier and delivered simultaneously to the client who consumes that value. In this case, the client is actually a *consumer* who has no impact on the value creation process, and in that respect, this type of model simulates the goods production and delivery model. Thus, although for a service the production and delivery of value occur concomitantly, they are, in fact, two separate processes. An

Fig. 2.4 Value delivery models: **a** value in-exchange and **b** value in-use



example of this type of service is the purchase of prescription medicine in a pharmacy, where the pharmacist supplies the client with the doctor-prescribed medication and the client pays for it. Another example is the public transportation sector, in which the supplier of a bus service creates the platform, comprising buses, drivers, stations, routes and timetables, and the client utilizes and pays for the service.

In contrast, a value-in-use model conceptualizes services as shared and dynamic problem-solving endeavors that create value in multiple dimensions. As such, the *supplier* becomes a *provider* that produces and delivers the service to the customer by providing the platform, which entails the resources, facilities, effort and knowledge required for value delivery. But this perspective also encourages the greater involvement of the client, who shares in the production and delivery of the service, in the process transforming from mere consumer to *customer* [20, 21]. Services of this type include consultation with a pharmacist about the different brands of a medication and about how to use it and the use of a taxi service, which in contrast to public transportation, the exact time and place that a taxi is ordered are determined by the customer.

Thus, value in-use actually means that the value is always *co-created*, jointly and reciprocally, in interactions among providers and beneficiaries using a constellation of integrated resources and capabilities that provider and customer share, combine and renew [21]. In general, service *co-creation* can be divided into three types [22]: (i) *consumption* or *co-usage*—the customers exploit a service and passively co-create value by creating the perception of value, for example, the use of a full-service gasoline station, where the provider supplies and delivers the service, (ii) *co-performance* or *co-production*—the customers share in some of the

tasks required to deliver the service, for instance, the self-use of a gasoline station, where the customers use the gas station to refill their tanks themselves, and (iii) *co-design*—a dialog between customers and service providers determines the types and form of service desired, for example, the design of a gas station service that provides both the full- and self-service refilling modes in the same place, but also other services like convenience store services.

2.7 Behavioral and Technological Aspects of Service

The production and delivery of services is also affected by cultural, social, psychological and behavioral aspects [23] as well as by the change inherent in technologies and their ongoing development [24]. The development of new technologies, especially those that are computer- and Internet-based, have forever changed the nature of services, and they allow both the provider and the customer to create and deliver the service's value via different routes and in more efficient, flexible and cost-effective manners. Furthermore, the ubiquity and sophistication of new information technologies like the Internet have led to fundamental, ongoing change in the ways that organizations interact with their customers [25]. Finally, new technologies and changes in the way that we create and consume products, i.e., goods and services, have revealed that the opportunities to design and develop new services are virtually unlimited [26].

The combination of new technologies, particularly information technologies and the Internet, together with the innovation of the co-creation principle, have also resulted in the development of new service modes such as: (i) *super-service*—mainly performed by the supplier, (ii) *self-service*—the customer takes an active part and invests knowledge, skills and facilities to execute most of the service, and (iii) *mixed-service*—both provider and customer share most of the tasks and capabilities [27–30] (Fig. 2.5). Using flight reservations as an example, in a super-service mode, reserving flight tickets, which includes the search for a flight on the desired date and the final ordering of the places on the flight, is done solely by the travel agency based on the customer's request. Customers who prefer the self-service mode use the Internet platform of the agency themselves to search for and purchase their tickets. And customers who exploit a mixed-service mode preform a preliminary search of the Internet themselves for the flights they want and then reserve the tickets through the services of a travel agency.

2.8 Service Card

As noted in the sections above, a variety of components should be considered and identified in the design and development of a service. Figure 2.6 summarizes these elements in a *service card*.

