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Typology of Service Innovation from Service-Dominant Logic Perspective

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Abstract: This study provides a conceptual framework with respect to service innovation, especially from a service-dominant logic (S-D logic) perspective. Even though innovation has been discussed as one of the most critical elements in enhancing the competitiveness of service industry, it was not clear how service innovation should be different from diverse types of existing innovation. The S-D logic provides a novel and valuable theoretical perspective that unifies the conventional literature on innovation. According to this new logic, four types of service innovation are presented based on two dimensions: the degree of co-creation and the degree of networked collaboration. We argue that service innovation can arise by the activity of value co-creation between firm and customer on the first dimension. On the second dimension, the firm needs to enhance their own capabilities for service innovation by applying the resources of all actors including suppliers and customers. Our framework indicates that it is critical for productive service innovation to make customers participate in value creation process and to integrate the dispersed resources held by participants. Examples are discussed with respect to different types of services innovation.

Keywords: Service Science, Service-Dominant Logic, Service innovation, Value co-creation, Networked-collaboration
Categories: A.1, H.0, H.1.0

1 Introduction

Today the service offers tremendous potential for growth and profitability in the global economy. Service industries have expanded rapidly in recent decades and comprise more than 75 percent of the U.S. economy and the great majority of the gross domestic product (GDP) of all developed nations [Paulson, 06; Larson, 08]. This shows that the economic paradigm has shifted from a product-based to a service-based economy. As service has become the source of sustainable and strategic competitive advantage rather than competition on the basis of physical products [Xin et al., 06], the term "service" has evolved to include many of today's offerings that are characterized by bundled solutions consisting of products and service.

In previous studies, service was differentiated from products on the basis of four characteristics, namely intangibility, heterogeneity, inseparability, and perishability

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[Fitzmmons and Fitzmmons, 07]. However, these characteristics are limited to represent service offerings because service and product are not separately considered in the service industries [Nam et al., 08]. Rather service and product have a nested relationship [Irens et al., 09] where, service includes tangible and intangible characteristics. For example, the iPod made by Apple not only provides a music download service through iTunes but also functions as mp3 player equipment [Ramaswamy, 06]. This trend is called a 'servicizing product' or 'productizing service' and expected to rise continuously in service industries [Howells, 01; 03]. As the result, the differentiation between product and service is becoming increasingly blurred [Basole and Rouse, 08].

It is imperative to study the new perspective of service in a service-based economy. There are substantial debates about how to describe these kinds of new service phenomena. A consensus is emerging that service cannot be described and understood through a single academic discipline [Glushko, 08]. The analysis of the problems of service industries requires more than the efficient solution for purely technical challenges. In order to better understand the studies of service, a new discipline called 'Service Science' is emerging. Service science is defined as a new scientific concept that aims at solving the complex problems of the service economy [Stauss et al., 08]. It embodies and marshals a multi-disciplinary approach: science, engineering and management, in an effort to address and build upon complex service related opportunities. Service Science Management and Engineering(SSME) is a growing multi-disciplinary research and academic effort that integrates aspects of established fields like computer science, operations research, engineering, management sciences, business strategy, social and cognitive sciences and legal sciences [Glushko, 08; Nam et al., 08].

Recently, research into service science has resulted in a remarkable rise in the number of journal articles and international conferences [Stauss et al., 08]. There have been several issues that have been employed to suggest service science as a new field for today's economy [Chesbrough, 05; Paulson, 06; Spohrer and Maglio, 07]. Such reviews of service science have helped us make substantial progress in understanding service in new perspectives. It is on the basis of service-dominant logic that manifests as phenomena, characteristic and new logic for service [Maglio and Spohrer, 08]. According to new logic, service science aims to combine fundamental science and engineering theories, models and applications with facets of the management field, in order to enhance and advance service innovation [Paton and McLaughlin, 08]. The reason is that innovation in service industries is considered as a source of competitive advantage and growth [Bichler, 08].

