

Exploring Digital Service Innovation Process Through Value Creation

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Abstract. Value is generated through the whole service innovation process in a complex collaborative networked ecosystem. This study aims to enhance understanding of value generation in digital service innovation process with an emphasis on information technology by developing an extended value generation process framework and evaluating on how it is applicable in a real-life networked retail service innovation context. The findings of the study suggest that multiple information technology (IT), process and business related factors affect value creation during the digital service innovation process. The role of information technology is multifaceted, providing both new opportunities and challenges in the service innovation context. The extended framework for exploring the service innovation process provides a more structured way to examine the complex, networked, service innovation ecosystems.

Keywords. Innovation, Value co-creation, Service industry, Retail selling.

1 Introduction

The rapid development of information and communication technologies has introduced a whole new array of possibilities for creating novel digitally enabled services that enhance peoples' daily lives and create new business opportunities for companies. Consequently, the focus of companies' innovation activities has shifted from closed good-centric to open and service-centric. As companies have become more and more service oriented, service innovation has gained increasing interest also in research and the scope has evolved from the traditional product innovation view to the multidimensional and all-encompassing view to service innovation (see e.g. Carlborg et al., 2014; Biemans et al., 2015). A network or an ecosystem centric view (see e.g. Chesbrough, 2006) emphasizes the collaborative nature of service innovation. The importance of information technology as an enabler and a driver of ecosystem based service innovation have also received notable attention in the research community. For example, Maglio and Spohrer (2008) suggested that technology is an integral part of innovation in service systems. Lusch and Nambisan (2015) develop a service dominant (S-D) logic based framework which emphasizes an ecosystem centric view of value co-creation and the role of information technology in the service innovation process.

According to Lusch and Nambisan (2015), behind the design and development of new digitally enabled service innovations, there is a network of actors with a wide range of

resources that can be used in the value co-creation. This stresses the importance of efficiency of resource integration processes. It is necessary to identify how resources are integrated between different companies and the customers and what the possible challenges are in resource integration and related value creation activities. From the perspective of the service provider companies, the main challenge is twofold. On one hand, they must manage the efficient inter-firm resource integration activities with other companies. On the other hand, they must adjust their value generation processes and service delivery mechanisms to enable the participation in the customers' value creation process in a meaningful and economically efficient manner.

Because of the two megatrends, digitalization and servitization, driving the economic development of our societies, the ability to solve the above twofold challenge is becoming crucial to more and more companies. Hence, there is a clear need for further research and development of analytical tools that on one hand address the value generation process from the customer-centric perspective, and on the other hand tackle the challenges related to resource integration from an ecosystem perspective.

In this study we attempt to address this need by developing a research framework which draws on two intertwined major marketing research themes, value creation and service innovation. The developed framework approaches the innovation process from the value generation viewpoint, by combining the service logic (SL) value generation process model (see e.g. Grönroos and Gummerus, 2014) and the service innovation framework introduced by Lusch and Nambisan (2015). In this framework, value is determined as value-in-use, which is the central value definition in both service-dominant logic (SDL) and service-logic (SL). Value-in-use is the value for the customer and it is created by the customer during usage of resources instead of being inherent to the product (see e.g. Woodruff and Gardial, 1996; Vargo and Lusch, 2004; Grönroos, 2006). As value is always created by the customer, the company's activities are related to the facilitation of creation of value-in-use (creation of potential value-in-use) and direct interaction with the customer (co-creation of value-in-use).

This study utilizes experiences from a pilot case in the retail sector to examine the suitability of the developed framework for analyzing the innovation process of a real-life digital service. Especially we are interested in whether the developed framework can be used for a) identifying the crucial factors in the digital service innovation process from the value generation viewpoint and b) assessing the role of information technology (IT) in the process. The retail sector was chosen because of its potential of benefitting from the emerging digitalization and related new ways of customer engagement. The importance of positive shopping experience and integrated multichannel customer engagement is highlighted in recent retail studies (e.g. Verhoef et al., 2009; Rigby, 2011; Grewal et al., 2011; Shankar et al., 2011; Gallino and Moreno, 2014; Herhausen et al., 2015). The multichannel utilization trend has forced retailers to find new ways to enhance the shopping experience and to reinvent the service concept of the traditional physical store (Brynjolfsson et al., 2013; Herhausen et al., 2015). These studies highlight the multifaceted nature of innovation in the retail context. The innovation process within the pilot case is examined using the developed framework. Through our framework, we are able to map the value generation activities of different actors during the service innovation process to the extended

value generation process framework, which provides a service-oriented customer-centric approach with an ecosystem actor perspective to examine value creation.

This paper is structured as follows. Section ‘Value generation process in service innovation’ provides the theoretical background of the research and the research questions. It introduces the approaches that provide a basis for the developed extended value generation process framework. The following ‘Research methods’ section provides an overview of the research approach and includes a description of the data collection methods used in the study. The fourth section describes the process of digital shopping service innovation mapped with the extended value generation process framework. The fifth section discusses the findings of the study and presents answers to the research questions raised within this study. The sixth section presents concluding remarks, brings out limitations of the study and outlines potential directions for future research.

2 Value generation process in service innovation

Lusch and Nambisan (2015, p. 161) define service innovation as “the rebundling of diverse resources that create novel resources that are beneficial (i.e., value experiencing) to some actors in a given context.” Hence, service innovation can be interpreted as a change in the roles and the composition of the actor network involved in the value creation processes. Consequently, the fundamental prerequisite in succeeding with new service development is identifying key actors, their roles and understanding the value creation processes.

2.1 Value creation

The concepts of value and value creation have gained increasing attention in marketing research since the focus of the majority of research shifted from goods to services. One of the most significant contributions was the introduction of service-dominant logic (SDL) by Vargo and Lusch (2004, 2008, 2016), which provides a conceptual framework for value co-creation. An analytical view to value creation, value co-creation and the value generation process was taken in service logic (SL) (Grönroos and Voima, 2013; Grönroos and Gummerus, 2014). SL is based on an explicit definition of value as value-in-use, and describes the value generation process (see Figure 1) including all provider and customer activities. The value generation process framework consists of three spheres: provider, joint and customer sphere (Grönroos and Voima, 2013).

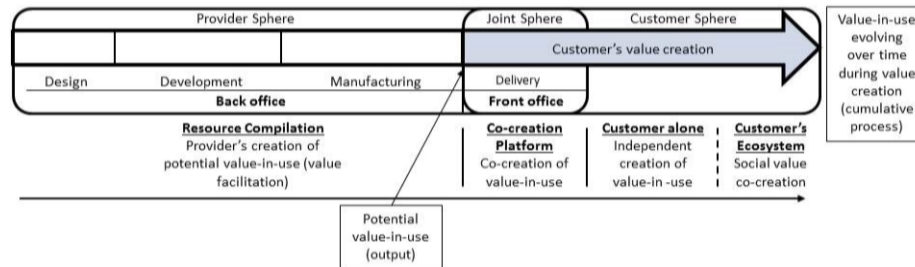


Fig. 1. SL based value generation, process model. Source: Grönroos and Gummerus (2014, p. 218).

The provider sphere is closed to the customer, and in it, the firms' activities are facilitating customers' value creation by compiling resources and thus producing potential value-in-use. In the joint sphere, a direct interaction between service provider and customer takes place. This direct interaction creates the co-creation platform, which enables the service provider to participate in and contribute to the customer's value creation process. The customer sphere is closed to the service provider. In this sphere, customer creates value-in-use either alone (independent creation of value-in-use) or as a part of his/her social ecosystem (social value co-creation). Social value co-creation has similarities with the concept of value-in-social context introduced by Edvardsson et al. (2011), who suggests that value perceptions are relative in nature as customers compare themselves with others. As stressed by Grönroos and Gummerus (2014), the process is not necessarily linear and static. Different spheres can be intertwined, for example, a co-creation platform (i.e. joint sphere) can be seen to have already emerged in the design phase if customers are involved in the service design and ideation.