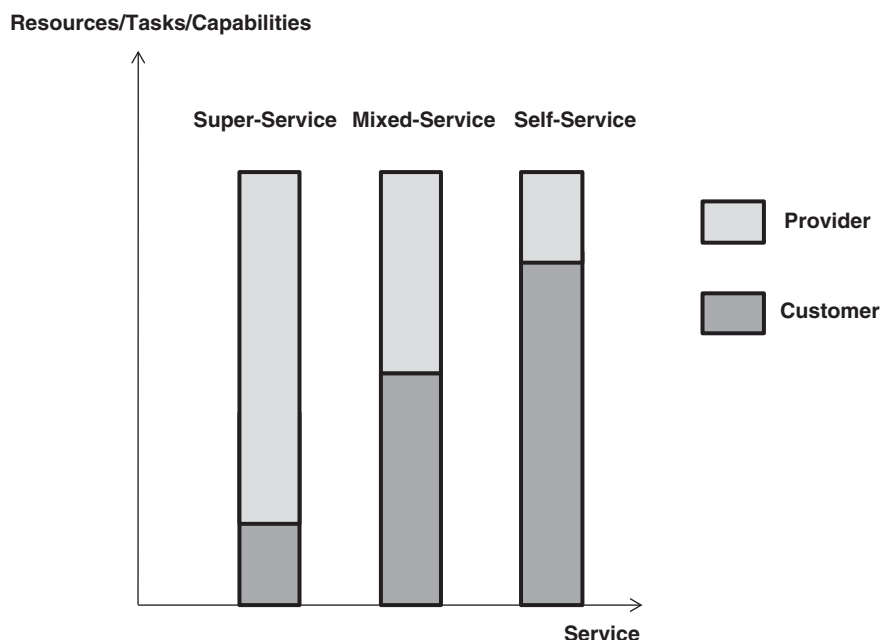


Fig. 2.5 Various modes of services

2.9 Service Performance: Measures and Indicators

Service performance evaluations rely on appropriate methods for the measurement and analysis of performance and on effective approaches that can be exploited to optimize performance. In general, service performance is evaluated in terms of productivity, efficiency and quality, which reflect on service organization, customer satisfaction, the mutual trust that develops between provider and customer, and the profits generated by the service [31–35]. In addition, as the assessment of service performance and the development of general indicators while simultaneously integrating all the relevant factors constitute a highly complex process, service performance methodologies and measurements bear the strongest resemblance to tangible products.

The productivity of a service is defined as a ratio of the output of a service unit to its input, while efficiency measures the ability to transform input to output. As such, service productivity evaluations entail parameters such as time of production and delivery and time of use as well as the technologies and resources used in the realization of the service. On the other hand, service quality, as a measure of how well a service conforms to the client's expectations, can be used to improve the service and increase client satisfaction. Thus, while both service productivity and efficiency are measures of service performance from the point of view and for the

Service Card

Service ID: _____Service Name: _____

Service Description: _____

Service Provider: _____

Service Customer: _____

Service Value: _____

☐ In-exchange ☐ In-use

Service Type:

☐ Consulting ☐ Maintaining ☐ Administrative ☐ Information

Service characteristic:

☐ Intangibility ☐ Inseparability ☐ Perishability ☐ Homogeneity

Value co-creation type

☐ Consume ☐ Co-perform ☐ Co-design

Service mode

Super-service: _____

Self-service: _____

Mixed-service: _____

Fig. 2.6 Service card

use of the provider, service quality is determined mainly by the customers who compare what they expect the service to provide with what they actually receive.

2.10 The Service Sector

In general, the economy is based on the three sectors of *agriculture* and *manufacturing*, which produce tangible values, i.e. goods, and *services*, termed “the tertiary sector of the economy”, which deliver intangible values. Although agriculture, which primarily supplies food, has been the basis of life and economics since antiquity, the industrial revolution shifted the center of mass of economics to the production of goods. However, in 2006, for the first time in history, the service sector employed more people globally (40.0 %) than either the agricultural (38.7 %) or manufacturing (21.3 %) sectors [36]. In addition, today the service sector also represents the largest sector in industrialized countries, and it is constantly growing (Fig. 2.7).

Finally, the continuing shift of the world economy toward services coupled with rapid advances in technology have significantly changed the way that organizations create, deliver and consume products, which consist of goods and services. At the same time, driven in large part by advances in technology, the service systems that are being designed to deliver services are becoming more comprehensive, complex and interdisciplinary [2, 38].

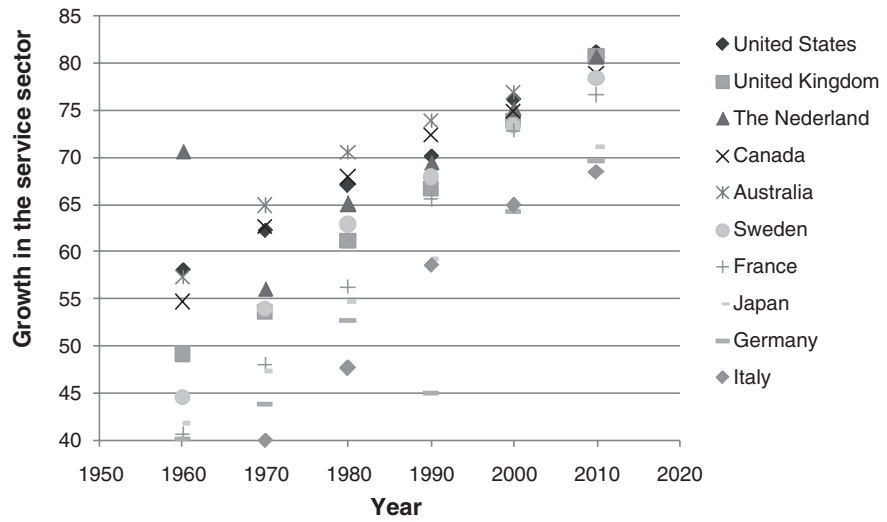


Fig. 2.7 Growth in the service sector (1960–2010) [52] for ten industrialized countries (percent GDP [37])