However, innovation in service has been poorly understood and its impact has been neglected. Service innovation was merely seen as a subset of technology innovation or similar to innovation in manufacturing. Previous studies suggested that service and manufacturing innovation show more similarities than differences based on technological perspective [Drejer, 04]. It distorts the view of the variety of activities in service innovation. Recently, as the studies of service innovation are expanded, many researchers agree that innovation in service has a different characteristic than in manufacturing innovation [Jong et al., 03]. Service innovation involves non-technological as well as technological. It needs a new approach to measure, model, predict and optimize service.

There are diverse methodologies such as new service development (NSD) and reverse product cycle (RPC) to analyze service sectors [Barras, 84; Jong et al., 04]. Also, many researchers suggest the models and framework for service innovation. Hertog [00] proposes the four dimensions of service innovation process, Liu and Chen [07] proposes the service innovation mechanism on customer-employee interaction and Chen et al.[07] represents '3V (value proposition, value deployment, value appropriation)', '3D ((service) delivery, design, development) for an integrated service framework. However, each of these methodologies and frameworks has its own limitation which makes it difficult to integrate and develop a general theory of innovation in service. It is critical to have a general innovation model that applies equally to service and other sectors. The unified service perspective helps managers gain insights into the nature of service and innovation in service.

The purpose of this study is to attempt to fill this gap and suggest an integrative typology of service innovation. To achieve this, we review the previous studies on service science for understanding new perspectives of service innovation. We then develop a conceptual framework for service innovation based on two-dimensions: the degree of co-creation and networked collaboration. The proposed model will provide the foundation for firms to understand service innovation. This study is expected to contribute to the literature by identifying the dimensions underlying service innovation and providing the typology of service innovation in an integrative model manner.

The paper proceeds as follows. In the next section, we begin with a review of literature, where we describe the new perspective of service. We then provide the concept of service-dominant logic, service system and service innovation. We then suggest the two dimensions of service innovation and categorize the extant methodologies for innovation in terms of discussion.

2 Literature review on service science

2.1 The new economic paradigm

As service industry is advancing, the reliance of industries on service increases. This phenomenon of service reliance can be explained by two factors; one is the growth of service industry itself, and the other is the increasing reliance of other industries including manufacturing on services [Hidaka, 06; Spohrer et al., 07; Kim and Nam, 09]. In developed countries, the proportion of the service industry in their GDP is greater than 75% [Paulson, 06; Glushko, 08]. Also over 75% of the United Kingdom and United States workforce can be classified as belonging to the service sector, with at least 50% of Japanese, German and Russian workers being similarly classified [OECD, 06; Paton and McLaughlin, 08]. This trend is common to the developing countries such as China and India [Hidaka, 06]. Such report[1] suggests that service industries represent a significant source of opportunity for global industry [Stauss et al., 08].

[1] U.S. National Academy of Engineering's 2003 Report, "The Impact of Academic Research on Industrial Performance".

With the growth of service industry itself, other industries increasingly depend on services. The reason for growth of service reliance is that contribution of services such as R&D, marketing, and finance in generating value for firms is greater than that of manufacturing [Sheehan, 06; Kim and Nam, 09]. For example, IBM has shifted from a manufacturing oriented to service oriented business. IBM's service business has grown quickly to dominate revenue [Maglio and Spohrer, 08]. In another example, Rolls Royce was a manufacturer producing aerospace engines. However, this company has moved strongly into acquiring aerospace engine repair and maintenance companies for providing engines not as a product (an engine) but as a service (hours of flight) [Howells, 03]. These examples suggest that service becomes a key driver for increasing competitiveness of manufacturing companies.

