Analysis and Design of IT Service System Based on Service-Dominant Logic

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Abstract. The performance of many organizations depends on their ability to utilize their IT service systems effectively. This implies the necessity to optimize the relationships between IT service provider(s), IT management and customers. In this paper, we propose a model of IT service system based on Service-Dominant Logic. This model is considered within an internal organizational context where an IT department offers IT services to other business units. We define three types of actors and the relationships between them including information exchange. We further recommend that customers should be actively co-producing IT service offerings and the IT service provider should participate in the design of business processes in the organization. A case study shows how the IT service system in Lapland University of Applied Sciences is analyzed and redesigned based on the proposed model.

Keywords: IT service system · Business process modelling · Service-Dominant logic

1 Introduction

Following the continuous growth of IT investments in the public sector and non-profit organizations, there is a need to better understand the relationship between IT and organizational performance. Previous studies have reported that there is a relationship between IT and interoperability, robustness, creativity and productivity of an organization [1] and that business processes can be used to recognize the path between IT resources, organizational capabilities and value creation [2]. This implies that the viability of an organization depends on its capability to utilize IT. Organizations may acquire IT resources as a service from internal IT departments or outsource them. It is also not uncommon that users are not satisfied completely with available IT service offerings because these are either not fully based on the users' exact requirements or can't be fully integrated into the existing business processes.

A need for specialized IT services has emerged from the rapid digitalization of business processes in organizations. Consequently, the IT service offerings need to be continuously adjusted to meet the evolving requirements of various business

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departments. Another challenge occurs when the development of business processes takes place in isolation from IT service providers and thus, the corresponding IT service may be developed during or even after the actual implementation of business processes. In this case, IT service offerings have to adapt and often they take the blame for not being fully compliant with business processes and thus not being as effective as expected by business users.

In addition to digitizing their business processes, organizations are looking for possibilities to optimize their human resources. Possible staff reductions contribute negatively to the diminishing communication between IT service providers and users. This problem is observed for example at Lapland University of Applied Sciences (henceforth LUAS), which is the case organization in this paper. However, the problem mentioned is not unique.

Our research objective in this paper is to enhance the organizational IT utilization capabilities by proposing a new model of collaboration between IT service providers, customers, and users by applying the Service-Dominant Logic (henceforth S-DL) [4]. The goal of the new model is to stress more service orientation of an IT service system (henceforth ITSS) and thus to avoid many challenges described earlier in the text. We focus on how the ITSS should be structured, who are the main actors in the system and their responsibilities, and how collaboration between these actors should be organized effectively.

The main contribution of this paper is that it proposes a new way to think about ITSS design and operation. Our approach is based on S-DL, the novel service paradigm proposed in [4]. The main characteristics of our model include: the involvement of IT service providers and users (both groups called actors) in the service design and delivery process thus achieving the value co-creation [4–6]; the redefined roles of actors in the service system and effective continuous interaction between them, and a view on the service system through a prism of operant and operand resources [5, 6] and their different configurations. By applying the proposed model, we are looking to achieve more effective collaboration between IT service providers and users when designing, implementing and maintaining the IT services, thus contributing to the overall organizational performance.

To evaluate the practicality of the proposed model we research the case organization LUAS with certain problems in its ITSS, analyze them and propose the solution. The previously functioning ITSS in LUAS was focusing on operative IT service and had different operational methods. The redesigned ITSS has a focus on effective information management. The empirical part of this study includes elements of action research, because both authors are employed by the case organization and one of them is closely involved in the ITSS design. Additionally, the analysis of organizational documentation and interviews with representatives of IT service providers and users helps to identify the present challenges and the potential of the proposed model. The developmental work based on the proposed model has already started in LUAS and the idea is positively evaluated by users, managers and IT service designers, as it is evidenced by the interviews with them [3].

This paper is organized as follows. In Sect. 2, we define the main concepts and take a look at related research. Section 3 presents the model for the ITSS design based on S-DL. In Sect. 4 we highlight the main points of the case study and show how the ITSS

in the case organization is analyzed. Finally, in Sect. 5 we make conclusions and point directions for further research.

2 Basic Concepts and Related Research

This paper is based on the convergence of two research areas: ITSS and S-DL. A large and growing body of research literature is dedicated to both of these fields. In this paper, we define an ITSS as a collection of structures, processes, resources, and actors which are interconnected and collaborate applying specialized skills and knowledge for the benefit of another. Our definition is in a line with a general definition of service in [4, 6].

