Chapter 6
Organizational Service Management as an Umbrella for Information Business

Jana Hanudelova and Lenka Prochazkova

Abstract In this chapter we intend to address different aspects of service management and business in relation to service science. With the shift from goods to service(s), and from manufacturing to service economy, a need for the new discipline called service science has arisen. The growth of service sector and its relevance for businesses, as we now live in service-based economy, has resulted in the need for many organizations to adjust their everyday operations to enable them to respond more quickly to changing market conditions, and to be more efficient and effective in the application of services. Thus, the main aim of our work is to perform recherché, examination, and systematization of different aspects of service management and business in relation to the service science. A partial goal is to provide the reader with an overview of the need for the discipline called service science to emerge. Another partial goal is to analyze the importance for businesses to create service innovations. And also an objective is to analyze the need for properly educated professionals and tools to apply the principles of service science. While writing this work we combine the study of literature, mostly scientific literature, with our own analytical proposal, and recommendation capabilities.

Keywords Service science · Service management · Business · IT · Innovation

1 Introduction

For the last 100 years there has been a significant shift from the primary and secondary sectors to the tertiary sector in industrialized countries. This sector is mainly characterized by producing services instead of end products.

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For example, agricultural employment today is less than 5% in forward economies, while a century ago, most people worked on farms, although there is enough food even a surplus. This is possible because the productivity of agriculture increased due to the shift of people out of agriculture into knowledge-intensive, specialized industries that support agricultural productivity. This shift of people into knowledge-intensive service industries is also a result of the rise of information and communication technologies that improve automation and connect us to global labor markets (Kryvinska et al. 2014a).

This chapter deals with different aspects of service management and business in relation to the service science. The main aim of it is to perform recherché, examination, and systematization on the different aspects of service management and business in relation to the service science.

The service science emerged as a discipline relatively recently; this chapter enables readers to understand its importance in today's service-based world. It provides the reader with a view on the topic from different authors and their mutual analysis and comparison.

In Sect. 1 we define the term service and we describe the differences between goods and services. In Sect. 2 we describe how the discipline service science emerged, its importance, and concepts giving the views from different authors. Section 3 deals with service management, IT service management, frameworks for aligning IT services with the needs of business, and it also deals with the need for service science professionals. In Sect. 4 we discuss outsourcing as it can provide several benefits for business. Section 5 discusses the business processes, and tools and technologies in this sphere that can enhance and enact business processes. In concluding sections we summarize the results of the research, analyze and compare with works of different authors, and contemplate of further development and research.

1.1 What Is Service?

The term 'service' has many explanations (Kaczor and Kryvinska 2013). Dictionary definitions include:

- an act of helpful activity,
- the supplying or supplier of utilities or commodities, as water, electricity, or gas, required or demanded by the public,
- the organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public,
- the supplying or a supplier of public communication and transportation (Dickinson),
- the performance of duties or the duties performed as or by a waiter or servant,

- employment in any duties or work for a person, organization, government, etc.,
- the duty or work of public servants,
- something made or done by a commercial organization for the public benefit and without regard to direct profit (free dictionary) and many others.

For the purpose of this document, we will refer to 'service' as a means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks. Service is a type of economic activity that is intangible, is not stored, does not result in ownership and it is consumed at the point of sale. In this type of activity the client and the provider exchange information and adopt differing roles (Katzan 2008a, b). Services are one of the two key components of economics, the other being goods.

There are many types of services that are offered by different organizations, companies, private agencies, or by the government sector. Some of the services are: education, communication, transportation, trade, healthcare and medical services, real state, foodservice, utilities, dispute resolution and prevention services, beauty care, construction, entertainment, and others.

To differentiate between services we can use a classification of services. There are at least five classification's criteria: service process, service nature, service delivery, service availability, and service demand where the major factor is a qualitative concept, "*service nature.*" A qualitative concept consists of service object and results, where the service object retain the roles of the service provider and service client and indicate whether the service is rendered on a person, a possession, or information (Katzan 2008a, b).

1.2 Services Versus Goods

In this subchapter we are going to describe differences between products and services. Probably the most obvious difference is that product is an artifact, something you can see or touch, while a service results in something worthwhile which is a change in a person or possession, not the creation of something (Katzan 2008a, b). In short, products are tangible and services are intangible.

Another difference is that a product is storable and services are not. Any product can be stored, but you cannot save services. When the service is provided, it is done and repeating the service is another service event.

Perishability is another characteristic of services. It means that services are produced and consumed during the same period of time.

Inseparability means the service provider and service consumer are indispensable for service delivery. The service consumer is involved in service delivery from requesting up to consuming the provided benefits and the service provider must immediately generate and provide the service to the requesting consumer.

Inconsistency refers to the characteristic that each service is unique. It can never be exactly repeated at the same point in time, location, conditions, circumstances, resources, and each service is modified for each consumer and situation.

The customer's participation in the service delivery process is also an important characteristic called involvement which means that a customer is able to get the service varied according to his requirements.

The term service and its modern usage has roots in the 1930s' U.S. Department of Commerce's Standard Industrial Classification (SIC) codes where this term referred to a residual category for activities that did not fit into agriculture or manufacturing (Chesbrough and Spohrer 2006). Today, the term 'services' is explained by Ted Hill (1997), an influential scholar, by the following definition: "*A service is a change in the condition of a person or good belonging to some economic unit, brought about as the result of the activity of some other economic entity, with the approval of the first person or economic entity.*"

In our economy services have the leading and significant role. Many business-to-business enterprises, e.g., IBM and GE, business-to-consumer enterprises, such as, Lowe's, Kodak, Apple, and also entire companies have noticed that services are the fastest growing parts of their business.

Now, in most developed countries more than 70% of economic activities are in service sector. Also most of the workforce is employed in services and services are a cornerstone of most business nowadays.

In Fig. 1, we can see the list of most developed countries and their share of the service sector to total GDP. Notice, that China's service sector accounted only 44.6% of GDP in 2012, while the world average represents 63.6%, thus there is a huge space for growth.

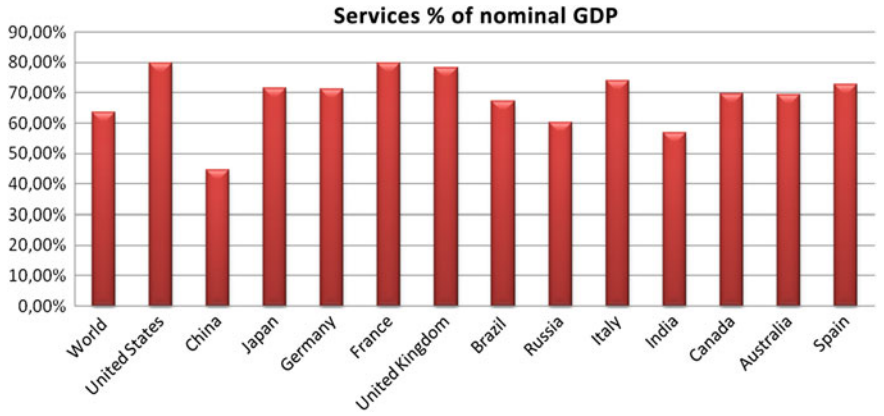

Fig. 1 Share of the service sector to total GDP (*Source* Author own processing according to data gathered from cia.gov)

2 A Short Excursus into Service Science Evolution

For the last 100 years there has been a rise of services and service sector become a large part of economy. Services grow and manufacturing declines and it has had to be dealt with. Services have had to become more productive and efficient. Thus a discipline called service science has been created. "*We have no choice but to make services more science- and technology-based if we are to improve the value delivered from the services sector. This is true of not just IT services, but especially of other services such as health, education and government*," Robert Morris, vice president for services research at IBM Research.

In September 2004, while starting up the IBM® Research Service Research department, Jim Spohrer was complaining to Henry Chesbrough, a professor of business and innovation at the University of California at Berkeley, about having trouble finding the job candidates who would have the right mix of knowledge, including computer science, engineering, management, and social science. In this conversation, the idea, that there ought to be a new scientific discipline called service science has its roots.

2.1 Service Science in Definitions

The service science is the incipient study of service systems, which are dynamic, cocreating configurations of resources, and they combine organization and human understanding with business and technological understanding. By resources we mean people, technologies, organizations, and shared information (Maglio and Spohrer 2008).

It is an interdisciplinary study, focusing not only on one aspect of service, but on service as a system of interacting parts that include people, technology, and business. It explains many types of service systems and how service systems interact and evolve to cocreate value (Maglio and Spohrer 2008). Service science involves methods and theories from a number of existing disciplines including computer science, cognitive science, economics, organizational behavior, human resources management, marketing, operations research, industrial engineering, psychology, information systems, design, and more (Auer et al. 2011; Gregus and Kryvinska 2015).

The main objective of the service science is to advance ability to design, improve, and scale service systems and to create service innovations (Stoshikj et al. 2016).

According to Maglio and Spohrer (2008) there are four categories of resources, those are transferred and shared within and among service systems in the service science concept. These categories encompass resources with rights, resources as property, physical entities, and socially constructed entities (Kryvinska and Gregus 2014).

2.2 Service System Analysis

Service systems are dynamic configurations of resources, both operant and operand, that can create value with other service systems through shared information (Spohrer et al. 2007), all connected internally and externally to other service systems by value propositions. Service systems interact to cocreate value. Many things, such as people, foundations, corporations, government agencies, cities, nations, families, can be considered as service systems or dynamic configuration of resources. Service systems are "*value-creation networks composed of people, technology, and organizations*" (Maglio et al. 2006, p. 81). We can see relationships and actions among service provider, service client and service target on Fig. 2.