The value generation process model gives customer-centric and service-oriented approach highlighting, for example, the customer's social ecosystem, but it does not cover a broader view to service ecosystems and resource integration activities from a B-to-B viewpoint. It highlights position and role of an end customer (e.g. customer of a store) as the creator of value-in-use and emphasizes direct interactions between the customer and the service provider in the platform of co-creation, but it does not explicitly deal with the network perspective, which includes back office activities incorporating resource compilation and value facilitation between multiple business actors.

2.2 Service Innovation

During the past decade, the research on service innovation has also undergone major changes. One of the main changes has been the opening of firm boundaries, i.e. shifting the focus from internal innovation resources and capabilities into a network or an ecosystem centric view (see e.g. Chesbrough, 2006). The importance Inter-firm collaboration in service innovation is highlighted in e.g. Schilling and Phelps (2007), and Tsou and Chen (2012). Furthermore, studies have also shown the benefits of integrating customers in innovation activities (e.g. Chen et al., 2011; Tsou and Chen, 2012). According to a broadened view of Lusch and Nambisan (2015), service

innovation is a collaborative resource rebundling process in an actor-to-actor-network highlighting value experienced by the beneficiary. This broadened view is based on a definition of services “as the application of specialized competencies (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself (Vargo and Lusch, 2004)”. This view highlights the importance of enhancing resource density, e.g. by providing interfaces and extending access to appropriate resources or resource bundles in order to support the collaborative innovation process and improve the opportunities for service innovations.

The aforementioned conceptualizations emphasizing service innovation as a collaborative, networked process include several aspects that are used when exploring this real-life case to achieve a better understanding of the nature of service innovation, value creation and the role of information technology in a complex network of diverse actors. Lusch and Nambisan (2015) introduced a service innovation framework with three inter-related elements: 1) a service ecosystem, an organizing structure for a network of actors, 2) a service platform that serves as the venue for innovation, and 3) value co-creation, processes and activities that underlie resource integration and incorporate roles of ecosystem actors. The service innovation framework is grounded in SDL and used to define the concept of value as value-in-use. Figure 2 illustrates the simplified service innovation framework including three identified inter-related key elements. In addition to emphasizing the network aspect of innovation, the framework by Lusch and Nambisan (2015) provides fruitful insights into the role of IT in service innovation. In recent studies, a role of information technology is considered an operand (static, tangible and enabling) and operant (dynamic, intangible and triggering) resource in the context of services and service innovation (Nambisan, 2013; Akaka and Vargo, 2014; Lusch and Nambisan, 2015).

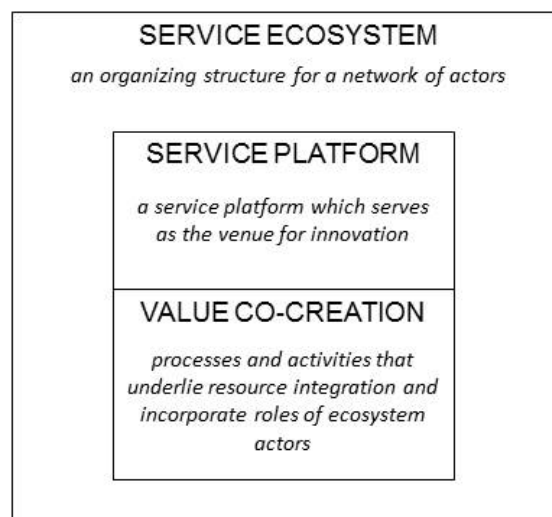


Fig. 2. A simplified version of service innovation framework. Source: Adaptation of Figure 1 from Lusch and Nambisan (2015, p. 162). Copyright © 2015, Regents of the University of Minnesota. Reprinted by permission.

One of the key issues related to service ecosystems is the architecture of participation, i.e. the way in which the interactions between network actors are coordinated (Lusch and Nambisan, 2015). A sound architecture of participation is the main antecedent of a well-balanced combination of structural flexibility and structural integrity. Structural flexibility refers to the actor network's ability to adapt to changes in business, societal and technological environments. Structural integrity can be considered as ties or relationships that hold the diverse actors together in a network (Lewicki and Brinsfield, 2009). The optimal mix of structural flexibility and integrity leads to efficiency in the resource integration process, which is also defined as resource density (Lusch and Nambisan, 2015). The central elements of participation coordination are clear and transparent rules of interaction, orchestration of the service innovation process and value capture structure, which creates adequate incentives for network participation. Lusch and Nambisan (2015) identified three supporting issues for value co-creation: facilitating interaction among actors, adapting internal processes, and transparency of activities, which can be seen as linked with the aforementioned elements of participation coordination and have an impact on the balance between structural flexibility and integrity.

In Lusch and Nambisan's service innovation framework, service platforms play a central role as they define a service platform as "a modular structure that comprises tangible and intangible components (resources) and facilitates the interaction of actors and resources (or resource bundles)" (Lusch and Nambisan, 2015, p. 166). In the context of the value generation process model, service platforms can emerge in both the provider sphere and the joint sphere, i.e. they can facilitate both business network interaction closed to the end customer, hence co-creating potential value-in-use and service provider-end customer interaction thus creating a co-creation platform which facilitates the co-creation of value-in-use.

To explicitly include the network aspect into the value creation analysis and to enhance understanding regarding resource integration and value creation in larger service innovation ecosystems consisting of diverse network of actors, the following extended value generation process framework (see Figure 3), which considers the closed sphere as a part of a B-to-B (business-to-business) innovation ecosystem, is proposed. With this framework we attempt to seek answers to our first research question:

RQ1: What kinds of crucial factors can be identified in the innovation process of digitally enabled service from the value generation viewpoint?

Through this combined framework, it is possible to map the value generation activities of different actors during the service innovation process. In the extended framework, the principle of a direct interaction concept (see Grönroos and Voima, 2013; Grönroos and Gummerus, 2014) for identifying when co-creation of potential value-in-use occurs through B-to-B focused resource integration processes especially in back office phases is applied.

This assumes the service provider as the focal company, which as the result of the service innovation process (including resource pooling and integration of different network actors), provides the retail service to the end customer in the joint sphere. Again, it must be noted that this framework is not linear and static. For example, if

end customers are involved in the design phase of the service innovation, then the joint sphere already emerges at that stage of the process.

The extended framework provides a foundation to examine more systematically activities and processes underlying value creation in a large service ecosystem and through that makes it easier to identify possible challenges and opportunities.

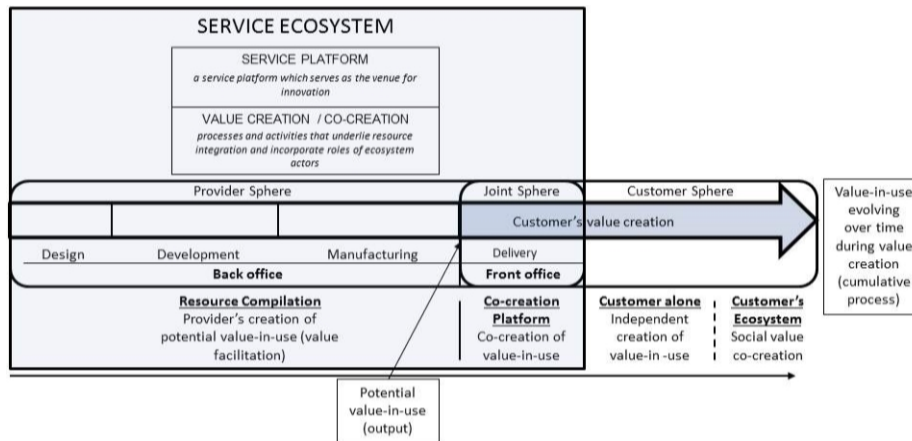


Fig. 3. The extended value generation process framework. Source: Adaptation of Grönroos and Gummerus (2014, p. 218) and Figure 1 of Lusch and Nambisan (2015, p. 162). Copyright © 2015, Regents of the University of Minnesota. Reprinted by permission.

2.3 Digitally enabled services

The rapid development of information and communication technologies has been one of the enablers and drivers in digitalization of different industries and introduced a new array of possibilities for creating novel digitally enabled services. It has been also suggested that technology is one integral part of value-creation configuration in service systems (Maglio and Spohrer, 2008). Technologically oriented approach that emphasizes commonly tangible technological aspects of the innovation is one of the common approaches to study the innovation. However, it can be seen that there are also a wide range of technology related intangible elements playing a substantial role within service innovations and value creation. Hence, a broader view is needed in order to achieve a deeper understanding of IT and value creation in digital service innovation.