Recognizing the importance of service as a new growth engine, many researchers have pointed out questions about whether 'service' is the best characterization of 'new dominant logic' [Vargo and Lusch, 06]. Traditionally, service in goods-dominant (G-D) logic was considered as nonproductive activities to subsidize output through goods [Varo and Lusch, 08b]. However, this definition is limited to explain the new phenomenon in service industry because many firms procure competitiveness through service. For instance, the G-D logic perspective has difficulty explaining how a company like Google is valued at billions of dollars, just 7 years after its founding [Michel et al., 08a]. So, recently the revised perspective of service has emerged in a scientific way by orchestrating a variety of knowledge including management, engineering, mathematics, and cognitive science. [Alter, 08; Gronroos, 90; Kim and Nam, 07; Jung, 09a]. This new logic calls service dominant (S-D) logic [Vargo and Lusch, 04a]. It points directly to normative notions of investment in resource, quality of service flow, relationships among service actors [Lusch and Varo, 06]. The S-D logic offers a new perspective as a conceptual foundation of service science.

2.2 Service-Dominant Logic

The S-D logic, as an alternative to the G-D logic, is a mental model that allows firms to view and better understand business reality through a service based lens [Karpen and Bove, 08]. This logic primarily unifies the traditional distinction between goods and services in terms of benefit provision [Vargo and Lusch, 08b; Karpen and Bove, 08]. In the S-D logic, service is defined as the application of specialized competences (i.e. knowledge and skills) for benefit of another entity, rather than the production of units of output [Vargo and Lusch, 04b; Lusch et al., 08]. In other words, service indicates a process of doing something for someone, and includes a series of procedure that is an offering service [Nam et al., 08]. Accordingly, many researchers argue that service is the expanded concept rather, contains goods as a vehicle for service provision [Hertog, 00; Howells, 03; Lusch et al., 08]. It means that services and goods are nested concepts with the former superordinating to the latter. Based on a new definition of service, the S-D logic redefines the value creation process.

In the G-D logic, value is added to the product itself and at the particular point of exchange is captured in 'value-in-exchange' [Vargo and Lusch, 04a; 06]. The S-D logic however, argues that value can only be driven and determined by the customer and through use [Basole and Rouse, 08]. It is referred to as 'value-in-use'. Thus, S-D logic highlights that the role of customers is altered from the recipient of goods to the co-creator of service and their participation in service provision are critical for the

successful value creation [Vargo and Lusch, 06; Abela and Murphy, 08]. Recently customer engages with firms during each stage of service design and delivery process as a co-creator of value. Therefore, the central S-D logic notion of co-creation is an interactive concept between company and customer [Vargo and Lusch, 06].

Co-creation occurs when a potential resource is turned into a specific benefit in value network [Lusch et al., 08]. Given account of G-D logic, the resources necessary for value creation are physical (i.e. raw material) in the supply chain. However, the real source of value is embedded in operant resources (i.e., skills, knowledge, and competence) rather than operand resources [Paswan et al., 09]. For S-D logic value results from the beneficial application of operant resources, which are sometimes transmitted through operand resources [Vargo and Maglio, 08].

This requires reconcepualizing the supply chain in terms of value network in S-D logic [Lusch et al., 08]. A value network contains all participants or actors such as suppliers, partners, customers and integrates various resources that other actors have [Basole and Rouse, 08]. The competencies of firms that strive to integrate resources make other resources to be embedded into their organization to delivery new service. Also it enables customers to perceive new benefits through service. For example, Websites like Google, eBay, Wikipedia create value by linking people through the resources of the Internet. It represents that value is increasingly created through combining resources accessed in an exchange with other resources in a value network context.

Under S-D logic, new perspectives for attaching new meaning to service, value defining, resource integration and value creation process are essential to create innovation in service that cannot be found in G-D logic. Table1,below, shows different perspectives between G-D logic and S-D logic.