The service system is an open system, which is able to improve the state of other system through applying or sharing its resources and able to improve its own state by acquiring external resources. Atomic service system is a service system that uses no other service systems as resources, such as an individual person (Maglio et al. 2009). Also we can distinguish a service system with one resource and a service system with many resources. A composite service system is formed by combining atomic service systems or other resources. Service systems are regarded as the basic unit of analysis in service science.

Service interactions are interactions of value cocreation that are happening between service systems, but not all service system interactions qualify as service

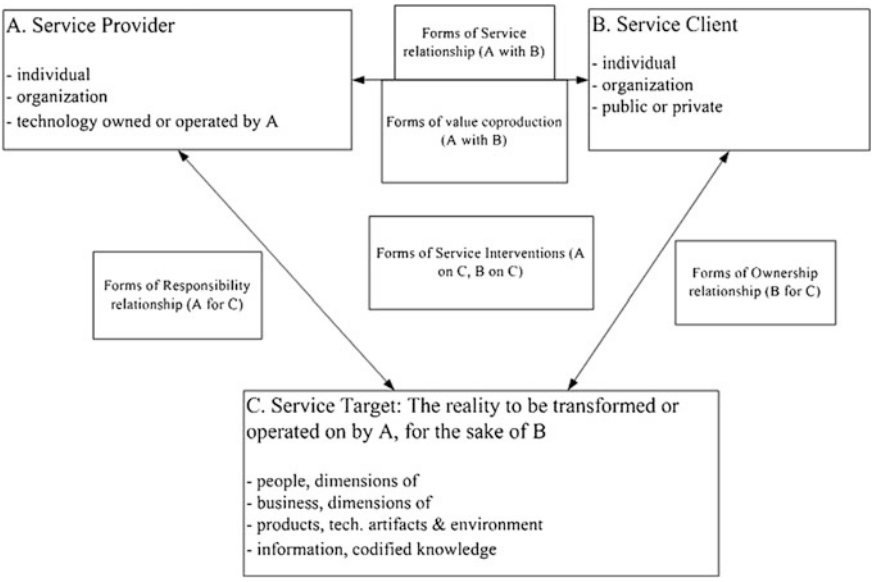

Fig. 2 Relationships and actions among service provider, service client and service target in terms of service systems (*Source* Maglio et al. 2006)

interactions (Maglio et al. 2009). For a service interaction to be a service interaction it must meet three criteria: proposal must be made by one party to another, parties must come to an agreement, and value must be realized by both. Non-service interactions include casual interactions between people and between organizations, informal conversations, inquiries, and they can be welcome or not welcome interactions.

Maglio et al. (2009, p. 400) developed ISPAR (Interact-Serve-Propose-Agree-Realize) framework of service systems interaction episodes, which are "*series of activities jointly undertaken by two service systems.*" ISPAR model covers the space of possible interactions between systems, and the total number of such different interactions is ten as shown in Fig. 3.

Different outcomes include: value cocreation is realized, the proposal is not communicated, the proposal is not agreed to, value is not realized and not disputed, value is not realized and disputed but it resolved in OK resolution for interested parties, value is not realized and disputed and it resolved in not OK resolution for interested parties, interaction is not a service interaction but it is welcome, not welcome non-service interaction is not criminal, not welcome non-service interaction is criminal and justice is realized, not welcome non-service interaction is criminal and justice is not realized.

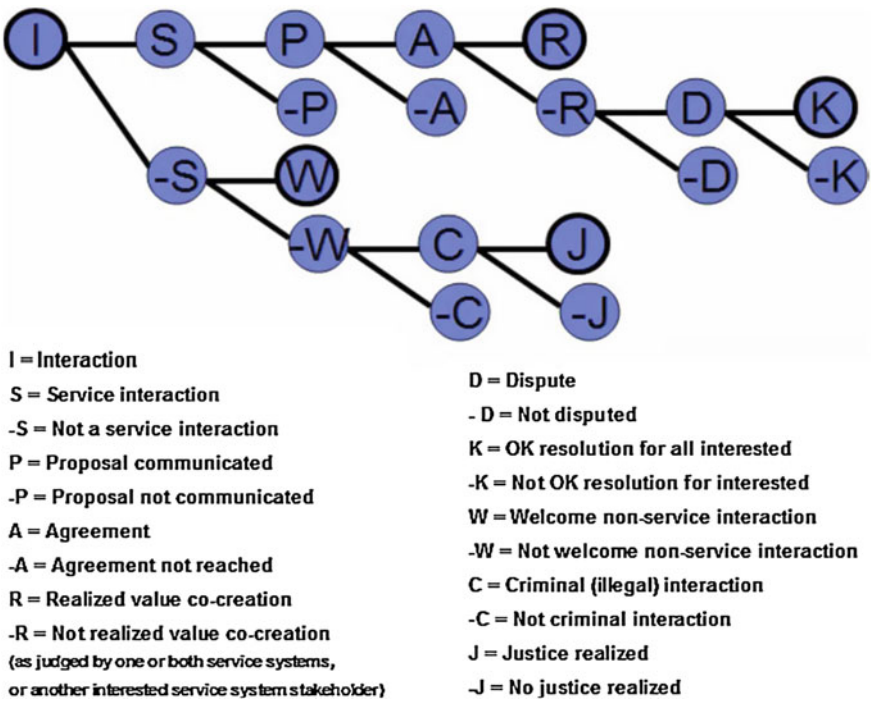

Fig. 3 ISPAR model (*Source* Maglio et al. 2009)

ISPAR model as proposed by Maglio et al. (2009), enables seeing the world as population of different types of service systems interacting, such as people, government agencies, businesses, and so on. Important mechanisms for improving service systems and learning are disputes and how effectively they are resolved. According to Maglio et al. (2009), this view of the world as people, businesses, and governments as interacting service systems can lead to enhancements in service productivity, regulatory compliance, quality, and sustainable innovations, although service–system abstraction is under development and there are still many abstraction needed for service science (Engelhardt-Nowitzki et al. 2011).

Each service system integrates in three main activities that form a service interaction:

- proposing a value-cocreation interaction to another service system, called proposal;
- agreeing to a proposal, called agreement;
- realizing the proposal, called realization.

There are two particular types of proposals which can be either agreed-to or rejected. First, to cocreate a new instance of service system, second, to cocreate a new type of service system. We also distinguish between formal service systems, which have a set of legal rights and responsibilities, and informal service systems, which may not have them. Formal service systems also depend more on monetary economic and informal service systems hinge more on traditional social systems.

Measurement of work and formal representation in service systems is not an easy task for the services economy. Many businesses are thinking of hiring service scientists who will study and handle service systems, solve problems, and utilize opportunities in creating service innovations.

In the paper Service Systems, Service Scientists, SSME, and Innovation Maglio et al. (2006) illustrated complexity of formally modeling service systems using four examples as service systems that are, education, IT service delivery centers, call centers, and patents.

Education: There is no doubt that education belongs to fundamental concepts in any society. According to Maglio et al. (2006), service scientists can help in handling problems of creating service innovations and enhancing the educational service system by:

- identifying the stakeholders and inform them of the service system's boundaries and of problems and opportunities for the stakeholders to see
- creating a formal model of service system that includes all interactions of stakeholders, organizations, and technologies that intervene in those interactions, and owners and not owners of the perceived problems and opportunities
- estimating the detailed evolution of the system and activities of the stakeholders by which service scientists might be able to envisage new service system that could be implemented to solve problems. In some cases what is needed is financial investment that is new stakeholders, sometimes existing stakeholders need to multitask on new activities. This could help service scientists in solving

problems that are known by connecting new service systems to the problematical sides of the primary service system.

IT service delivery centers: Because there exist complicated relationships between businesses, organizations, and technologies, informal work in IT operations is prevalent in many cases. According to the study of Maglio et al. (2006), activities of informal work represent much time of system administrator. Informal work activities encompass negotiating items and schedules of work, looking for information and expertise, and providing them and usage and sharing tools and practices, they are performed outside formal IT service processes, which make them an inefficient addition. In their study, Maglio et al. (2006) identified couple of opportunities to make IT service delivery more effective, for example, they developed a platform to transform informal activities into activities that are supported (Kryvinska et al. 2014b).

Call centers: The following are the possible service provider views of call centers on how to economize:

- if it is possible, stop the incoming call
- minimize time of the call if it has to be answered
- provide service with the lowest labor cost, if the issue cannot be resolved over the phone

The call center system consists of different stakeholders and each has different objectives:

- customer looking for service provider who is dependable and provides high-quality service that is cost-effective
- the service provider's goal is to reduce cost, increase revenue, maximize profit, and reach on its service-level agreements (SLA) at the same time
- call takers have many aspects that are satisfaction of customers, simple use of tools, success of first call resolution, and controlling volumes of call
- individual account managers take responsibility for particular accounts and targets for the customer satisfaction
- schedulers provide forecast demand that is based on SLA agreements and statistics
- the quality management team controls the call's quality, and constantly improves effectiveness of calls by focusing on the top and bottom 25%

Studying and analyzing all stakeholders, their boundaries and measurements indicate that benefits for the whole system can be in focusing on transformation of the system with appropriate processes, technology, and tools that are working in accordance among all stakeholders. And transformation is done by the combination of process, organization, technology, and tools changes (Maglio et al. 2006; Kryvinska et al. 2015).