Examining the role of IT from operand/operant and service platform aspects can provide a foundation for a deeper understanding of IT's role in the service innovation context. In terms of operand and operant resources the former refers to resources that enable or facilitate value creation. These types of resources are typically tangible and static, such as a digital infrastructure or devices. Operant resources are typically dynamic and intangible resources, which act on other resources in the value creation process. These operant resources are for example, people's skills and expertise. Basically, in traditional manufacturing environment materials can be seen as operand

resources and employees as operant resources. Traditionally technology has been treated as an operand resource that is an outcome of human actions highlighting material characteristics of technology, but it can be also viewed as a dynamic and intangible operant resource (Akaka and Vargo, 2014). As noted in Lusch and Nambisan (2015) IT has a dual role in digital service innovation – as an operand resource and as an operant resource. In addition to examination of service innovation from operand and operant resource perspectives, a definition of service platform can give a starting point for more extended examination of the IT and service innovation as it highlights service platform's modular structure and role as a venue for innovation (see Lusch and Nambisan, 2015). Referring to the aforementioned views our second research question is:

RQ2: What is the role of information technology in the service innovation process?

Finally, as this research presents a new research framework and applies it to a real-life digital service innovation case in the retail sector, we scrutinize the suitability of the developed framework as a tool for service innovation analysis. Our third research question is:

RQ3: How suitable is the extended value generation process framework for exploring service innovation?

3 Research methods

The research questions call for a holistic approach to the phenomenon under analysis – the value generation during the service innovation process. Hence, use of the case study approach was appropriate as it enables researchers to gain an in-depth understanding of a complex issue by scrutinizing the phenomenon using multiple data sources. Yin (1984) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. Yin (1984) further states that the case study's unique strength is its ability to deal with a wide variety of evidence - documents, artefacts, interviews and observations. One benefit of a case study is that it allows for use of quantitative data. Yin (2003) makes a distinction between case study and qualitative study by acknowledging the use of quantitative evidence in the former.

Data for the analysis was collected through observation and interviews. Collected and analyzed data was mainly qualitative. In addition, quantitative customer behavior related data was collected by using a depth sensor tracking system. That data was used for analyzing customer behavior in proximity to the customer PC in the store.

Observations were done by actively participating in different innovation activities during different phases of the pilot case. Researchers involved in the case took notes regarding different face-to-face and telco meetings. Notes were also used to support the analysis of the case. In addition, ecosystem business actors involved in the pilot case were interviewed after deployment of and during a working pilot service. Semi-structured interviews were arranged as face-to-face and phone interviews. All interviews were recorded and transcribed by researchers for later analysis.

Semi-structured interviews of ecosystem business actors focused on various themes, such as actors' interests, aims, roles and practices in the shopping service innovation context. In the analysis, the main goal was identification of the different value related assets and their associations between different actors. In addition, the goal was to identify possible challenges and opportunities regarding the pilot case and innovation activities, and in particular, to examine them from the perspective of generation of potential value-in-use and value co-creation of value-in-use. Table 1 illustrates the group of interviewed ecosystem business actors. Nine of these ten interviews were individual interviews while one retail personnel interview in the first additional pilot store was conducted with two interviewees. In addition to the first interview with a store manager in the original pilot store, this manager was later contacted several times by phone to receive information on the usage of the new shopping service and the opinions of sales personnel of the service.

In addition to interviewed business actors, store customers were interviewed and observed in the store, which provided premises for the pilot shopping service. At the beginning of the interview, the concept of the new digital shopping service was introduced to the customers; however, they did not actually directly interact with the service. A total of 35 store customers were interviewed and nine of them participated in a usability test in a real store environment. In addition, a brief survey was administered to all end customers who placed a product order through the shopping service. A primary goal of the end customer interviews was to gain an understanding of the customer's value-in-use regarding retail services, by collecting data about online and offline shopping behavior and to clarify the customers' attitudes towards the digitally enabled shopping service as well as how useful they felt it to be. The main goal of the usability test was to collect data for refining requirements for further service development with a central focus on the customer PC's user interface.

An analysis phase of the study consisted of multiple stages. In the analysis transcribed verbal statements from different ecosystem business actor interviews and meetings were systematically gone through in order to identify common themes and discrepancies, which were then coded and categorized. In addition, analyzed data from the customer interface was reflected and compared with data from business actor interviews and meetings. When the shopping service was deployed in two additional pilot stores later on, representatives of these stores were also interviewed and collected data analyzed jointly with previously collected data. As researchers (including the first author of this paper) were involved in the service innovation process activities and especially in the ideation, concepting and deployment phases of the innovation process, their observations through the process provided also support for the analysis phase.

Table 1. Interviewed ecosystem business actors.

Interviewee	Organization	Interview type
Concept development director	Digital signage service provider	Face-to-Face
Director in retail area	Retail management	Face-to-Face
Store manager	Retail personnel/Store management (original pilot store)	Phone
Project director	E-commerce development company	Phone
Division manager	Store chain management	Face-to-Face
Development manager in retail	Retail management	Face-to-Face
Marketing manager	Sales and marketing in the retail company	Phone
Store manager and sales person	Retail personnel (1 st additional pilot store)	Face to Face
Store manager	Retail personnel (2 nd additional pilot store)	Face to Face
Sales person	Retail personnel (2 nd additional pilot store)	Face to Face

As a process grounded framework, the extended value generation process framework naturally steers us to examine value generation in service innovation through phases of the innovation process. The pilot case is explored based on the extended framework by the five identified phases with the main focus being on the service innovation process, more precisely on resources and their integration activities and related value generation. The exploration especially emphasizes the three support areas of co-creation and the efficient resource integration views that are highlighted in the service innovation framework defined by Lusch and Nambisan (2015). As noted earlier, the central elements of participation coordination are clear and transparent rules of interaction, orchestration of the service innovation process and value capture structure, which creates adequate incentives for network participation. These participation coordination elements can be seen as connected with the three following areas of supporting a favorable environment for resource integration activities and consequently for value co-creation: 1) facilitating interaction among actors, 2) adapting internal processes and 3) transparency of activities.

Table 2 sums up the focus areas that are used for exploration of value creation in the pilot case. The role of IT is also discussed in different phases of the innovation process.

Table 2. Focus areas for examining value creation in the pilot case.

Focus	Viewpoints for examination
Resource integration and creation of potential value-in-use	How is potential value-in-use generated through resource integration? What kind of roles, activities, processes there are behind resource integrations and value creation between business actors? What kind of challenges can be identified in creation of potential value-in-use?
Co-creation of value-in-use with the end customer	How does the end customer value (value-in-use) generation occur in the co-creation platform through direct interactions? What kind of roles, activities, processes there are behind resource integrations and value creation between actors? What kind of challenges can be identified in resource integration activities in co-creation platform?
Facilitating interaction among actors	Mechanisms provided for interaction among ecosystem actors
Adapting internal processes	Capability to adapt existing or adopt new internal processes
Transparency of activities	Enhancing the transparency of resource integration activities in the service ecosystem

4 Mapping the innovation process of the real-life pilot case with the extended value generation process framework

The target of the retail service provider was to provide a wider selection of goods from a store for customers living in a rural area with limited shopping opportunities. An initial assumption was that the new digital shopping service might especially support shopping activities of the elderly customers of the store. The pilot store was selected based on these thoughts from the rural area in northern Finland, where a number of special stores is limited and the proportion of older people is relatively high. The basic idea was to seamlessly combine different physical and digital channels so that customers could more facilely do their shopping in a retail store. The customers were also provided with the possibility of placing their orders online outside the store, e.g. from their homes and then collect the ordered products from the store. The shopping service innovation was realized over several stages. In general, the stages of the innovation process usually include all steps from idea generation to commercialization (Baregheh et al., 2009). This section describes the innovation process, ecosystem actors, their roles and activities, and the pilot solution as a service platform in the context of the shopping service pilot case. In addition, the case is explored through the extended value generation process framework.