	G-D logic	**S-D logic**
Purpose	Producing, selling	Value co-creation
Exchange unit	Goods and services, outputs	Servicing and experiencing
Resource used	Operand resources	Operant resources
Value chain	Supply chain	Value-creation network
The role of customer	Purchaser or consumer	Co-producer

Table 1: G-D logic versus S-D logic: A change of perspectives

2.3 Service systems and service innovation

Service science addresses service through a system-based approach. Following this approach, service science aims to offer systematic methodologies and formal practice to create sustainable service innovation [Maglio et al., 07]. It means that service science is related to understanding the evolution of service systems. Service systems are defined as value co-creation configurations of people, technology, value propositions connecting internal and external service systems, and shared information (e.g., language, laws, measures, and methods) [Maglio and Spohrer, 08]. This definition of service systems is insightful in two aspects. First, service systems include providers, partners, competitors, customers and a network of resource such as

information, technology, and people. Second, in service systems, providers and customers co-create value by dynamic configuration of resources [Chen et al., 09]. Under the systematic structure of service, it is very important to drive innovation for firms to acquire strategic competitive advantage [Spohrer et al., 07]. This continuous innovation can help to position service firms competitively in service industries.

The analysis of service and service innovation has progressed remarkably over the past three decades. However the main focus of innovation was primarily concerned with innovations related to technological artifacts or products even though the attention given to services has grown from the 1970s [Droego and Hildebrand, 09]. Pavitt [84] argued the innovation in service was mainly supplier-dominated sectors. Similarly, Barras[86] portrays most service sectors as initially supplier-led, and as being driven from manufacturing [Hertog, 00].

By the late 1990s, as it shows the differentiation between service innovation and product innovation, many researchers suggested different aspects of innovation in service. Johne and Storey [98] defined service innovation as a development of new service products. Van der Aa and Elfring [02] referred that service innovation encompasses ideas, practices or objects which are new to the organization and to the relevant environment. Also, Liu and Chen [07] defined service innovation as all creative activities about services or relevant with service. Following these definitions, service innovation is considered as an interactive process.

Service innovation success depends on the interaction between customer and provider [Liu and Chen, 07]. A high degree of interaction creates the value-added service. Customers have the key resource of external information and act as value co-creator for service innovation. They negotiate with providers about new requirements concerning collaboration for service innovation [Moller et al., 08]. So, when the providers incorporate customers' experience and capabilities into service co-creation, they are able to create innovation in service. Furthermore, service innovation depends on a value network to embrace the customer's co-creation of value [Michel et al., 08b]. Resources, especially operant resources in the network play a significant role in innovation development [Lusch et al., 08]. Service innovation can be strength when value creation activities integrate resources. Therefore, the key targets of service innovation are to interact with customers and extend value network among all actors.

3 The typology of service innovation

3.1 Dimensions of the service innovation

As the field of service innovation studies has expanded, two results of significance have emerged. First, it recognizes that the customer is not merely a passive recipient. Rather, the customer is a co-creator of value. So, firm and customer engage in the important activities of co-creation of service [Payne et al., 08]. Second, it emphasizes the collaborative relationship with all participants for interconnected resources [Basole and Rouse, 08]. So, service innovation is a customer-oriented term and demands interactive activities in service network based on S-D logic.

Drawing on prior studies of value creation, we distinguish two dimensions for creating value: the degree of co-creation and the degree of networked collaboration

The first dimension relates to the co-creation between customer and firm. Studies on service innovation suggest that the activity of value co-creation would likely shape the innovation in service [Payne et al., 08], and such as, this dimension assumes importance of interactive process in the current service context. During the innovation process, there exist plenty of interactive activities between customer and firm. Customers play the role not only the as origin of creativity but also as co-creators. Firms also strive to reflect customers' ideas or experience into service [Li and Chen, 07; Lusch et al., 08]. Therefore, customer-employee interaction is the driving power for successful service innovation [Li and Chen, 07]. This study will consider whether value co-creation activities drive service innovation or not.

The second dimension relates to the networked collaboration in service context. S-D logic proposes the collaborative nature and system-based view of value creation. Since value is not created by a firm alone, firms increase their own capabilities by applying all actors' resources such as suppliers' and customers' resources [Michel et al., 08b]. So, service network involving all participants is established to coordinate internal and external relationships for integrating resources [Moller et al., 08]. This networking or networked collaboration has important implications for the diffusion of innovation [Miles and Kastrinos, 95]. That is, service innovation is triggered by interplaying among multiple actors and resources to co-create value.