Patents: A patent system as a service system also consists of different stakeholders with various goals:

- inventors seeking for simplifying filing patents
- owners of the invention's rights want to keep the cost and cost of conflict resolution on minimum level, simplify the use of the system, and sustain in property of the invention
- consumers that are using the invention as indirect beneficiaries of a system which support innovation in cost-effective manner by accessibility of consumables that are better and cheaper
- nations, that are under jurisdiction of the patenting authority are concerned with a larger gross domestic product and prospering economy
- patent authorities take responsibility for costs, realization, and system's fairness

Analyzing patent as service system will enable improvement in quality and prior-art search, and stimulate economic vitality. Producing and capturing value from innovations and net effect on economy and stakeholders are real measures of success.

2.3 Service Science Establishment

We know that there are two perspectives for the consideration of services (Vargo and Lusch 2008).

One, called goods-dominant logic (G-D), has its roots in work of Smith in 1776. G-D logic views goods as the primary focus of economic exchange and services as intangible units of output. In G-D logic, the economic exchange is centered on products which are embedded with value during the manufacturing process and customer does not participate in this process. Products include tangible (goods) and intangible (services) units of output. G-D logic acknowledges value formed by firm and consumed by customers.

Business-to-business (B2B) marketing represents a sub-discipline, and was created more because the G-D logic mainstream marketing was unable "*to provide a suitable foundation for understanding inter-enterprise exchange phenomena not because of any real and essential difference compared to enterprise-to-individual exchange*" (Vargo and Lusch 2008, p. 255). It refers to business which is performed between companies, rather than between company and individual, called business-to-consumer (B2C), or between company and government, called business-to-government (B2G). In the context of communication, it is a type of communication where employees from different companies communicate with each other.

The other perspective for consideration of services, called service-dominant logic (S-D), consider service as the application of knowledge and skills for the benefit of another party, it is a process of applying resources for the benefit of another, based on the idea that service is the basis of all exchange.

Services are no longer viewed as intangible units of outputs. S-D logic considers service itself, rather than in relation to goods. In S-D logic, value is cocreated with

customers; it is not formed by firms themselves. Service-dominant logic is considered as a philosophical foundation of service science, while its basic theoretical construct could be the service system (Maglio and Spohrer 2008). However, traditional G-D logic paradigm remains strong in this foundation of service science, whose influence is considerable in language used to describe and examine phenomenon associated with economic exchange, encompassing that related to service science and service systems (Kryvinska et al. 2013b).

In S-D logic, service is not considered as a substitute for goods. In the shift from goods to services or from goods-dominant logic to service-dominant logic, there is a need for understanding service as a transcending concept to goods. This transcendence constitutes relationship where goods-dominant logic is nested within service-dominant logic, and considers theoretical and conceptual components of G-D logic as relevant, but not as deep and general as those of S-D logic.

For the better developing and formalizing the concept of S-D logic and related phenomenon, a comparison of G-D logic concept and S-D logic concept have been made. In this comparison, five key constructs used in the study of exchange among service systems are compared in G-D logic and S-D logic concepts. S-D logic concepts are described below in Table 1.

Service

Regarding the term 'service,' there have been misinterpretations of S-D logic and some have even expressed concerns about using this term. It stems from the fact that in G-D logic concept the term '*services*' (plural) is used to refer to intangible units of output, whilst S-D logic is using the term '*service*' (singular) which refers to a process of doing something for another party.

S-D logic focuses on service as a process which includes the service beneficiary in the process of serving in which the customer participates. The firm's activity is not just about making goods and services, but the firm is now assisting customers in their own process of value creation.

Table 1 Contrasting G-D logic and S-D Logic concepts (*Source* Vargo, Lusch, and Akaka 2010)

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

Value

According to Maglio et al. (2009, p. 403), definition of value in service science reads as follows: "*improvement in a system, as judged by the system or the system's ability to fit an environment.*" Value in S-D logic concept is no longer consider as something produced and sold and the firm can only propose value. Value is rather something which is cocreated with customers.

System

"*A system is a configuration of resources including at least one operant resource, in which the properties and behavior of the configuration is more than the properties and behavior of the individual resources*."

In S-D logic concept, we are talking about value-creation networks, which represent a process of applying, integrating, and transforming resources in which multiple actors participate (Vargo et al. 2010). In this value-creation process, all systems involved in the value-creation process are considered as service providers and also service beneficiaries which establishes a symmetric framework. This is opposite of asymmetrical framework in G-D logic, where firms, producers, and value creators were distinguished from customers, consumers, and value destroyers (Vargo et al. 2010). In S-D logic, we are also talking about symmetric flow of information and communication internally and externally and symmetric treatment which means that all parties involved in the process are treated as equals.

From S-D logic view, value creation is happening at various levels of aggregation, within and also among service systems (Vargo and Lusch 2008). Networks are not only linear, vertical or horizontal, but there is an infinite number of ways arranged, and traditional concept of linear supply chain, as it was in G-D logic, is no longer adequate.

Interaction

In S-D logic, relationships and models of exchange are dynamic, interactive, nondeterministic, and nonequilibrium which is opposite to G-D logic concept of exchange.

Collaborative communication indicates interactions not only between firms and customers, but also among employees, shareholders, society, and others who may be involved in service exchange. All the parties involved in collaborative communications are as well considers as partners in value creation (Urikova et al. 2012a).

Learning via exchange process is provided by dynamic interaction and collaborative communication. According to Lusch et al. (2007), in S-D logic concept, actors exchange with other actors to improve their existing conditions, mostly by improving the conditions of others. The process of improving the wellbeing of any service systems requires feedback and learning.

Resources

As we move from a product focus to a service focus, there is also a shift from firm resources thought as operand in G-D logic to operant in S-D logic. Operand resources present tangible resources, resources that need to be acted upon. Operant

resources have been identified as intangible, invisible, infinite, and dynamic resources, resources which are able to act upon other operand, and operant, resources, such as knowledge and skills (Vargo et al. 2010). Operant resources are not produced or distributed per se, but they can evolve, transform, multiply.

Lusch et al. (2008) defined resourcing as an activity in which value creation only occurs when a potential resource, which is usually operant, is applied and contributes to a specific bonus. Resourcing involves resource creation, resource integration, and resistance removal.

Vargo et al. (2010) examined the importance of proper use of vocabulary in G-D and S-D logic concept, language used to discuss S-D logic and service science and its clear definitions, the importance of distinguished S-D logic concept and G-D logic concepts. They described the clarification of S-D logic as foundation for service science which brought attention to the G-D logic and its influence. They presented several key constructs associated with S-D logic, their comparison with G-D logic (see Table 1), and they stressed the importance of transparent definitions for the misinterpretations of foundational premises of S-D logic to be revaluated.

According to Lusch et al. (2008), in S-D logic customers are seen as operant resources (unlike the operand resources in G-D logic), and as the cocreator of value with the firm. This cocreation of value implies evolving a dialog between parties included. The dialog aims at development of understanding the point of view of every participant included in cocreation of value. They referred to the dialog not as the one-to-one dialog but rather as many-to-many dialog which is especially possible because of the World Wide Internet, through which stakeholders can engage in dialog and the firm does not have to actively participate (Lusch et al. 2008).

2.4 Cocreation of Value

Value cocreation is one of the key components of service systems, sometimes discussed from the perspective of a production orientation.

In general, two broad conceptualizations of value have been recognized over the years: "*value-in-exchange*" and "*value-in-use*" (Vargo et al. 2008). Although the traditional research primarily focused on value-in-exchange; recently, the attention has refocused on value-in-use, to some extent indirectly through service-marketing and B2B research (Vargo and Akaka 2009).

As I mentioned above, in S-D logic value is cocreated with customers not produced by the firms, which was also stimulated by the increasing emphasis on value-in-use conceptualization.

Value-in-use is also considered as one of the key components of service systems, as it was developed by Prahalad and Ramaswamy in 2000 (and also by Normann and Ramirez in 1993) and adopted and elaborated in service-dominant logic (Vargo et al. 2010).

Vargo and Lusch also appointed the term service ecosystems that are resource-integration networks, loosely coupled systems of service systems. It comes out of

the need for more extended venue for value creation in the process where customer participates in value creation than it is in the firm or firm–customer interaction. This leads to a network-within-network concept of relationships which converge on value creation through a web of resource integration (Vargo and Akaka 2009). This implies that every part of value creation is unique to an individual service system and can be evaluated from the perspective of the individual service system only.

As the center point of value creation has been redirected from value-in-exchange to value-in-use, phenomenological and experiential conceptualization of value emphasized, and this has been recognized as value-in-context in service-dominant logic (Vargo et al. 2008). Value-in-context stresses the importance of key variables in the value creation and value determination that are time dimensions, place dimension, and network relationships.

In his article, Gronroos (2011) analyzed implications for value creation and marketing by adopting service logic in business relationships, and how processes marketing and value creation are intertwined with interaction as a clarifying factor. Adopting service logic in business enables creation of value for both customer and supplier. Emphasizing value-in-use (in his article the terms value creation and value-creating process are only used for the creation of value-in-use by customer; the terms value generation and value-generating process are used for more comprehensive process consisting of developing, manufacturing, designing, delivering, firm's front-office and back-office activities, and it also includes customer creation of value-in-use), business aimed at mutual value creation with mediating factor service in the process. His analysis suggests that marketing and value creation are intertwined. Suppliers participating in their customer's value creation are given opportunities to extend their marketing and sales activities into the customer's zone by incorporating activities during interactions of a firm with customers which enables new marketing strategies. A supplier who is directly and actively involved in customer's value creation through value-cocreation activities with them provide interactive marketing. Firms that adopted goods-dominant logic do not have opportunities of interactive marketing (Grönroos 2011).