4.1 Innovation process and service ecosystem actors

The shopping service was realized through several process phases. The primary goal of the service innovation was to improve the customer's value-in-use experience by providing a seamless shopping experience for customers in the store and better

selection of goods. This required development of new processes and the configuration of technological components. The innovation process of the case consisted of process phases from ideation to a working pilot service. During the phases of the innovation process, different ecosystem actors were active in order to provide their knowledge and skills for creating a novel shopping service solution. The innovation process was iterative in nature and identified phases had overlapping activities.

When the identified innovation process phases of the pilot case were positioned with the value generation process model (see Figure 4), the first four of these phases (ideation, concepting & design, development and deployment) could be considered to be back office activities (i.e. provider sphere) and the fifth phase (pilot service) referred to delivery activities of the front office (i.e. joint sphere), when a service is available for usage. As mentioned before, the joint sphere can emerge in earlier process phases, which in this case was within the provider's sphere. For example, this can occur through close co-design activities with the customer. In the pilot case; however, customers of the store were not involved in the innovation process prior to the front office activities (pilot service phase).

The pilot case required active and close collaboration, and direct interactions between actors in different phases. Different actors were actively involved in resource integrations and influenced potential value-in-use that is realized as a value-in-use through experiences of the end customer. According to Grönroos and Gummerus (2014), collaborative and dialogical joint processes evoke co-creation platforms for reciprocal co-creation of value. When innovation process phases and related resource integrations between business actors of the pilot case are examined against that statement, it can be observed that the innovation process phases of the pilot case are grounded on value co-creation.

A diverse set of actors with a range of different roles and resources participated in the innovation process. Table 3 describes the service ecosystem actors, their main role and involvement in different phases of the innovation process in the pilot case.

Table 3. Ecosystem actors, their key resources/roles and participation in the innovation process (* part of the service provider organization).

Service ecosystem actor	Key resource/Role	Ideation	Concepting & Design	Development	Deployment	Pilot service
Research organization	Knowledge and skills to build digitally enabled service concepts in the retail domain and experience in designing research and conducting pilot studies.	x	x	x	x	x
*Management of the retail company	Knowledge about retail business and processes and digital roadmap	x	x			
*Sales and marketing unit of the retail company	Design and implementation of different marketing material and digital service content		x	x	x	
*E-commerce development company	Design and implementation of retail online solutions	x	x	x	x	x

Service ecosystem actor	Key resource/Role	Ideation	Concepting & Design	Development	Deployment	Pilot service
Web service development company	Design and implementation of the digital service user interface		x	x		
3D visualization company	Design and implementation of 3D visualizations		x	x	x	
Digital signage service provider	Design and implementation of digital signage solutions	x	x	x	x	
*Store/Retail service provider	Knowledge about the practical activities and daily operations/processes in the store environment				x	x
Customer	End customers of the shopping service involved in the testing activities					x

Figure 4 illustrates the elements of the shopping service pilot case mapped in the extended value generation process framework covering end customer and inter-firm connections through the shopping service innovation process.

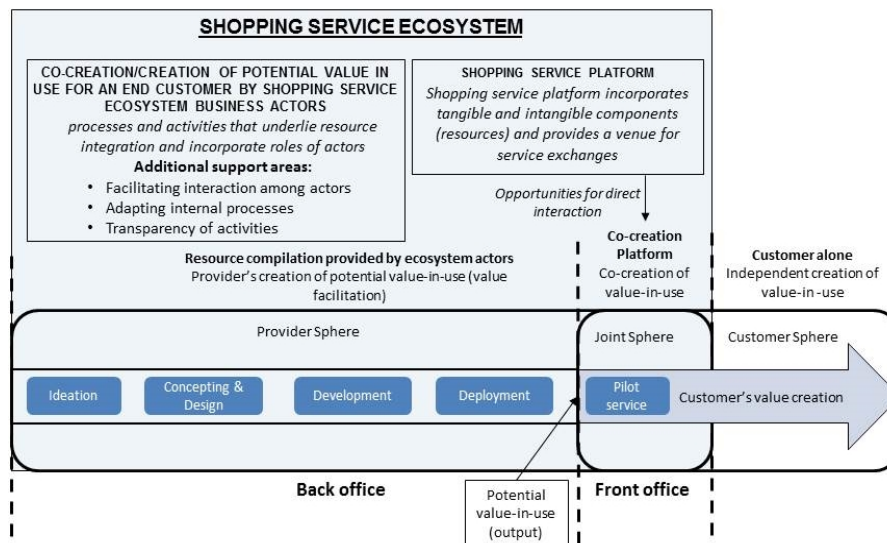


Fig. 4. Shopping service elements of the pilot case mapped with the extended value generation process framework. Source: Adaptation of Grönroos and Gummerus (2014, p. 218) and Figure 1 of Lusch and Nambisan (2015, p. 162). Copyright © 2015, Regents of the University of Minnesota. Reprinted by permission.

4.2 The new shopping service

Next sub-sections scrutinize service innovation process in the pilot case by using the extended value generation process framework.

Ideation. The first phase in creating a way towards the working pilot service was the *ideation*. The core of the selected idea was based on integrating (existing and new) online services and digital features with a physical grocery store. A need for a novel operational model regarding digital services had already been identified by the retail company management a couple of years earlier.

Key resources used in the early ideation phase were intangible in nature. The management of the retail company provided knowledge of the business and the division manager of the retail company brought knowledge of the processes in the store environment. The e-commerce development company provided information on the current e-commerce solutions and their earlier experiences with e-commerce services in public spaces. The research organization's role was to study new trends in retail and contribute the ideation based on the omnichannel retail approach (see e.g. Frazer and Stiehler, 2014; Rigby, 2011) and provide information about technological possibilities. In addition, the research organization coordinated the ideation activities by arranging and leading ideation workshop meetings. The above-mentioned group of ecosystem actors constitutes a key group in creating the foundational idea for a new digitally enabled shopping service.

Ideation continued later in the innovation process, focusing more on greater detail and was, in part, parallel to and interactive with the concepting and design phases. Overall, ideation and concepting activities were rather closely connected. First drafts of the concept description raised discussions and acted as a starting point for modifications and additional ideas that could be utilized in concepting and design. In practice, a general level idea was taken to the more concrete and detailed level by describing it through different techniques (e.g. sketches, service blueprints, customer journeys), which created a foundation for new ideas focusing more on details. A digital signage service company was also active in this more detailed ideation, primarily focusing on integrating digital resources seamlessly into a shopping service and providing ideas for digital visualization.

Store personnel and end customers of the store were not directly involved in the ideation activities. Information about the store processes was essentially provided by the division manager and upper management of the retail company. The division manager acted as a link between the "offerings" of different actors and the numerous different processes in a store (e.g. payment processes, customer service processes, product collection processes). The division manager provided valuable information on store processes together with the upper retail management in the ideation phase. However, the store manager was of the opinion that it might have been beneficial in the early phases of the innovation process to have greater collaboration with the store personnel, who directly interact with the end customers on a daily basis. The following comment of the store representative illustrates this point:

"It would have been good, if the whole thing had been thought more from a store level and from a different perspective, so that we [store personnel] would have a possibility to think how it should be implemented and what is the smartest way to do it." (Store manager)

In the ideation phase, communication was done through face-to-face/telco/video meetings and emails. However, there were no face-to-face meetings in which representatives from all organizations would have been in attendance at the same

time. Resource integrations were transparent as actors' roles and goals were clear, and the number of active actors was relatively small in the ideation phase. The retail company was also willing to develop new internal processes (e.g. a supported product ordering in the store).

Concepting and design. To summarize, the aforementioned group of ecosystem actors brought their resources to the ideation phase, resulting in the idea that was viewed as feasible from business, process and technological aspects. In addition, more detailed ideation was interactively done with concepting activities. The roles of key actors were clear, and necessary additional ecosystem actors were identified for the innovation activities. During the *concepting and design* phase, the identified service idea was brought to a more concrete level. The main objective of this phase was to create a good starting point for different development activities (e.g. SW development, visual content creation) in the following phase. In this phase, activities continued in collaboration with several ecosystem actors.