Dimensions	Definition	
1. Co-creation	Two more parties have the ability to exert influence upon each other, engage in the exchange of values	Li and Chen, 07
	Customer participation activities including the co-development of new products, production, assembly, distribution, retail, after sales service and usage	Zhang and Chen, 08
2. Networked collaboration	Relationships structure for corporating other actors' experience and capabilities into service co-creation	Moller et al., 08
	Integrating or transforming specialized competencies into complex service by creating network of operant resource	Michel et al., 08a

Table 2: The definition of two dimensions

3.2 The typology of service innovation

To identify how firms proceed with service innovation, we develop a framework for service innovation and suggest categories of service innovation based on two dimensions: the degree of co-creation and the networked collaboration in Figure 1. Each cell in the framework offers a way to imagine a particular approach to service innovation and describe the business model. It is useful for firms to identify the cells in which they are targeting at a specific innovation and to understand the cell's dynamics and leverage points. Next, we define each of these cells and describe their underlying characteristics through examples.

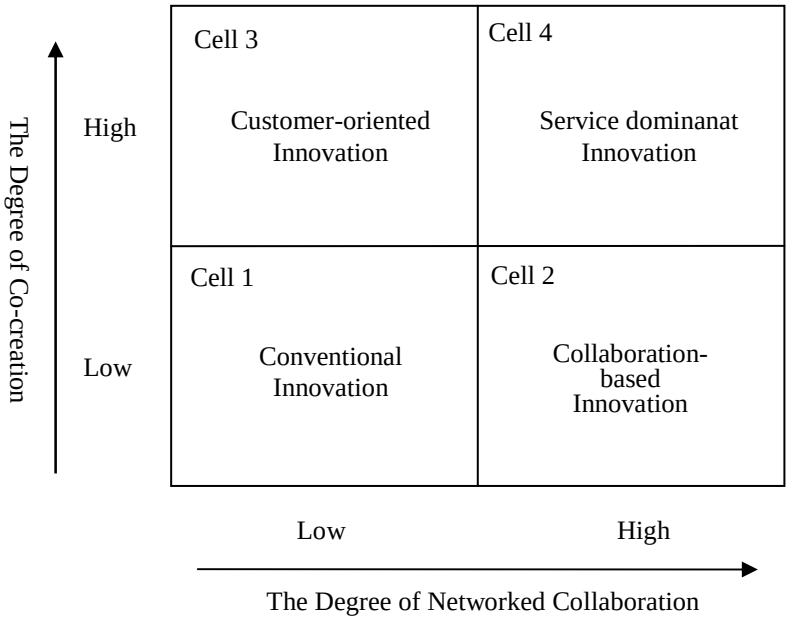

Figure 1: A typology of service innovation

Cell 1: Conventional innovation. This cell describes the innovation that is explained by both the low level of co-creation activities and the low level of the networked collaboration. This type of innovation has its roots in the product-based economy and allows firms to be leader for creating benefit or value in market. It is relevant for manufacturing firms, which increasingly drive innovation in service functions to differentiate their products [Hertog, 2000]. Traditionally innovation in the service sector focuses on developing technologies that facilitate new products or services offerings and enhance product or service productivity. It also utilizes internal resources that are acquired by the intra firm R&D activities. An early pioneer of this type of innovation was Xerox, the leading copier company during the 1980s. Xerox established the research center named Palo Alto Research Center. This center developed the new printing technology and led the discovery of a variety of important innovations that improved Xerox's copier and printer businesses. However, Xerox develops and produces all products and services within its organizations and does not apply external resources or competences. This practice makes it difficult for Xerox to capture the real value from its own technology Therefore, in this type of innovation, it is a limitation to co-create activities with customers and use external resources.