Cocreation of value emerges from the interactions of many parts. To cocreate value, a provider and a customer must interact directly or indirectly. The customer and the provider have to be able to grant each other access to some set of resources which can be divided into four parts depending on whether they are physical or not physical, and whether they do or do not have rights. Maglio and Spohrer (2013, p. 667) explored value-proposition design as one type of business model innovation using four basic principles of service science. "*A value-proposition can be viewed as a request from one service system entity to others to run a procedure or an algorithm. Business model innovation can be understood as value-proposition design.*" As business model innovation can aim at cost advantage or differentiation, value-proposition design can aim for adaptive advantages without taking proper account of restraints (Maglio and Spohrer 2013). Value-proposition design can provide a systematic search for adaptive advantages using technology to create new offerings, improve an existing offering, or reconfigure ecosystems. In their study

Maglio and Spohrer (2013) described four basic principles of service science, which can bridge various disciplines, such as marketing, engineering, design, operations and management, economics, computing, policy, and social sciences to help describe, understand, and increase cocreation of value through new business model innovation.

3 Service Management

In enterprises, which for our consideration could be educational organizations, businesses or government entities, the roles of service providers and service clients are adapting to provide services to clients and they manage their own services. Because an enterprise can be a provider and a user of services, and the fact that many internal services are managed as businesses, they sometimes deploy into external service providers, there is only a tenuous line of division between management and business (Katzan 2008a, b).

Service management is a set of specialized organizational capabilities for providing value to customers in the form of service. The specialized organizational capabilities include the processes, activities, functions and roles, which are used by service providers to enable them to deliver services to their customers. These capabilities also include the ability to organize and manage knowledge and understand how to facilitate outcomes that create value.

Businesses nowadays have benefited from the application of information and communication technology (ICT). In many organizations, the rise of ICT has enabled them to be more effective and efficient in the application of services, and to respond more quickly to changing market conditions, that leads to revenue growth. The aim of ICT is to create and support information systems that integrate with processes and people to provide Government and Business Services (GBS) (Galup et al. 2007).

According to Katzan (2008a, b), there are three forces operating in the service processes domain. First, information systems refer to the use of ICT enablement that provides revenue growth, efficiency, and effectiveness for traditional, enhanced services, and for conventional business processes. Second, providing IT services to external organizations is in consulting services domain. And third, it is IT Services Management, which refers to the use of ICT to manage information systems and services.

Service provisioning is a process which determines who pays for the service and how the organization of that support is managed. Service lifecycle is a cyclic process in which internal processes of effective service management are moving. Service lifecycle includes:

- service strategy,
- service design,
- service transition,

- service operation,
- and continual service improvement

The service strategy is considered to be the most important element (Katzan 2008a, b). Because conditions are changing and successful service operations are not sustainable over long periods, service strategy is necessary. Service strategy is a long-term plan that is based on customers' needs and it enables the organization to adapt to conditions that are changing. A service document, where service strategy is recorded, should indicate whether certain service strategy is intended for a client or the provider, whether management of services is done internally or outsourced, key collaborators, as well as important service management functions should be included, too.

The service design embraces processes, service architecture, policies, necessary documentation, and it also includes capacity, availability, and security management as well as key responsibilities in the organization.

The service transition is considered as a bridge between service design stage and service operation stage. In this stage services are implemented into production environment. Service transition stage involves also implementation of required changes to existing services if they are needed, building framework, and observance of formal policy for implementation and integration of changes, establishing a supplementary training.

The service operation stage is responsible for managing and delivering services that were established in service design stage. During this phase monitoring of the event is of paramount importance and business value is delivered to the enterprise (Katzan 2008a, b).

Continual service improvement is related to sustaining the value. Important output of this stage, called service reporting, gives the feedback into the previous four stages, and presents the service lifecycle. This stage includes seven steps as it is defined in IT Infrastructure Library (we are going to describe IT Infrastructure Library in another section):

- Step 1: Identifying the strategy for improvement, thus identifying what will be measured
- Step 2: Identifying what can be measured
- Step 3: Gathering and measuring the data
- Step 4: Processing the data
- Step 5: Analyzing the data
- Step 6: Presenting and using the information
- Step 7: Implementing corrective actions

Katzan (2008a, b) named two aspects of service management. One aspect concerns components, which are entities of organization for instantiating services, and it tells about the ability to pass information and tasks between components without obvious direction, in short, choreography of components. Another aspect regards monitoring the components and their attributes, for which a computer database is usually used.

3.1 IT Service Management

IT service management is a set of tasks that deal with monitoring and controlling IT services (Hochstein et al. 2005). It is process-focused, it aligns enterprise IT services with business, and it refers to the implementation and management of quality IT services. According to Katzan (2008a, b, p. 4), IT service management involves "*keeping track of things,*" and he called these '*things*' service elements. Service elements, for example, could be hardware, software, configurations, and so on, those are evident, or service elements such as categorization of services, contractors, outsourced projects, business partners. These service elements are less evident and they mostly concern enterprise operations which are able to offer a challenge.

IT service is a service that is provided to one or more customers by an IT service provider, and it is based on the use of information technology.

It is important to note that the view of IT service management is different from the service client and service provider perspective. There is a mutual denominator between these perspectives that is the set of common issues related to a service lifecycle as they involve strategic planning, business partners and relationships, sourcing, governance, etc. (Kryvinska et al. 2009).

3.2 Information Technology Infrastructure Library (ITIL)

ITIL is a framework developed in the 1980s by the UK's Office of Government Commerce, The Central Computer, and Telecommunications Agency (CCTA), proposing Best Practice in Information and Communication Technology (ICT) Service Management (Potgieter et al. 2004). According to Potgieter et al. (2004), using ITIL framework improves customer satisfaction. In their study they monitored if there exists a direct correlation between using ITIL and customer satisfaction. The methodology of their study was in using SERVQUAL instrument (Zeithaml et al. 1990), which is a widely used instrument by academics and business, to design customer satisfaction surveys. Using the SERVQUAL scale, which has five generic dimensions (tangibles, reliability, responsiveness, assurance, and empathy), they compared customer expectations and their perception of actual performance. They do not focus due to the deployment of ITIL framework. The findings of their study implicate that increased using of ITIL framework results in improvements of customer satisfaction and operational performance.

Many organizations have adopted ITIL framework mainly because it offers a systematic approach to provide and manage information technology services (Cervone 2008). ITIL framework provides many benefits for organizations, such as reducing costs, improving productivity and customer satisfaction, and also can help to provide effective ways to define metrics and measure their outcomes. ITIL's focus is on the service lifecycle that is associated with a project. In digital libraries, ITIL focus is not only on technical issues, as in other best practices and guidelines

but it also includes how functions and services within an IT organization align with and add value to the larger organization. Moreover, ITIL focus is not primarily on operational issues. Many stakeholders are part of the team within the ITIL framework, and part of the service implementation function.

According to Cervone (2008), it is important to maintain close cooperation with customers and a little bit of understanding the processes in ITIL by customers for better serving of IT services to the purposes of the organization.

As for the understanding of the ITIL framework, it is not an easy task. Previous methodology of ITIL framework was described in a set of nine books and it was reduced to five books in version 3 which involve: Service Strategy, Service Design, Service Transition, Service Operation, and Continual Service Improvement. This version of ITIL has its added benefit in providing material which is useful for people outside of ITIL instead on focusing solely on technical staff in information technology organizations. Version 3 of ITIL also makes documentations of standardized definitions of processes and IT services whose using can help in reducing the costs and providing end users with results and costs (Cervone 2008).

Information Technology Infrastructure Library is a collection of best practices for Information Technology Service Management (ITSM). ITSM constitutes a manual to the IT service's processes that exist in the organization (Suhairi and Gaol 2013). ITMS focus is on reducing differences between IT language and business unit managers that are using IT services. Thus the alignment between IT and business might be implemented from the beginning of the lifecycle of the information technology.

3.3 Information Technology Service Management (ITSM)

According to Galup et al. (2007) ITSM is "a subset of the Service Science discipline that focuses on IT operations delivery and support. It is a set of processes that detail best practices based on ITIL standards to enable and optimize IT services in order to satisfy business requirements and manage the IT infrastructure both tactically and strategically." In other words, "ITSM provides a framework to align IT operations-related activities and the interactions of IT technical personnel with business customers and users processes" (Galup et al. 2009). It is important to manage IT as it fundamental for organizations to support their businesses, and it is also important to establish and engage best practices processes in order to optimize IT services. Part of ITSM approach is also a common vocabulary, approach for ensuring stability in the environment of information technologies, and a set of principles for management. This is particularly needed in situations such as when the provider of the service is outside the country and operation of the service is complicated due to diverse regulations of government and cultures of the country.

It is a distinction between IT management and ITSM. Whereas IT management is technology-oriented, ITSM approach is process-oriented, and so IT service providers now have to be more careful about the quality of services they provide

and the relationships they have with customers. Because of the ITSM's process-focused, it shares common themes with the process improvement movement, such as Total Quality Management, Six Sigma, Business Process Management, and Capability Maturity Model Integration. In Fig. 4 we can see the evolution of ITSM best practice standards that start with the Information Technology Infrastructure Library, and continue with British Standards 15000 and ISO (International Organization for Standards)/IEC 20000 (International Electrotechnical Commision). Other standards, such as COBIT, eTOM, CMMI, etc., that influenced the formation of ISO/IEC are listed at the bottom of Fig. 4.