A new service concept was described using different techniques. The research organization had a leading role in the early phase of concepting, and created descriptions on the service based on the information received from different actors. The main results of this phase was the concept description (including e.g. use cases, service blueprints, service processes descriptions and definitions of underlying design elements) for the digital shopping service. At this phase, background processes related to the shopping service (e.g. delivery, storage) were also discussed and defined at a detailed level and necessary additional resources were identified for the shopping service. Discussions were started and actively continued with "indirect" actors (e.g. Internet service provider, retail company's IT unit), whose resources were identified to be essential for the new shopping service.

When the shopping service concept was taken to a more concrete level, research activities to study customer behavior in the context of new shopping service were also planned at a more detailed level by the research organization. A general plan was to study customer behavior through interviews and a depth sensor, customer tracking system. Concrete descriptions with spatial dimensions of the store were required for tracking system related algorithm development. The pilot store sent information about the store (e.g. images) to support the research organization's research planning and depth sensor system configuration for the store.

Concepting and design were partially done parallel to the development phase. Based on the design sketches from the research organization and the ideas from the digital signage service provider, the retail company's sales and marketing team was able to design and generate more finalized versions of service user interface (UI) visualization templates including content for info screens. The web service development company used different versions of UI layouts during their software development activities. In general, key actors collaborated actively and interaction was done through multiple channels including face-to-face meetings and there were no visible challenges in collaboration between actors. However, as in the previous ideation phase, store personnel and end customers were not involved in the activities of this phase.

Development. A *development* phase mainly consisted of the implementation/integration activities and setting up of the pilot systems. Separate

online stores were integrated through the common UI layer, which was developed based on a finalized UI design. Online and offline content for the service (e.g. ultra-resolution images) was generated for the service. The system was also tested in order to ensure that all parts of the system were working properly before setting up the pilot service in the store environment. Technical implementations and system integrations between different IT based system suppliers were highlighted, especially in this phase.

During the development phase, some challenges emerged in the resource integration related activities. The digital signage service provider did not have direct visibility for digital UI development done by the e-commerce development company and the web service development company. The initial idea of technical integration between customer PC UI and the digital signage system was abandoned, which was not communicated clearly enough for all ecosystem members. This situation was commented as follows by one of the technology providers:

"The challenge was that we did not know much about the e-commerce side...not even an exact schedule. We did not know what they have been thinking about and what they are developing." (Technology provider)

The main reasons for leaving out the technical integration during the pilot case were a relatively tight schedule and the lack of appropriate, available resources in the pilot project. However, if the digital signage service provider would have been more closely connected to the integration activities, it is possible that initial specifications for future enhancements regarding digital signage integration with other IT components could have been done.

The research organization developed algorithms for the analysis components of the customer behavior tracking system. Spatial dimensions of the store and location and physical dimensions of the service UI were needed for development of the analysis algorithms. In addition, questions for customer and store personnel interviews and usability tests to be conducted in a real store were planned at the same time.

The ultra-resolution image content was also integrated with the UI implementation of the customer PC. The e-commerce development company, the web service development company and the 3D visualization company collaborated closely in order to develop a coherent implementation. There were some challenges in generation of ultra-resolution pictures in order to provide a possibility for richer visualization. The initial goal was to provide product images that could be viewed from different angles by the end customer. However, at that time the actors did not have readiness to generate the required images, which resulted in the use of still images. There was clearly a lack of appropriate resources in the service ecosystem for generating visualization that could provide additional functionalities for the user of the service and initially planned richer visualization was not used in the shopping service. This can partly be seen as a challenge of adapting one's own processes in order to create a more supportive environment for value co-creation of potential value-in-use.

Deployment. After the development/integration of different service elements, it was time to set up the pilot service in the store environment including system installations. Key technology enablers of the service and depth sensor tracking system, as tangible

components (resources) of the shopping service solution, were set up to the pilot store. Figure 5 illustrates tangible components of the physical interaction layer installed in the pilot store. As a part of the *deployment* phase, the sales personnel were also trained and external communication was done through media.

One of the key issues in the deployment phase was ensuring adequate bandwidth for data transfer regarding digital content of the customer PC. In particular, the ultra-resolution images required high data transfer capacity. As the pilot store was located in a rural area, high capacity network connections were not available at a reasonable price. 10/2 Mb network connection installed in the pilot store was adequate for ultra-resolution images. If richer visualizations would have been used as initially planned, it might have required a faster connection.

The new shopping service solution was generally well received by the store's sales personnel; however, the amount of new devices was questioned by the store personnel. For example an additional payment terminal and a printer were installed in the store along with the new shopping service solution. In addition to the existing IT system for package management, they received a new separate package management IT system with the pilot shopping service. The additional devices and systems made the store environment more complex to manage and thus more challenging to maintain good customer service. The following two comments from interviewees illustrate the use of parallel systems in the store:

"If we think about systems...technical and that kind of systems...there are some overlapping things. If we are going to extend [the service], they should be solved in some way." (Retail chain representative)

"A separate payment terminal feels a bit strange. If she/he [a customer] would pay the product directly to the cash register, it would also felt that the product is bought from the own local store." (Store manager)

The e-commerce development company's view was that it would have been beneficial if their personnel had been present in the store when the new customer PC was installed in the store. That way they could have directly seen if there were any previously unidentified challenges in a real usage context of the customer PC, and they could have reacted faster to these potential challenges. In addition, the sales and marketing personnel of the retail company highlighted that marketing and communication for end customers and the store personnel is extremely important regarding the new service. Furthermore, management highlighted the role of the store personnel in adoption of the new service as they are in direct contact with customers.

Pilot service. After the service related installations and deployment activities, the *pilot service* phase that also included testing the service in a real store was initiated. Data was collected from the sales personnel and the customers of the store. The primary goal of the user study was to examine customers' online and offline shopping behavior and to clarify their attitudes towards the digitally enabled shopping service. In addition, a usability test was conducted in the pilot store with the customers to collect digital UI related data for future development requirements of the shopping service solution. The digital shopping service concept was validated through data analysis.

In general, the new shopping service was not an immediate financial success, as

customers did not use the service for shopping in the store to the expected extent. Usability related issues in the customer PC could partially explain the relatively low degree of usage of the shopping service. The main issues decreasing the value-in-use experience that emerged from the usability test were related to problems in the sensitivity of the touch screen, an unintuitive order process through the common UI layer and the lack of privacy when using the customer PC for product browsing. Depth sensor based data pointed out that the store's customers did not spend much time in front of the customer PC, which indicated for the most part, that the customer PC was not used for placing product orders. Instead, it was used for taking a quick glance at the service. The detailed results of the user study, including end customer and store personnel experiences, are presented in *Ervasti et al. (2014)*.

In addition to challenges in a customer interface, there were also business related factors that affected the digital service innovation process and the outcome. As the service provider role can partially be considered to be shared between two ecosystem business actors (a retail company and an e-commerce development company), there should have been clearly defined rules on how financial benefits could be shared between the two actors. In the pilot case, this was not a major problem as it was experimental in nature. However, if this kind of service would be put into wider use, sharing of financial benefits should be carefully considered to ensure that they are adequately beneficial and motivating for all actors in a service provider's role. Moreover, according to one of the interviewees, if benefits are clearly defined and communicated, they might also increase the commitment of the operational level employees to the newly deployed services.

In addition, the e-commerce development company approached the pilot case from the scalability viewpoint. An interviewed project director of the e-commerce development company viewed the scalability as a crucial aspect in new services. As the pilot case consisted of a single service point, scalability was not concrete challenge yet. However, if the service would be scaled up to cover a wide range of stores, scalability issues should be carefully considered. In particular, scalability raises new requirements for technical solutions so that instead of managing numerous separate and fragmented digital shopping services, there should be a possibility to manage digitally enabled services in a more centralized and effective way, e.g. through a common digital service platform.

Even though the new shopping service was not an immediate financial success, based on experiences from the pilot shopping service, revised versions of the service were subsequently adopted in two additional stores. Both of these stores are also located in rural areas with limited shopping opportunities. In the first additional pilot store, the deployed shopping service was nearly identical to that of the original pilot shopping service, including the same service processes in the store. The only clear difference was that there was not an info screen above the customer PC. According to store personnel, the use of online stores among customers was increased by the new shopping service. The second additional store utilized a "lighter" service solution, which was based on a tablet PC usage without a separate payment terminal or printer.