Cell 2: Collaboration-based innovation. This cell describes the innovation that is characterized by the low level of the co-creation activities but the high level of the networked collaboration. This innovation proposes that service is an active collaboration among providers, partners, suppliers and customers. The motivation for undertaking this type of innovation is that firms can take advantage of the

complementarities in their business processes competencies [Sawhney et al., 04; Jung, 09b]. In some cases, companies need cooperation with other organizations or industries from outside sources to improve back office processes as well as front office processes [Michel et al., 08a]. UPS (United Parcel Service) of America Inc., fits into this cell. UPS has been in the package delivery business. Since 1994, UPS was interested in changing its structure and processes, forming new businesses to be transformed into an enabler of global e-commerce. With additional investment in information technology such as web based application, UPS had efforts to integrate supply chain management and handle related information exchange for satisfying the customers' needs. They have partnered with Nike Inc., which is one of example of their customers, taking responsibility for managing all the back-end processes, including order management, shipping, delivery and returns management. Through creative deployment of their core competence, UPS has driven the great value in process. This type of innovation is very useful to obtain and use external resources as well as internal resources. However it doesn't consider the customer as a co-creator, merely noticing that customers plays a pivotal role in creating value.

Cell 3: Customer-oriented innovation. This cell describes the innovation that features the high level of co-creation activities and the low level of the networked collaboration. This type of innovation is referred to as a customer-dominant innovation. This kind of innovation invites individual customers to actively co-produce value of service through personalized interaction [Prahalad and Ramawsamy, 03]. That is, it allows customers to access to a firm's technology or seeks for their help with service development. As a result, the firms can often acquire and apply more tacit forms of knowledge from customers' to innovate their service or product. Consider, for example, web-based content service, called 'do-it-yourself encyclopaedia' by Wikipedia. Its principle is 'openness' so that knowledge can be shared among users and also edited by any other users. That is, all users can access the site and post users' knowledge or information and also solve their problems by themselves. It facilitates a more customer-centric view of innovation and cannot be achieved without the interaction between individual users in the web-based community. For the firms that are involved in this type of innovation, critical is to draw customers' participation through which they have access to customers' experience and knowledge.

Cell 4: Service-dominant innovation. This cell describes the innovation that demands both a high level of co-creation activities and a high level of the networked collaboration. Value in this type of innovation is co-created through the combined efforts of providers, suppliers, partners, customers, and other actors and is differentiated by different customers. So, it might know how customers co-create value by participating or using a firm's offering [Michel et al., 08a]. Value creation in this cell is the most productive when diverse resources among all actors can be dynamically exchanged in the value network. It is further argued that in addition to tangible resources like materials, product, process-oriented and intangible forms of knowledge, skills flows are crucial in this type of innovation [Hertog, 00]. For instance, Google develops new applications with partners and helps customer easily interact with other actors. YouTube.com owned by Google creates value with

customers and is constantly transforming the way of sharing information. This company creates service innovation which enables users to find, upload, view and share video contents made by other users. In sum, this type of innovation can be achieved by relieving or enabling customers to co-create activities and by reconfiguring the value network.

Figure 2 shows different methodologies for approaches to each type of innovation. The conventional innovation, with the low level of the co-creation and the networked collaboration, focuses on the product-based innovation and applies methodologies such as TQM, BPR to improve quality and reduce the cost. The collaboration-based innovation concentrates on the process-oriented innovation and establishes the relationship with other organizations by using management techniques like outsourcing, SCM and ERP. The customer-oriented innovation focuses on enhancing interaction between firms and customers or among customers through Web-based model, CRM methods. Finally, service-dominant innovation is characterized by both the high level of the co-creation and the networked collaboration that maximizes the value in the service economy. This new perspective overcomes the traditional and limiting product-based view. Table 3 summarized the characteristic of each typology of service innovation.