ITSM and ITIL are often invoked together. The focus of ITSM as subsection of ITIL is on service delivery and service support.

The British standard 15000 was developed by the British Standard Institute in the United Kingdom and ratified in 2000, and it was the world's first standard for ITSM (Galup et al. 2009). BS 150000 represents best practice guidance inherited within Information Technology Infrastructure Library framework, and it also supports other IT service management frameworks. BS 15000 describes a framework through which processes can be established and evaluated. It is based on the ITIL framework and specifies management processes which are mainly operations-oriented.

International Standards Organization/International Electrotechnical Commision 20000, the world's first standard for IT service management, is the successor of BS 15000. ISO/IEC 20000 was first published in December 2005 and revised in 2011 and it is divided into five parts: ISO/IEC 20000-1, ISO/IEC 20000-2, ISO/IEC 20000-3, ISO/IEC 20000-4, and ISO/IEC 20000-5. The 2011 version of ISO/IEC 20000-1 is a formal standard and specifies requirements about design, transition, delivery, and improvement of services to deliver quality services that provide value for service provider and also the customer. It consists of following sections:

- Scope
- Normative references
- Terms and definitions
- Service management system general requirements
- Design and transition of new or changed services
- Service delivery processes

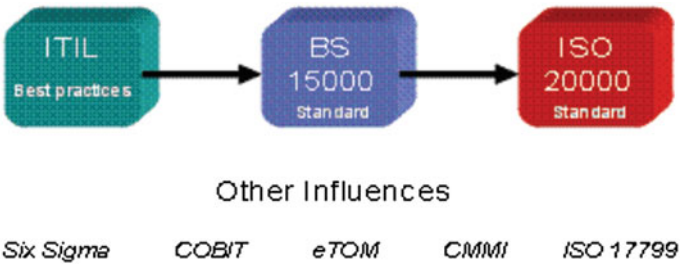

Fig. 4 Evolution of ITSM (*Source* Adapted from Galup et al. 2009)

- Relationship processes
- Resolution processes
- Control processes (Galup et al. 2009)

ISO/IEC 20000-2 describes best practices for service management based on requirements of ISO/IEC 20000-1. ISO/IEC 20000-3 represents guidance on scope definition and applicability of ISO/IEC 20000-1. ISO/IEC 20000-4 represents process reference model. And ISO/IEC 20000-5 constitutes exemplar implementation plan for ISO/IEC 20000-1 (Cots and Fa 2014).

According to Galup et al. (2009) main benefits for businesses that implemented the ITSM are:

- consistence of outsourced customers handling across data centers,
- quality of delivered service is improved,
- functional visibility across data centers is improved,
- financial aspects of IT operations management are improved.

There are some other frameworks using the ITIL as their foundation. PRM-IT that is Process Reference Model for IT from IBM, ITSM Reference Model from Hewlett Packard, and MOF, Microsoft Operating Framework.

The Process Reference Model for IT "*is a powerful management tool for investigating and identifying areas for IT improvement. PRM-IT is an integrated collection of the processes involved in using IT to assist businesses in carrying out many or all of their fundamental purposes*" (Jacob et al. 2008, p. 9) It is an integrated collection of 41 processes across eight categories that are:

- IT governance and management system
- IT customer relationships
- IT direction
- Solution development
- Solution deployment
- IT operational services
- IT resilience
- IT administration (Jacob et al. 2008)

There categories are shown in Fig. 5.

Microsoft Operations Framework (MOF) helps organizations in implementing ITIL by providing operational guidance. In comparison to ITIL, MOF focuses less on governance and more on IT operations, it gives more prescriptive and specific recommendations about changes in improving processes and supporting the changed processes with products from Microsoft. According to Galup et al. (2007), MOF comprises of several foundational elements that are:

- The Process Model
- The Team Model
- The Risk Management Model

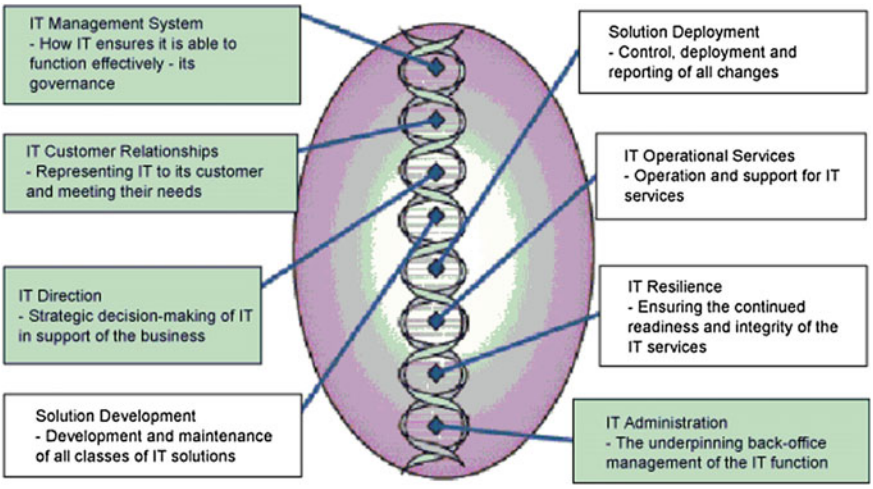

Fig. 5 Process categories of PRM-IT (*Source* http://www.ibm.com/developerworks/rational/library/mar07/hanford/)

MOF Process Model is organized around four quadrants, Changing, Operating, Supporting, Optimizing, and several Service Management Functions, as Fig. 6 shows. MOF Team Model role is to simplify the appearance of team roles and support the MOF Process Model by providing guidelines to organize people into teams or clusters and it describes the key activities for each role cluster.

The MOF Risk Management Model role is to help organizations in managing risk whilst running the businesses.

MOF version 4.0 was updated in April 2008; it encompasses the whole IT lifecycle in terms of three phases and a foundation layer:

- Plan Phase—ensures that there is alignment among businesses, IT objectives, financial management, policy compliance, and reliability
- Deliver Phase—regards envisioning, planning, building, stabilizing, and deployment of requested service
- Operate Phase—handles efficient operation, monitoring, control, and support of deployed services in line with service-level agreement (SLA) goals
- Manage Layer—helps IT professionals in managing governance, risk, and compliance

According to Galup et al. (2009), there are several initiatives to transition ITSM into university pedagogy:

- Service Science, Management, and Engineering (SSME)
- Information Technology Service Management Forum (itSMF)
- Association of Information Systems (AIS)

Fig. 6 MOF process model quadrants (*Source* http://consultingblogs.emc.com/markwilson/archive/2005/02/10/973.aspx)

3.4 Service Science, Management, and Engineering

SSME is a term that was introduced by IBM originally to describe the service science. SSME is the "application of scientific, management, and engineering disciplines to tasks that one organization (service provider) beneficially performs for and with another (service client). SSME aims to understand how an organization can invest effectively to create service innovations and to realize more predictable outcomes" (Spohrer et al. 2007, p. 71). It is an IBM initiative that emphasizes a program for undergraduates and graduates which focuses on support and development of IT organization's internal operations and government and business services (GBS). Nowadays, more than 450 universities over the world offer some sort of service science program.

Global service economy is growing which has led to a huge increase in people's daily interactions with highly specialized service systems such as education,

healthcare, financial, retail, transportation, legal, entertainment, legal, government, retail, communications, professional, and other interactions. People can be customers and also providers in these interactions, thus they can play many roles in many service systems which brings us to the fact, that people are individual service systems themselves (Spohrer and Kwan 2009). Hence it is highly important to understand service systems. The discipline whose aim is to understand and innovate service systems is called Service Science, Management, Engineering, and Design (SSMED).

Service systems, their creation, improvement, understanding, and innovations is an area of interest for service science professionals. Because of innovations of information and communication technologies, and higher level of creation and sharing of specialized knowledge assets, service systems are evolving in costs reduction.

The world nowadays creates the impression of accelerating complexity of economics, technology, society, politics, and environment. People live in this world and constantly interact with each other, business, and societal service systems. Daily service interactions include healthcare, education, retail, transportation, government, business, financial, professional, utilities, energy service, communication service, entertainment service, online self-service websites, and others, which represent a vast and growing investment of time, money, attention, and effort. Customers, providers, government entities, and competitors of innovations are seen as service systems interacting mutually. Business professionals and academics are adopting a new view of people, organizations, and institutions as service systems that are embedded in a world of comprehensive, interacting populations of service systems. Spohrer and Kwan (2008) call this view the service systems worldview. "*The service systems worldview can be used to interpret the world that we live in as a world of (1) interacting service systems, (2) connected by value propositions (to cocreate value), (3) with governance mechanisms (to resolve disputes) among the many stakeholder service systems, (4) that collectively form many dynamic, interlocking service networks*" (Spohrer and Kwan 2008). According to Spohrer and Kwan (2009), in the service systems worldview, people, as individuals are all service systems, all customers, and all providers. As an example, when we are visiting a hairdresser, we play the role of customer entering a provider's service system. But when we call a repairman into our house, he plays the role of service provider entering our service system. Both situations represent people as service systems who are adapting roles in the service system of someone else in order to cocreate value.