2.11 Service-Dominant-Logic

In 2004 Vargo and Lusch offered a new paradigm for thinking about commerce, marketing, and exchange known as *service-dominant (S-D) logic* [39–42]. They suggested that taking an S-D logic perspective would overcome many of the limitations inherent in the *goods-dominant (G-D) logic* that evolved during the Industrial Revolution. Moreover, S-D logic suggests that the focus should be moved from the exchange of products or goods to that of services, and that actually all exchanges between producers and consumers are based on service.

Vargo and Lusch also suggested ten foundational premises (FPs) of S-D logic (Table 2.2) [41]. In addition, S-D logic handles the basic constructs of social and economic exchange in a fundamentally different manner (Table 2.3) [42].

In addition, the S-D logic model suggests that the customer also participate in the production of the value, i.e., value in-use (Fig. 2.4b), and that the value is always co-created, jointly and reciprocally, in interactions among providers and customers using a constellation of integrated resources and capabilities that provider and customer share, combine and renew [21].

Table 2.2 Foundational premises (FPs) of service-dominant logic [41]

FPs	Premise	Explanation/justification
1	Service is the fundamental basis of exchange	The application of operant resources (knowledge and skills), “service” is the basis for all exchange. Service is exchanged for service
2	Indirect exchange masks the fundamental basis of exchange	Goods, money, and institutions mask the service-for-service nature of exchange
3	Goods are distribution mechanisms for service provision	Goods (both durable and non-durable) derive their value through use, i.e., the service they provide
4	Operant resources are the fundamental source of competitive advantage	The comparative ability to cause desired change drives competition
5	All economies are service economies	Service (singular) is only now becoming more apparent with increased specialization and outsourcing
6	The customer is always a co-creator of value	Implies value creation is interactional
7	The enterprise cannot deliver value, but only offer value propositions	The firm can offer its applied resources and collaboratively (interactively) create value following acceptance, but cannot create/ deliver value alone
8	A service-centered view is inherently customer oriented and relational	Service is customer-determined and co-created; thus, it is inherently customer oriented and relational
9	All economic and social actors are resource integrators	Implies the context of value creation is in networks of networks (resource-integrators)
10	Value is always uniquely and phenomenologically determined by the beneficiary	Value is idiosyncratic, experiential, contextual, and meaning-laden

Table 2.3 Comparison of the G-D logic and S-D logic concepts [42]

Core constructs	G-D logic concepts	S-D logic concepts
Service	Goods and services Transaction	Serving and experiencing Relationship and collaboration
Value	Value-added Value-in-Exchange Price	Value co-creation Value-in-context Value proposing
System	Supply-chain Asymmetric information	Value-creation network Symmetric information flows
Interaction	Promotion/propaganda Maximizing behavior	Open source Communication learning via exchange
Resources	Operand resources Resource acquisition	Operant resources Resourcing

2.12 Service Science

As service philosophy has shifted from service products that are economically measurable and management-oriented to values that are more socially responsible and operationally-oriented, service research has become multidisciplinary, incorporating concepts from marketing, computer science, information systems, and operations as well as psychology and sociology. Hence, at about the same time that S-D logic was introduced, the IBM Almaden Research Center foresaw a need for a new discipline, which it named *service science*, with the goal of creating a platform for systematic service innovation [43–46]. The rationale and justification for this new discipline was to develop the underlying principles that define the subject matter and identify all the relevant stakeholder groups (e.g., academia, industry, and government) and demonstrate its relationship to other disciplines [47, 48]. Furtheron, the concept of S-D logic was synchronized with service science [49, 50].

Finally, one of the main incentives behind establishing a new track for service research in the form of service science was to clearly define service according to what it *is* and not, as was the convention in the past, according to what it is *not*, e.g., the service sector has traditionally been defined as whatever is not agriculture or manufacturing [51]. Service science, by necessity, takes a broad service system perspective that extends beyond the typical company or organization boundaries. Therefore, the goals in introducing this new discipline were (i) to recognize the importance of transdisciplinary research and teaching in contrast to the traditional functional disciplines, (ii) to apply scientific methods to better understand and manage services, and (iii) to develop valid metrics to measure performance.

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Sustainability through Service

Perspectives, Concepts and Examples

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