The findings from the two additional stores support earlier findings in the original pilot store setting and, for example, found that most of the product orders were done outside of the store. The finished service solution was installed in the stores and the

personnel were trained to use the new service without involvement in the early phases of the innovation process. In general, the new digital shopping service was perceived to be an advantageous additional service in both stores, and employees were generally satisfied with the new service. In addition, according to the store personnel, the store customers perceived the shopping service as positive. Despite generally positive perceptions of the new service, there were also some service related challenges mainly related to the service process in the store and inadequate privacy.

Overall, the retail company considered the shopping service as a long-term strategic initiative and they were satisfied with the pilot shopping service. The goal for the future is to simplify the usage process of the service through tailored shopping service solutions, which are deployed in other stores.

4.3 Shopping service platform

As noted earlier, Lusch and Nambisan (2015) delineate a service platform as a modular structure consisting of tangible and intangible resources that facilitates interaction of actors and resources or resource bundles in the service ecosystem. They also suggest that “service platforms serve as a venue for service innovation because many interacting actors will seek or discover novel solutions to problems; that is, their resource exchanges may lead to innovative, scalable solutions” (Lusch and Nambisan, 2015, p. 166). Simply, the service platform can be seen as a venue that serves actors in their efforts to find relevant resources for resource integration by providing easy access and interfaces for service innovation. That reflects to resource density of the service ecosystem. As the pilot case service innovation is approached from the service platform perspective, a structure consisting of a wide range of different tangible and intangible components can be identified. Figure 5 illustrates the structure of the pilot service solution from the IT or digital component based viewpoint. In addition to a tangible dimension of these components, there is a broad scale of IT related intangible resources, for example, on design and development of the software (SW) components for the shopping service. As this study shows, digital components have a crucial role in shopping service. The upper part of Figure 5 represents the IT based service platform components in the service front end and the lower part incorporates back end components. Here, the front end refers to the service interface between the user in the role of end customer and store personnel and the shopping service. Basically, front end components, which were installed in the physical pilot store, constitute an IT based physical interaction layer, whereas back end components are part of the digital processing layer of the shopping service. From a technical viewpoint, these layers can be seen as constituting a digital infrastructure of the shopping service solution.

When exploring the pilot shopping service from the service platform perspective, it can be identified that it is structured from a wide range of tangible and intangible components, and it facilitates B-to-B and B-to-C (Business-to-Customer) interactions between different actors within the service ecosystem. As the shopping service is scrutinized in greater detail through the extended framework (see Figure 4), the physical interaction layer, as a part of the service platform, can be seen to have the potential to create a co-creation platform by enabling direct interaction and thus, can provide a venue for co-creation of value-in-use for the end customer and the service

provider. In terms of direct interaction in the pilot case, store personnel also had an essential role in the shopping service. The shopping process related to the new service incorporated several phases where end customers and store employees interacted directly. Browsing service content via a customer touch screen PC with the help of store personnel and payment activities by cash register are examples of the shopping process phases in which direct interaction occurred between the sales person and the end customer. These activities naturally also included the use of a set of different tangible IT based resources of the service platform. In sum, the intangible resources of store personnel together with tangible IT based resources in the physical interaction layer served as a setting for direct interactions and enabled co-creation of value-in-use between the end customer and the service provider. For example, in the pilot case two tangible IT based components, the info screen and the touch screen customer PC, created a co-creation platform.

The service platform perspective also sheds light on value creation related activities between business actors as a part the shopping service ecosystem. There is a wide range of different intangible IT related components (e.g. design and engineering related resources) behind all tangible IT based resources illustrated in Figure 5. These resources and combinations of resources were preconditions for developing the new shopping service based on the initial idea about the service. In addition, these IT based components potentially provide the foundation for future innovations that can enhance the shopping service with new actors and their resources.

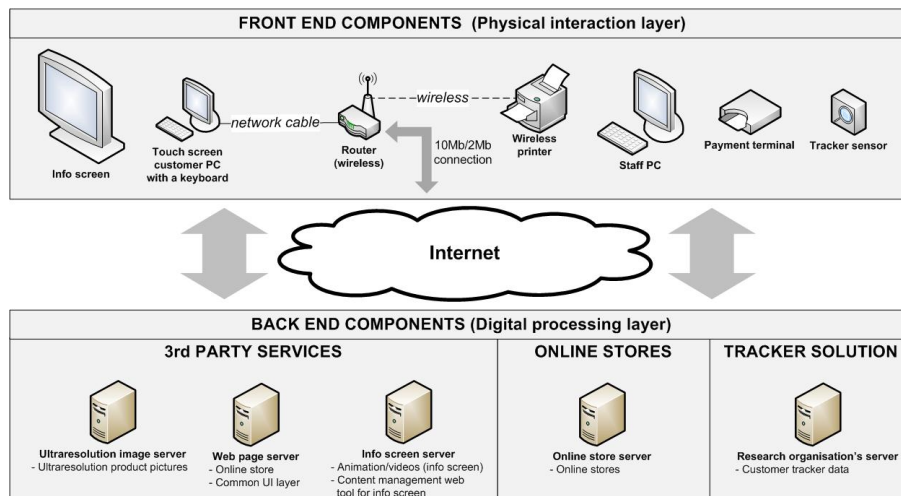


Fig. 5. IT based tangible digital components (resources) constituting a digital infrastructure of the shopping service solution.

In order to achieve a more holistic view to value creation in the pilot shopping service it is also necessary to explore other than IT based resources impacting resource integration activities behind the value creation. As a part of the shopping service platform, these non-IT resources can hinder or set the scene for service exchanges among actors and resources, and provide good ground for innovations. For example, expertise in retail business logic and operational level support activities in a store are

related to intangible non-IT resources that are needed for the working pilot service. In addition, actors responsible for transportation of ordered products with respected resources are needed to deal with the delivery process of the ordered product. The physical store premises can be seen as a tangible non-IT resource in the service platform.

5 Discussion

According to our study multiple information technology, process and business related factors affect value creation during the digital service innovation process and the role of information technology is multifaceted, providing both new opportunities and challenges in the service innovation context. In addition, the extended framework for exploring the service innovation process provides a more structured way to examine the complex, networked, service innovation ecosystems. In order to answer the research questions, activities and processes behind resource integration between service innovation ecosystem actors were examined and applied to an extended value generation process framework in a real-life pilot case. The three research questions are answered in this section. The first research question was formulated as:

RQ1: What kinds of crucial factors can be identified in the innovation process of digitally enabled service from the value generation viewpoint?

Based on the findings from the pilot case, three layers of service innovation were identified. These include information technology, process and business layers. All of these layers incorporated resource integration related factors that affect the value creation or co-creation. The information technology layer consists of elements related to IT resources in the shopping service innovation. The process layer incorporates back end and front end operations and processes related to the shopping service. In addition, a marketing and communication process was identified to be an important factor in the service innovation. The business layer covers business related factors that emerged during the shopping service innovation process. Table 4 presents identified crucial factors that were found to have an impact on the different layers of the service innovation. Based on the experiences from the pilot case, recommended actions that could tackle the potential challenges resulted from factors identified during the service innovation process were also formulated. Even though some of these factors did not have a major impact on the experimental pilot case, if this service were to be scaled up to include a greater number of stores and customers, the significance of the identified factors should be increased.

Examination of the innovation process phases from the viewpoint of the identified factors revealed that early phases of the service innovation process are critical. Furthermore, our findings stress the importance of the customer-centric approach highlighted in SL (Grönroos and Gummerus, 2014). Store personnel and end customers were not directly involved in the early phases of the innovation process. There was no direct interaction and consequently a co-creation platform did not emerge between the end customers and the shopping service provided by the service provider prior to the pilot service phase. Direct involvement of store personnel first

occurred in the deployment phase of the innovation process. Involving end customers and store personnel already in the design phase of the service innovation process could have paved the way for more user-friendly and acceptable service. This could be achieved, for example, through the co-design approach that has roots in the participatory design (Sanders and Stappers, 2008). New innovative methods and dedicated resources are needed for collaboration, as there can be challenges in integrating collaboration activities with the effective and busy daily operation of a store, as mentioned in interviews.