Service Science, Management, Engineering, and Design represent an "*interdisciplinary approach to the understanding of service systems and the value propositions and governance mechanisms that connect them into service networks*" (Spohrer and Kwan 2008). Both, the formal service systems study as well as informal service systems study are included:

- the formal system's study comprises: the study of economic markets, formal, written contracts among service systems, and legal system for enforcement of contracts

  - as examples of formal service systems we consider legal entities such as people, businesses, government agencies, nations, cities, hospitals, universities, and many others which have rights and responsibilities, can own a property, and are able to make contracts with other legal entities

- the informal system's study includes: the study of relationships among service systems, social systems, cultural norms, beliefs, and political systems to maintain those relationships

  - as examples of informal service systems we consider families, open source communities, and others social or societal systems governed by unwritten cultural and behavioral norms

Service science endeavors to create and understand the service, both formal and informal nature of service, as regards to entities, interactions, and outcomes.

According to Spohrer and Kwan (2009), there are three foundational concepts that underlie the service systems worldview:

- service systems—knowledge-value thinking entities (people, organizations, machines) that are sophisticated enough to get involved in rationally designed service interactions leading to win–win outcomes of value cocreation; entities are able to construct models of possible worlds (past, present and future) that include a model of others as well as themselves; entities can be seen as populations of stakeholders who interact in service worlds
- value propositions—shared capabilities and needs among entities, which model interactions among entities; value propositions are applied to outline the win–win outcomes of value cocreation
- governance mechanisms—shared information among entities, which model interactions among entities; governance mechanisms are applied to outline the collective win, contested decisions, which refers, for example to government authorities and legal processes, risk taking, and learning to enhance performance

And also other concepts are important to understand the service systems nature, which are value, stakeholder perspective, measures, and resources.

SSMED aim to answer to the four fundamental questions:

- Science—Questions of evolution, interaction of service systems, and what service systems are.
- Management—Discusses the questions of investments due to improvements in service systems and service value networks.
- Engineering—Discusses the questions of improvements in scaling of service systems by the invention of new technologies or restitution of already existing ones.
- Design—Discusses the issues of best improvements in experience of people in service systems

3.5 T-Shaped People

As the complex service systems have been more affecting people's everyday lives, and their importance and complexity has been raising, wide range of knowledge was needed to understand service systems (Urikova et al. 2012b). There was a need for a service science specialist with deep knowledge of service systems and expertise from many existing disciplines. In their article, Spohrer and Kwan (2009) reviewed disciplinary areas that support directly the rational design of complex service systems, and are organized as follows:

- Evolution: Learning from history of interactions—this includes economic and legal, social and political, knowledge and linguistic
- Measures: Four basic roles from stakeholder perspective—customer and quality, provider and productivity, authority and compliance, and competitor and innovation
- Resources: Four logical categories—people (physical and can contract), technology (physical and cannot contract), information (not physical and cannot contract), organization (not physical and can contract)
- Strategy: Learning from possible future worlds—management and strategy, and finance and investment

Students attending disciplinary areas indicated above might add to their studies "*deep disciplinary knowledge interactional expertise in SSMED-related disciplines*" (Spohrer and Kwan 2008).

According to Spohrer and Kwan (2009), T-shaped professionals are created by interactional expertise in the SSMED-related disciplines. Interactional expertise means that those who have adopted this expertise are able to communicate effectively with academic discipline's specialists, who are able to understand problems and proposed solutions, but they are not able to solve the problems. T-shaped people reflect the depth of expertise in at least one area but a horizontal breadth of knowledge in a broad set of related areas, which allows them to solve problems with colleagues across disciplines (see Fig. 7).

Spohrer and Kwan (2009) also indicated that T-shaped professionals can better learn and adapt to the changing needs of business.

Hansen and Nohria (2004) in their article described how managers can promote collaboration. They indicated that the T-shaped role of managers tends to bring satisfying results in prioritizing and delegating to subordinates. Managers who adopted the T-shaped role have primary responsibility in delivering results for their own business unit (that is the vertical part of the T), and as the horizontal part of the T, manager's responsibility is to seek help and aid others (Hansen and Nohria 2004).

Bullen et al. (2009) in their article examined the workforce trends in IT provider companies. Their results indicate that more than technical capabilities, provider firms also look for client-facing capabilities, knowledge of business domain, and project management. Their implications for IS curriculum and hiring suggest that

Fig. 7 T-shaped people (*Source* http://www-03.ibm.com/ibm/history/ibm100/us/en/icons/servicescience/)

students will need to be trained in technical and also nontechnical skills. People who adopted T-shaped role have broad general skills and deep technical skills, and according to the data in the study of Bullen et al. (2009) highly valued people would also have broad technical skills and deep business skills (Bullen et al. 2009; Stoshikj et al. 2014).

Water nowadays plays a central role in many sectors. As a consequence of population growth and our climate, water supply is increasingly limited. Thus the change is increasingly important in sectors where water plays a key role. There is a need for change in terms that essential services, such as water, food, energy, are managed and delivered in a more effective and integrated way. McIntosh and Taylor (2013) in their article developed a concept of the T-shaped water professional. It provides a framework for the design of curricula for educational programs in order to raise the capacity of water professionals who would stimulate and control processes of innovation and change which, in twenty-first century, constitutes an increasingly key topic for water professionals (Mcintosh and Taylor 2013). T-shaped water professionals, in order to effectively lead teams, need to have an in-depth knowledge of a particular discipline and broader, general knowledge to recognize opportunities for idea generating, integration, and collaboration.

4 Outsourcing

"Outsourcing is the transfer of the ownership of a business process to a supplier, which includes management and day-to-day execution of that function" (Katzan 2008a, b, p. 9). Business processes such as information technology, customer support, accounting, call center operations, and human resources are mainly outsourced, but core business competencies are usually not outsourced. Also a

company that focuses on information technology can provide consulting as well as outsourcing as business services. The difference is that with consulting the company tells the customer how to do things, and with outsourcing the company does it for the customer. The objective of outsourcing can be reducing costs, benefiting from special capabilities of provider firm, or focusing firm's business on more profitable activities. Usually, outsourcing is associated with offshoring. It means the relocation of a business process from one country to another, when the other country can provide business activities in less expensive manner (Katzan 2008a, b). When a company establishes business agreement in the transfer of the whole business function to another company in another country, this company is both offshoring and outsourcing.

There have been studies that have been dealing with knowledge sharing through outsourcing partnership and its effect on the success of outsourcing. Knowledge sharing was defined as "*activities of transferring or disseminating knowledge from one person, group, or organization to another*" (Lee 2001, p. 324). Between service provider and service receiver knowledge sharing arises, which is one of the most eminent motives for establishing the partnership based on mutual trust. Knowledge sharing between different organizations, however, is not easily transferred when such organizations have different cultures, goals, and structures. In that case, for successful outsourcing, both the service provider and receiver should set common goals and vision for that partnership, and this was termed partnership quality (Lee 2001). Ability to learn and acquire requisite knowledge from other organizations is another important factor for successful outsourcing partnership. An organization should be able to exploit the external knowledge, recognize the value of new information, assimilate it, and apply it for an organization capability. According to Lee (2001) and his study, knowledge sharing is highly associated with the level of achievement of outsourcing benefits. Also the service receiver should have the ability to absorb, integrate, and leverage the needed knowledge for the higher effect on such benefits, and his ability to do so is also important for effective knowledge sharing. Moreover, his study indicates that the partnership quality has a significant role in knowledge sharing and outsourcing success as a mediator between them. His study also showed that for successful outsourcing explicit knowledge sharing is more effective than the implicit knowledge sharing. Implicit knowledge sharing is also a significant predictor in successful outsourcing but explicit knowledge sharing was found to be easier to understand and share with other organizations.

Grover et al. (1996, p. 93) say that the success of outsourcing can be evaluated in terms of three benefits, which "*need to be weighed against the increase in transactional costs, decrease in flexibility, and conflicting objectives of the outsourcer vis-a-vis the firm.*" These benefits are: strategic benefits, economic benefits, and technological benefits. Strategic benefits mean that the firm is able to focus on its core business, where through outsourcing arrangements routine IT activities can be left outsourced and the firm can focus on the strategic use of IT. Economic activities mean that the firm is able to make use of expertise and economies of scale in human and technological resources of the service provider and is also able to make

unequivocal contractual arrangements for better management of the cost structure. And third, technological benefits mean that the firm is able to respond quickly to changes in IT, adapt to these changes, and avoid the technological obsolescence.

In the study they explored firms that outsource IT functions, if they are successful and which variables might influence their success. Their study showed a positive relationship between IT outsourcing and the level of achievement of benefits. A long-term interactive relationship that is based on communication, trust, satisfaction, and cooperation has also the significant effect on outsourcing success. The study further implies that the establishment of elements of partnership and service quality are important factors for successful outsourcing. However, the study also discusses difficulties in maintaining partnerships and that elements such as trust, communication, satisfaction, and cooperation might be difficult to build and sustain. Increasing service quality can improve firm's chances for success, especially in transaction that are asset-specific, such as end-user support or systems planning management (Grover et al. 1996).

Implementing internal or external outsourcing within an organization can also lead to concerns over management control and operational flexibility and a syndrome called "*tail wagging the dog*" resulting in bringing major services, e.g. IT outsourcing, back into the parent organization as proposed by Katzan (2008a, b).