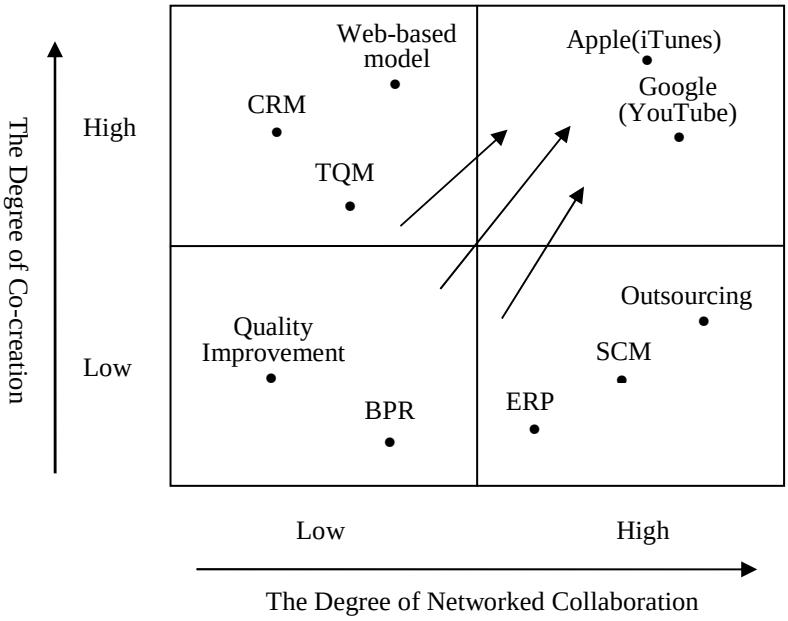

Figure 2: The various types of service methodologies in the typology

	Cell 1	**Cell 2**	**Cell 3**	**Cell 4**
	Conventional innovation	**Collaboration-based innovation**	**Customer-oriented innovation**	**Service dominant innovation**
Characteristic	• Quality-based improvement • Operation-oriented productivity • Focused on internal people • Product-based innovation • Supplier-dominant innovation	• Process improvement among diverse organizations • From internal organization to collaboration with external organization • Focused on back-end systems	• Focused on front end systems such as web interface • Customer requirement becomes important • Diverse business models are developed	• Systems approach • The role of resource integrator is important • Integration between back-end and front-end systems
Critical success factors	• Long term trust based relationship among internal people • Developing and retaining technology, people within organization	• Developing service value chain and technology for new product or service • Systematic network structure • Linking internal and external resource	• Perceiving the customer needs in market context • Provider competence to provide infrastructure and other resource to support customer • Communities served as a platform for customer to create new knowledge	• Enhancing Customer-Customer relationship • Provider competence to engage with the customers in interactions • Linking resource (i.e knowledge, skills) with customer needs for creating value • Partnership among competitors
Example	Xerox	UPS	Wikipedia	Apple(iTunes), Google(YouTube.com)

Table 3: The characteristic of typology in service innovation

4 Conclusions

We in this study set out to develop a framework for service innovation based on the S-D logic. We distinguish the service-oriented innovation from product-oriented innovation and suggest the typology of service innovation that is determined by two dimensions. The proposed typology emphasizes that co-creation of value and the networked collaboration are important to innovate service. We also describe different approaches that firms can adopt to pursue such a strategy.

From a theoretical perspective, the proposed typology provides readers with several implications. Our framework proposes an integrative perspective toward service innovation. Previous studies did not consider in an integrative manner the actors, innovation process or resource types that shape the outcome of an innovation. This study embraces the customer side issue, the value co-creation, and the provider side issue, the networked collaboration so that readers understand the very nature of service innovation in light of the S-D logic. The core message that the S-D logic indicates is that it is critical for the productive service innovation to make customers participate in value creation process and to integrate the dispersed resources held by participants. Based on this notion, future study is desired to investigate the effect of the two dimensions on the effectiveness of innovation and in turn the performance of firms. Future research also, needs to consider other dimensions to pin point the nature of service innovation from the S-D logic perspective. The different dimensions may include service life cycle, service-product convergence.

From a practical perspective, the proposed framework may provide the firms with relevant methodologies for different types of innovation. In addition, this study indicates that firms need to be aware of the importance of customer participation and knowledge utilization for service innovation and also of the criticality of building the active value network where operant resources are flowing seamlessly. These practices will help firms build their own competence and the capability of the network.

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