All in all, based on the findings of the case study, communication and interaction related factors in the service ecosystem were the most impacting factors in the creation of challenges during the innovation process. In addition to a lack of direct interaction between the service provider and end users (i.e. end customers and store personnel) in the early phases (back office activities) of the service innovation process, there were also some deficiencies in the communication and interaction between business actors in different phases of the innovation process. This highlights the importance of participation coordination and creation of a supportive environment for the service innovation.

Reviewing the pilot case in terms of the three areas that impact support of value creation identified by Lusch and Nambisan (2015), it was noted that interaction facilitation among actors, internal process adaptation and transparency of activities were relevant and apparent in the pilot case. In all three areas, some challenges and needs for improvements were identified during the pilot innovation process.

Table 4. Summary of identified factors and recommended actions that should be taken into consideration during a service innovation process.

Layer	Identified factor	Recommended practical actions
IT	Parallel IT components in the service environment	Early back office phase exploration of existing IT systems (IT architecture) with service provider's IT experts and integration of service components with existing IT systems.
	Digital UI related challenges in the customer interface	Early involvement of end users from early back office phases to later front office phase in order to iteratively identify user requirements for the user interface.
	Inadequate transparency of IT development activities	Close collaboration and active communication between ecosystem actors through different channels.
	Network and device requirements for the service	Early phase exploration of context specific technical limitations with IT experts of the service provider organization.
	Fragmented point service solution related challenges in scalability and maintenance	Focus on designing and developing an interoperable system (e.g. a common digital service platform), which provides effective content management features and enables service enhancements in the future.
Process	Adaptation of a new service with the back end processes in a store (e.g. storage and delivery)	Exploration of existing back end processes and definition of requirements in a new service context. Close collaboration in process definition between different actors.
	Adaptation of a new service with front end processes (e.g. payment)	Exploration of existing front end processes and definition of requirements in a new service context.

Layer	Identified factor	Recommended practical actions
	and customer support) in a store	Close collaboration in process definition between different actors including end users.
	Marketing and communication processes	Active communication with store personnel and potential customers in early phases of the innovation.
	Integration of service innovation process related activities with service provider's daily operational level activities	Allocation of dedicated operational level resources for service innovation related activities in order to facilitate effective collaboration during the innovation process.
Business	Clear understanding of the possible effects on business process requirements between actors in a new service context	Negotiations in the early phase of service innovation process about the business logic behind the service between different actors
	Service innovation processes and outcomes as a part of the service provider's business	Defining service innovation processes and outcome as a longer term initiative, which does not necessarily offer immediate financial benefits, but is more a part of strategic aims.

The second research question was formulated as:

RQ2: What is the role of information technology in the service innovation process?

IT resource focused elaboration of service innovation in the pilot case provides concrete real-life examples how operant and operand resources discussed in earlier research (Nambisan 2013; Akaka and Vargo, 2014; Lusch and Nambisan, 2015) emerge in a networked service innovation context. The analysis of the case study through resource classification enhances understanding about a role IT resources in the service innovation context.

Overall, tangible IT components and intangible IT resources (e.g. IT related design and development competence) were naturally pivotal to the service innovation process as a central target was to integrate retail processes and digital service elements. When exploring the service innovation process and the digital infrastructure from an information technology viewpoint through operand and operant resource classification, it can be perceived that both types of IT resources existed in the pilot case. As stated in earlier research, operand resources are more static, tangible and enabling in nature and operant resources are more dynamic, intangible and triggering in nature (Nambisan 2013; Akaka and Vargo, 2014; Lusch and Nambisan, 2015).

Upon closer examination of the IT based resources in the pilot case, the common UI layer can be seen to be an example of an enabler of innovation, emphasizing an operand nature of the resource. In general, the common UI layer supports the integrations of different resources at different levels. On a higher level, it enables integration of physical store environments with online stores. On a lower service level, the common UI layer creates opportunities for value creation by facilitating integrations between different online stores and equalizing the usage processes of online stores in the physical store environment.

A depth sensor system installed in a store and used for data collection can be seen as an example of an IT resource that is operant in nature and creates novel opportunities

for resource integration and innovation. The depth sensor solution triggered initial ideas for further service innovations in the store environment. A common factor for these ideas was that depth sensors could be used for supporting interaction between the elements in the physical store environment and the digital service content. The basic idea was that the enhanced depth sensor system would “scan” the environment and changes in the environment would be reflected as digital content of the service and physical store elements (e.g. lights). In addition, the depth sensor system can be seen as an independent service platform that provides interfaces for resource integrations and innovations and thus improves the resource density of the service innovation. In general, the depth sensor system could provide a way to bridge physical and digital elements of the shopping service more tightly together. Intangible IT resources are crucial in terms of the depth sensor system as specialized knowledge and skills are needed in design and development activities of the novel depth sensor based systems for retail environments. These activities can include, for example, research and development of context specific SW algorithms and fusion methods for real-time analysis of shopper movement, action and mood.

Although the depth sensor system installed in a store can primarily be identified as operant resource, it might have a more operand nature in the future. It can be postulated that the depth sensor system will become an everyday solution with numerous connections between the system and the surrounding digital and physical retail environment. This extends current research related to a role of technology with a view, whereby a nature of certain resources is changing over time and a line between operand and operant is not necessarily distinct.

The third research question was formulated as:

RQ3: How suitable is the extended value generation process framework for exploring service innovation?

In general, the extended value generation process framework provided a structured way to explore the service innovation process and related value creation activities from a service ecosystem perspective with a special focus on the end customer role. The service platform view gave an organizing structure for the resources behind value creation. It made it easier to form a holistic and clear understanding of the service infrastructure through IT based resource identification and description; areas of support for value-creation that were pointed out to be relevant when exploring the pilot case. Three areas of value co-creation provide a foundation for estimating how supportive the environment is for potential value-in-use. In summary, the extended framework provides a good tool for exploring the role of the end customer in the service innovation process from a value creation perspective. In addition, the extended framework gives tools for exploring B-to-B emphasized resource integrations and observes the potential challenges in the service innovation process in value creation related activities between business actors.

6 Conclusions

Examination of the pilot case through the extended value generation process framework elicited a wide range of factors that were different from each other in

terms of their nature. Based on these factors, three main layers (information technology, process and business) were created to which the identified factors were assigned. The findings revealed that the three layers identified in this study, together with the extended value generation process framework, could provide a good reference point for examining resource integrations and value creation/co-creation in digitally enabled service innovation processes in the future. These layers are intertwined with each other, and elements in different layers can be seen as being connected to the innovation process phases and impacting on value creation and consequently the success of the service innovation outcome.

A role of IT was elaborated through the operand/operant classification in the pilot case. According to findings of our study different kinds of IT related resources can be found in different levels of service innovation impacting widely on value creation, and exploration of the service innovation process indicated that some IT elements are operand or operant in their nature. However, it can be seen that a difference between operant and operand is not always necessarily distinct. Further research is needed for achieving a deeper understanding on operand and operant resources and the role of IT in the service innovation context. Long-term case studies would provide a good starting point for further research focusing on different resource types in the service innovation context.

Earlier research emphasizing IT related aspects in value creation/co-creation could also provide useful insights for enhancing understanding of the role of IT in the service innovation. For example, Grover and Kohli (2012) have focused on the role of IT in inter-organizational settings and studied the value of IT in networked firm interactions. Lempinen and Rajala (2014) approach value creation from an organizational viewpoint by studying multi-actor value creation in IT service processes. Tuunanen et al. (2010) have created a framework for the development of digitized services focusing on value co-creation in consumer information systems and emphasizing system value propositions and customer value drivers. Even though many of these IT related studies discussing value creation are not directly focused on innovation research, they might provide fruitful ideas for positioning different aspects of information technology into the service innovation context in future research.