4.1 Opensourcing

Opensourcing is a global sourcing strategy. Open source software development model is similar to outsourcing and offshoring, as it also offers many advantages such as reducing salary costs, reducing cycle time, cross-site modularization of development work, accessing the larger pool of skilled developers, innovation and sharing best practice, and closer proximity to customers (Agerfalk and Fitzgerald 2008). The open-sourcing phenomenon has been characterized as "the *use of the open source software development model as a global sourcing strategy for an organization's software development process*" (Agerfalk and Fitzgerald 2008, p. 386). The open source software development model enables firms to subcontract activities related to development to another party, which is similar to outsourcing.

Research on open source has focused on the supply side of the relationship, on detection of the development process and projects and their characteristics, and not on customer side as the offshore outsourcing tends to be (Agerfalk and Fitzgerald 2008).

4.2 Psychological Contract Theory

A psychological contract theory (PCT) has been used for the better view of "*mutual relationships between managers of offshore outsourcing customer organizations*

and members of their global OSS community" (Agerfalk and Fitzgerald 2008, p. 386). In the outsourcing point of view, three implications of the psychological contract are mostly relevant: First, it is important in obligations in a social context because of its mutuality and reciprocity that are critical to the OSS development model and its success. Second, psychological contracts are different from legal contracts, because they embrace written and also unwritten terms. Developers contributing to OSS development projects are expected to be familiar with both written and unwritten rules and norms. The third factor is related to motivation of developers to contribute to OSS development projects. The PCT's focus is on individual's expectations, it promotes individual level of analysis because whether contribution of the developer is eminent or not depends mainly on the level of individual.

For the outsourcing to be successful, customers must also contribute. According to Koh et al. (2004) there are four particular commitments:

- accurately describe and explain the requirements of the services covered by outsourcing,
- pay on time to suppliers, no unnecessary withheld payments,
- attending project meetings and discussions, and active control of the project progress,
- to ensure that senior management promotes strong leadership, support, and commitment to the outsourcing project by project ownership.

For the successful outsourcing, the supplier must also take responsibility for these five obligations (Koh et al. 2004):

- structures of authority must be clear, so that all parties involved know what their roles and responsibilities are,
- solving problems or completing the job with minimal customer involvement,
- ensuring that high-quality staff is working on the project and prevent staff turnover during the project,
- building and maintaining effective interorganizational teams where relationships between all parties involved in the project are good working,
- active transfer of knowledge in educating customers because their role in OSS is significant as they can contribute to testing, documentation, etc.

In their study, using interviews, they identified customer and community obligations in the context of outsourcing. These obligations are summarized in Table 2.

Then they further explored these obligations by means of survey between community and customer representatives with outsourcing experience, where respondents were asked to consider an opensourcing project that they have participated in, and on scale estimate to what extent these obligations were met and to what extent the project was considered as successful. The results of their study indicate that opensourcing success and fulfillment of certain community and customer obligations are significantly associated. Also, these obligations are "*partly symmetrical and complementary*" and so there is a tension between community and

Table 2 Summary of refined customer and OSS community in opensourcing (*Source* Agerfalk and Fitzgerald 2008, p. 397)

Customer obligations	Community obligations
Achieving consensus on development roadmap (vision)	Clear and democratic authority structure and process transparency
Project ownership	Responsible and innovative attitude
Marketing project to increase visibility	Creating a sustainable ecosystem
Transparency and close project monitoring	
Creating a sustainable ecosystem	

customer obligations that need to be managed jointly, but the realization needs to be done differently by the community and the customer for the open-sourcing to be successful (Agerfalk and Fitzgerald 2008).

The contribution of this study is also in adopting the perspective of both community and customer, while previous studies have mostly focused on single perspective of the customer or the supplier.

5 Business Process Management (BMP)

The idea of process thinking came out in the late eighties. "Process thinking should enhance the service to clients by extending beyond ad hoc, local decision-making that pays little attention to the effectiveness across the process" (Reijers 2003, p. 1) The presence of business processes in organizing and managing work nowadays is related to specialization and its development across different periods of time. The higher degree of specialism was in raise during the Industrial Revolution. Over the nineteenth and twentieth century the dominant organization of work was in creating functional departments within the company for better differentiating responsibilities among managers.

Nowadays, the emphasis is on the process, particularly the practical interest is in business processes. Managing business processes, such as an insurance company, work in a bank, call centers, and many others, is a difficult task, and also scientific interest has focused on the area of business processes. Business Process Management is a term referring to the field of study between Management and Computing Science which involves business processes. According to Reijers (2003, p. 9), we can consider Business Process Management "as the field of designing and controlling business processes." This is constructed using the distinction between two fundamental aspects; build time aspect, which focuses on the creation of a business process, and run time aspect, which focuses on execution of a business process.

Business process has been defined as "a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer" (Hammer

and Champy's 1993, p. 53). The output of a business process is called a product, it is either goods or service. A business process which delivers service is also often called as a workflow. The main reason to consider business processes, and all related parts is to support a decision of some form. There are three criteria that can be used to differentiate between decision-making levels within an organization:

- frequency of decision-making
- the range of the decision to be taken
- discuss the issue whether it is dynamic or static state of the process that is more relevant

The first dimension of the business process management definition stated above, the design of business processes is traditionally viewed as a strategic issue. Examples of strategic decisions that fall within the scope of BMP are decisions on finances, logistics, quality, decisions of a restructuring of the business processes, and other. Strategic decisions that are not relevant from a BMP view are for example, decisions whether products should be continued or abolished from a product lifecycle, decisions of which markets should be abandoned and which should be conquered, questions of preferred corporate image, or decisions of funding the organization.

The control of business processes, that is the second dimension of the BMP definition stated above, refer to the decisions taken in real-time, and tactical and operational levels of decision-making. Examples of the activities that fall within this dimension of the BMP are planning of production, assignment of resources, budgeting, and handling the exception.

According to Reijers (2003), elementary parts of the Business Process Management were defined as design and control of business processes. There are similarities as well as differences between these two dimensions of the BPM, but as the technological developments raised, the difference between design and control, which should be acute, is vanishing. However, the term business process management in business practices and sciences is frequently used; there is no accurate agreement on its meaning. There are rather themes jointly gathered under the term business process management respecting business processes, such as analysis, modeling, design, control, and implementation of business processes (Reijers 2003).

In his study, Van der Aalst (2013, p. 1) is referring to Business Process Management as "*the discipline that combines knowledge from information technology and knowledge from management sciences and applies this to operational business processes,*" and BMP systems as "*generic software systems that are driven by explicit process design to enact and manage operational business processes.*" BMP is aimed at improving business processes which can lead to increased productivity, and saving costs. This, when possible, BMP is doing without using the newest technologies for example, by analyzing and modeling business processes with the use of simulation.

Workflow Management
Workflow management (WFM) can be considered as related to BMP, but while WFM main focus is on the automation of business processes, BMP focuses on a wider range, that is from automation and analysis of the process to operations management and the organization of work. There are many BMP systems available, and conferences that are BMP-related, so the relevance of the BMP discipline by practitioners and academics is acknowledged.

Van der Aalst (2013) in his article provides twenty BMP use cases that show "*how, where, and when*" BMP techniques can be applied. The use cases refer to the practical application of BMP tools and techniques. These cases can also be tied together creating composite use cases that suits to practical BMP scenarios. His survey also describes six BMP key concerns that emphasize significant research area within the BMP discipline. The key concerns have not been frequently encountered in practice, so far, but they require fundamental research.

Nowadays, there are many BMP systems, tools and technologies available for the practitioners' using to model, enhance, and enact business processes. Despite the development of the BMP discipline, there are also paucities especially in BMP language, as van der Aalst (2013) pointed out, where many papers present a new modeling, often unclear, language which may lead to difficulties in using, comparison, and presentation of the results. His survey also revealed neglects in some use cases, thus the active classification of publications and tools that are using use cases should be introduced. Given these and some other weaknesses and the significance of BMP, van der Aalst (2013) also highlighted the urgency of these weaknesses to be take care of (Van der Aalst 2013).

6 Discussion

The service science discipline includes a wide range of studies, articles, books, and other related material. As it is an interdisciplinary study, and involves methods and theories from many existing disciplines, it can provide and adopt multiple approaches to determine various issues in service sector.

The need for a discipline called service science is delineated in many studies. For example, Vargo and Lusch (2008) described the shift from goods to service(s), from manufacturing to service economy, and suggested perception of firms redirecting the production and marketing strategy from manufacture oriented to those concerned with service(s). They consider this shift to service focus very important for the firm's wellbeing. Chesbrough and Spohrer (2006) also argued the need for service science discipline. They suggested that the growth of service sector and its relevance for firms as we now live in service-based economy requires deep understanding of how to innovate services. Vargo et al. (2010) described the evolution of service science as it stems from the need to understand the intangible and dynamic aspect of exchange. I would summarize the need for the new discipline called service science as follows:

- a shift from goods to service(s)
- majority of service industries in gross domestic products, most workforce employed in the service sector
- the growth of the service sector and arising fundamental need of scientific understanding of modern service
- the rise of information and communication technologies (ICT) as a result of the people's shift from manufacturing to the knowledge-intensive service industries
- the need for generating innovations in service economy
- deep understanding of customer needs
- to answers questions such as, "*why industries and companies vary in their productivity*" using business modeling and business process modeling

In the service science with S-D logic as its philosophical foundation, value is cocreated with customer. Thus deep understanding of customers, their behavior, and perception in service encounters is fundamental for business and many studies support this. Chase and Basu (2001) indicated the importance of perception in service encounters using behavioral science. Firms that want to retain their customers in long-term relationships should focus on the service encounter and how managers can optimize those moments. For example, one of the findings for service-encounter management which emerged from the behavioral-science research is the principle '*finish strong*' indicating that the end of service encounter is far more important than the beginning. Zhang and Chen (2008) also delineated the importance of involving customers in cocreating value as an important strategy for business and for gaining competitive advantages. Adopting service perspective on business enables engaging suppliers with their customer in value creation offering the suppliers opportunities to extend their marketing activities into the customers' sphere, which according to Grönroos (2011) allows new marketing strategies. These provide interactive marketing opportunities for the firm that has adopted the service perspective on business.

Giving the importance of customer in value creation, customer loyalty and customer satisfaction have been the subjects of several studies. Enhanced customer loyalty indicates increased revenue, reduced acquisition cost on customer, increased firm's performance (Reichheld 1993; Rust et al. 2000). Customer satisfaction is also an important aspect of value creation, and enhances firm's competitiveness as well. We confront '*customer satisfaction*' everyday: when we are in a retail shop and the saleswoman is rude, we are not satisfied with the offered service and we are not coming back; when the food in a restaurant is not tasty, or when we are not satisfied with the haircut at the hairdresser, we also might not come back. Given these and many other existing examples, we would underline the importance of customer satisfaction in interaction of firms with their customer, thus organizations should be given attention to enhanced satisfaction of their customers knowing real customers' demands.

The emergence of service science discipline has also given opportunities for innovations in service economy. Creating service innovations is also one of the main objectives of the service science (Maglio and Spohrer 2008). SSME prime aim

is on understanding how organizations can invest effectively to create service innovations and to realize more predictable outcomes. Understanding and innovating service systems is also the aim of another discipline called SSMED. As Maglio et al. (2006) described, real measures of success in interacting service systems include producing and capturing value from innovations as well as net effects on economy and stakeholders (Kryvinska et al. 2013a). According to Maglio and Spohrer (2013), service innovations are key priorities for nations, businesses, and citizens in the way our world works. While cocreating and delivering value, competitive advantage can be achieved by business model, by means of business model innovation (Chesbrough 2010). As a business model is a result of strategy (Casadesus-Masanell and Ricart 2010, p. 212), such strategic interaction between competitors lead to competition that is based on business model modifications or innovations. According to Boons and Lüdeke-Freund (2013), business models innovation is a significant aspect in creating competitive advantage and aspect for renewing organizations. However, given today's growth of population, and smarter machines, business model innovation will require systematic research of reconfiguration in the resources, and will hinge on value propositions that better use billions of new interconnected people around the world, and the access to the information possessed (Maglio and Spohrer 2013). Nowadays, also social network service providers, such as LinkedIn, Facebook, or Twitter use business models depending on access to shared information. We can see in our everyday life how the technology is changing and moving forward, and as we are adapting to these changes, organizations and business also have to adapt to these changes in our competitive environment. Business model innovations help us to make innovations more systematic and more sustainable to encounter entire business and societal challenges. In a manner of innovations, managers are essential in applying principles of service science for innovativeness of entities the way it remains equitable, sustainable, and resilient.

Given the rise in ICT, specialization of businesses and professions, and global regulations as aspects of an emerging discipline of the service science, there is a need for properly educated professionals with a wide range of knowledge. Many articles discuss T-shaped professionals, and how they can better understand complex service systems. Spohrer and Kwan (2009) discussed the need for T-shaped professional with a deep knowledge of service systems and expertise from many existing disciplines to understand service systems. Their study also indicated that T-shaped professionals can better learn and adapt to the changing needs of business. Hansen and Nohria (2004) also stressed the need for managers to adopt T-shaped role that would help them promote collaboration, and tends to bring satisfying results in prioritizing and delegating to subordinates. Bullen et al. (2009) examining workforce trends in IT provider companies concluded that those companies are seeking for professionals who adopted T-shape role not only having broad general skills and deep technical skills, but also for those having broad technical skills and deep business skills.

With the rise of service sector in our world, T-shaped professionals are becoming relevant in various spheres of business. McIntosh and Taylor (2013),

seeing the need for change in terms of essential services, such as water, food, and energy to be managed in more effective and integrated way, developed a concept of T-shaped water professional. These professionals would also have to develop an in-depth knowledge of a particular discipline and broader, general knowledge to recognize opportunities for idea generating, integration, and collaboration.

The nature of service science itself as an interdisciplinary study that involves methods and theories from a number of existing disciplines, such as computer science, cognitive science, organizational behavior, economics, human resource management, operational research, marketing, psychology, industrial engineering, information systems, design and others refers to the need for T-shaped professionals who would have the ability to understand multiple fields, and deep understanding in one particular field. Business in different areas requires in-depth knowledge of that particular area but also generates knowledge in, for example communication skills for better competitive advantages, geographical and demographical skills if for example you are finding new areas for providing your service, or leading skills for better collaboration with your subordinates. Given this aspect of service science, our view suggests that T-shaped professionals and managers should be in focus of various kinds of businesses, not only those related to essential services or IT.

The first step in developing T-shaped professionals should be in schools, especially business schools. Davis and Berdrow (2008) described a challenge for academia to develop integrated curricula. SSME, an IBM initiative, emphasizing programs for undergraduates and graduates is now offering some sort of service science programs in more than 450 universities all over the world. However, there is still a gap between the skills that business schools are providing and the skills that companies need (Davis and Berdrow 2008; Bennis and O'Toole 2005). Considering the gap between provided skills and needed skills, academia and business need to engage in partnerships to overcome these gaps and form programs which both students and also employers demand. This brings suggestions for the educational programs to be redefined to better meet the needs of today's businesses and better define a knowledge-based service management approach, and for academic institutions to more interact with business and organizations.

The rise of ICT specialization and the importance of service management as a set of specialized organizational capabilities for providing value to customers in the form of service, also indicate the need for new and better tools or frameworks to apply principles of service science. ITSM as a set of processes that detail best practices based on ITIL standards enables and optimizes IT services in order to satisfy business requirements and manage the IT infrastructure (Galup et al. 2007). Many organizations have adopted ITIL framework offering a systematic approach to provide and manage information technology services. As Potgieter et al. (2004) suggested, using ITIL framework improves customer satisfaction. ITIL also provides other benefits for an organization such as reducing costs and improving productivity (Cervone 2008). PRM-IT from IBM is an example of management tool that investigates and identifies areas for IT improvement. MOF helps organizations in implementing ITIL by providing operational guidance.

Reviewing these examples it is obvious that for our service-oriented world in which ICT are on the rise, it is essential for the community of service science to work on new tools and educational programs which will improve the ability of service science professionals and others involved to make value-proposition design, more systematic search over time, and enable better implementations of ongoing changes in this service-oriented environment.

However, examining available literature indicates differences in language use. There is a need for an alignment between IT and business. For example, ITSM also aim on reducing differences between IT language and business unit managers that are using IT services. As Reijers (2003) indicates that the meaning of the term business process management which is used in business practices and sciences is also not accurate agreement. Van der Aalst (2013) pointed out new, often unclear language in BMP, too. There is, therefore, a necessity to overcome these differences for better modeling, enhancement, and enactment of business processes.

Service science depends on S-D logic and in S-D logic value is cocreated with customers. Given this nature of service science where the customer is involved in value cocreation with the provider, and businesses cooperate with customers to cocreate value, questions of understanding the processes in the firm by the customer arise. Cervone (2008) indicates that a little bit of understanding the ITIL processes by customers is important IT services to better serve the purposes of the organization. I am not sure whether it is important in every business, but given the limited space in this work. I would let the questions of importance of understanding the processes in a firm by customers for future research.

7 Conclusion

The service sector in global economies grows, and in most developed countries more than 70% of economic activities take place in the service sector. Nowadays, modern businesses rely on information, communication, automation, technology, and globalization, which require of them to operate in a complex web of customers, suppliers, and all involved in the process of value cocreation for mutual benefit (Fauska et al. 2014). As service science involves methods and theories from a range of disciplines, it is an emerging study of such complex web of customers, suppliers, and other stakeholders.

Living in nowadays service-based economy, businesses need to be more efficient and effective in the application of services, and respond quickly to the changing market conditions to be successful in today's competitive environment. It is in best interest for businesses to adjust everyday operations in order to do so.

This chapter discussed the different aspects of service management and business in relation to the service science. The main aim of the work was to perform recherché, examination, and systematization on the different aspects of service management and business in relation to the service science within an available scientific literature. A partial aim of the work was to provide an overview for the

need of the service science discipline to emerge. Another partial aim was to analyze the importance of service innovations creation for businesses. A further aim was to analyze the need for properly educated professionals and tools to apply the principles of service science. We managed to fulfil these objectives. Examining available literature we also analyzed the differences in used language, especially differences between IT language and managers in business that are using IT services and we emphasized the necessity to overcome these differences. In the concluding section we discussed the results of the research, analyzed and compared them with works of various authors, and contemplated further development and research.

The contribution of this work is in providing the analysis of different aspect of service management and business in relation to the service science using available scientific literature with our own analytical, proposal, and recommendation capabilities.

Given the nature of service science as the discipline that involves methods and theories from a number of existing disciplines, there are many opportunities for future research. It could be possible for further research to describe the importance of understanding processes in businesses by customers, deeper analysis of tools and technologies that enable business to be successful in today's competitive environment or better elaborate the need for T-shaped professionals in various kinds of businesses, and related educational programs to better meet the needs of business.

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