The findings from the pilot case highlight the importance of involving operational level employees and end users in the service innovation process already in early back office phases. This is important for achieving a successful front office phase. Especially employees working on the frontline close to the end customers have an integral role in the service innovation. Hasu et al. (2015) have also identified user-employee interaction as a crucial element in the context of service innovation and highlighted the interactive process between the service provider and the user, and its impact on the use value. Review of the findings indicate that communication and direct interaction are also important in B-to-B relationships in order to avoid setbacks in the innovation process, and create a supportive environment for resource integration and value creation in the service ecosystem. Overall it can be postulated, that although the technology has a central role in digitally enabled service innovations, a service innovation process should be considered to be primarily driven by people not technology. Based on the experiences from the pilot case, the goal should be to reach a human centric service innovation process, which emphasizes the

role of people in the process of the service innovation.

In this study the principle of a direct interaction concept was applied, which is primarily discussed in the context of B-to-C interactions. Basically, the concept of direct interaction is based on the view that collaborative and dialogical joint processes evoke co-creation platforms for reciprocal co-creation of value (Grönroos and Gummerus, 2014). Further research in B-to-B context is suggested as it would contribute to service innovation research by focusing on interactions between business actors. This then could lead to a better understanding of the business actors' roles in the service innovation process. In addition, examining different value dimensions affecting value creation in a B-to-B context can provide an interesting direction for the future research. For example, in addition to traditional economic values, other customer value dimensions (e.g. emotional value) have recently been highlighted in B-to-B relationships (Leek and Christodoulides, 2012) and more specifically in the service innovation context (Coutelle-Brillet et al., 2014).

This study aims at enhancing understanding of the factors that are an integral part of service innovation, value creation and value co-creation. Naturally, more research on the topic is needed to achieve greater generalizability, as this study only included one case from the retail sector with a limited sample size. In the future research also other sectors, such as health, energy, banking and financial services, should be covered in order to enhance understanding on potential industry specific characteristics within service innovation. Despite some limitations of the study, we feel that results of this study provide a step toward a more holistic understanding of value creation in a service innovation context and provide interesting directions for future research.

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7 References

- Akaka, M. A., & Vargo, S. L. (2014). Technology as an operant resource in service (eco) systems. *Information Systems and e-Business Management*, 12(3), 367-384.
- Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management decision*, 47(8), 1323-1339.
- Biemans, W. G., Griffin, A., & Moenaert, R. K. (2015). New service development: How the field developed, its current status and recommendations for moving the field forward. *Journal of Product Innovation Management*.
- Brynjolfsson, E., Hu, Y. J., & Rahman, M. S. (2013). Competing in the Age of Omnichannel Retailing. *MIT Sloan Management Review*, 54(4), 23-29.

- Carlborg, P., Kindström, D., & Kowalkowski, C. (2014). The evolution of service innovation research: a critical review and synthesis. *The Service Industries Journal*, 34(5), 373-398.
- Chen, J.S., Tsou, H.T., & Ching, R.K.H. (2011). Co-production and its effects on service innovation. *Industrial Marketing Management*, 40(8), 1331-1346.
- Chesbrough, H. (2006). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.
- Coutelle-Brillet, P., Riviere, A., & Garets, V. D. (2014). Perceived value of service innovation: a conceptual framework. *The Journal of Business and Industrial Marketing*, 29(2), 164-172.
- Edvardsson, B., Tronvoll, B., & Gruber, T. (2011). Expanding understanding of service exchange and value co-creation: a social construction approach. *Journal of the Academy of Marketing Science*, 39(2), 327-339.
- Ervasti, M., Isomursu, M., & Mäkelä, S. M. (2014). Enriching Everyday Experience with a Digital Service: Case Study in Rural Retail Store. In *Proceedings of the 27th Bled Conference 2014*, AIS Electronic Library, 1-16.
- Frazer, M., & Stiehler, B. E. (2014). Omnichannel retailing: The merging of the online and offline environment. In *Proceedings of the Global Conference on Business and Finance in Honolulu, Hawaii, 2014*, 655-657.
- Gallino, S., & Moreno A. (2014). Integration of Online and Offline Channels in Retail: The Impact of Sharing Reliable Inventory Availability Information. *Management Science*, 60(6), 1434-1451.
- Grewal, D., Ailawadi, K. L., Gauri, D., Hall, K., Kopalle, P., & Robertson, J. R. (2011). Innovations in retail pricing and promotions. *Journal of Retailing*, 87(1), 43-52.
- Grönroos, C. (2006). Adopting a service logic for marketing. *Marketing Theory*, 6(3), 317-333.
- Grönroos, C., & Gummerus, J. (2014). The service revolution and its marketing implications: service logic vs service-dominant logic. *Managing Service Quality*, 24(3), 206-229.
- Grönroos, C., & Voima, P. (2013). Critical service logic: making sense of value creation and co-creation. *Journal of the Academy of Marketing Science*, 41(2), 133-150.
- Grover, V., & Kohli, R. (2012). Cocreating IT Value: New Capabilities and Metrics for Multifirm Environments. *MIS Quarterly*, 36(1), 225-232.
- Hasu, M., Toivonen, M., Tuominen, T., & Saari, E. (2015). Employees and Users as Resource Integrators in Service Innovation: A Learning Framework. In Agarwal, R., Selen, W., Roos, G. and Green, R. (Eds.), *The Handbook of Service Innovation*, (pp. 169-192). London: Springer-Verlag.
- Herhausen, D., Binder, J., Schoegel, M., & Herrmann, A. (2015). Integrating Bricks with Clicks: Retailer-Level and Channel-Level Outcomes of Online-Offline Channel Integration. *Journal of Retailing*, 91(2), 309-325.
- Leek, S., & Christodoulides, G. (2012). A framework of brand value in B2B markets:

- The contributing role of functional and emotional components. *Industrial Marketing Management*, 41(1), 106-114.
- Lempinen, H., & Rajala, R. (2014). Exploring multi-actor value creation in IT service processes. *Journal of Information Technology*, 29(2), 170-185.
- Lewicki, R., & Brinsfield, C. (2009). Trust, Distrust, and Building Social Capital, In Bartkus, V. and Davis, J. (Eds.), *Social Capital: Reaching Out, Reaching In*, (pp. 275-303). Cheltenham, UK: Edward Elgar Publishing.
- Lusch, R., & Nambisan, S. (2015). Service Innovation: A Service-Dominant Logic Perspective. *MIS Quarterly*, 39(1), 155-175.
- Maglio, P. P., & Spohrer, J. (2008). Fundamentals of service science. *Journal of the Academy of Marketing Science*, 36(1), 18-20.
- Nambisan, S. (2013). Information Technology and Product/Service Innovation: A Brief Assessment and Some Suggestions for Future Research. *Journal of the Association for Information Systems*, 14(4), 215-226.
- Rigby, D. (2011). The Future of Shopping. *Harvard Business Review*, 89(12), 64-75.
- Sanders, E. B. N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Co-design*, 4(1), 5-18.
- Schilling, M.A., & Phelps, C.C. (2007). Interfirm collaboration networks: The impact of large-scale network structure on firm innovation. *Management Science*, 53(7), 1113-1126.
- Shankar, V., Inman, J. J., Mantrala, M., Kelley, E., & Rizley, R. (2011). Innovations in shopper marketing: current insights and future research issues. *Journal of Retailing*, 87 (1), 29-S42.
- Tsou, H., & Chen, J. (2012). The influence of interfirm codevelopment competency on e-service innovation. *Information and Management*, 49(3-4), 177- 189.
- Tuunanen, T., Myers, M., & Cassab, H. (2010). A conceptual framework for consumer information systems development. *Pacific Asia Journal of the Association for Information Systems*, 2(1), 47-66.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of marketing*, 68(1), 1-17.
- Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: continuing the evolution. *Journal of the Academy of Marketing Science*, 36(1), 1-10.
- Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: an extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, 44(1), 5-23.
- Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer Experience Creation: Determinants, Dynamics and Management Strategies. *Journal of Retailing*, 85(1), 31-41.
- Woodruff, R.B., & Gardial, S. (1996). *Know your Customers: New Approaches to Understanding Customer Value and Satisfaction*. Oxford: Blackwell.
- Yin, R.K. (1984). *Case Study Research: Design and Methods (1st ed.)*. Beverly Hills, CA: Sage Publications.

Yin, R.K. (2003). *Case Study Research: Design and Methods (3rd ed.)*. Thousand Oaks, CA: Sage Publications.