S-DL is a new service paradigm firstly proposed in [4]. That theory is focusing on value co-creation through the interaction of service providers and service users, both of which groups are called actors. Furthermore, a service system is based on operand and operant resources. Operand resources require an act or operation to be performed on to produce an effect, whereas operant resources are employed to act on operand resources. S-DL included initially 8 [4] and later 10 [6] foundational premises which define the difference between goods and service focused thinking. S-DL is a very promising theory although originally proposed in the marketing field, could be applied in different research areas bringing a totally novel insight, and the IT service area is not an exception. IT service is a continuous process where service is designed, produced and delivered and it is often hard to differentiate between the phases. As a part of service delivery there is always feedback from users which serves as a part of design. Therefore, we propose to consider IT service design and delivery as interconnected and tightly linked parts of ITSS.

IT service management (henceforth ITSM) is a process based concept for managing IT services and is widely accepted as service centered [7, 8]. However, the definition of service varies in the most recognized ITSM process frameworks, and includes process deliverables, intangible products, or means to deliver value [9]. These definitions are not in line with the concept of service in S-DL and thus the present ITSM process frameworks are more related to Goods-Dominant Logic.

One way to utilize the S-DL paradigm for enhancing ITSM implementation was proposed in [10]. That research is concentrating on improving the effectiveness of Service Level Agreements by looking at interaction between actors as a value co-creation process. Another interesting approach to rethink about the whole ITSS from the S-DL perspective is [3]. That research suggests that an ITSS should co-create value involving actors and service offerings should be integrated in organizational business processes. Furthermore, inviting customers to co-produce service offerings may enhance customer experience and as a result improve the competitive advantage of a service provider as it is also suggested in [5]. Additionally, one of the benefits of service providers in the co-production and service provision interactions is in learning about their customers' business processes [11].

The need for collaboration between actors in the service system is further emphasized in [12]. That study suggests that IT resources should be seen as operant resources to enhance organizational capability to increase its performance, to develop related service systems and to innovate. Thus, in order to effectively develop business processes,

involved actors should be aware of the possibilities and constraints of accessible IT resources. Similarly, the actors responsible for the development of ITSS should be able to recognize how present offerings are integrated in business processes to further develop ITSS in accordance with the needs of the customers.

It seems plausible that S-DL mindset can be used to develop the viability of service systems successfully. Yet, according to [13] there are lags in putting S-DL in practice. A possible explanation for this lag is that the literature reviewed so far, provides little concrete guidance on the actual co-production of IT service offerings. For example, there are studies on how IT service offerings should be communicated in accordance with S-DL [10] and on the role of signs and practices in IT service innovations [14] but the actual co-production phase of IT service offerings has been mostly neglected. Nevertheless, it is possible to utilize other methods in this co-production. Studies on the overlapping of S-DL and Design Thinking [15] and the use of S-DL perspective in Service Design, where the object of the design is a service process [16], imply interdisciplinary benefits. Moreover, according to [17], S-DL thinking may facilitate the bridging of Service Design and Participatory Design (henceforth PD). In PD, users are involved in the design of IT systems [18, 19], which S-DL recognizes as mechanisms for indirect service provisioning [6].

This paper is utilizing many of the research ideas mentioned above and is proposing an approach to the overall design of ITSS based on S-DL. Finally, this research is continuing the work [3], where Lindholm has analyzed the ITSS in LUAS and proposed the application of S-DL to redesign ITSS.

3 IT Service System Based on Service-Dominant Logic

In our model of ITSS based on S-DL we define the actors including Customers together with their service users, IT Management and IT Service Provider. The IT Management is a function in Customers' organization and its purpose is to serve Customers and their users by developing efficient IT resource configurations which support business processes. Furthermore, in our model IT Management is in charge of IT service sourcing. With this goal, IT Management and Customers collaborate to develop IT offerings including service, resource configurations and their utilization in business processes. IT Management collaborates with external or internal IT Service Providers whose purpose is provisioning IT service to users. Based on its multifaceted role, IT Management is the focal actor in ITSS. In this context, direct IT service refers to service provisioning between two actors. Indirect IT service is provisioned through a mediator i.e., goods or other actors. For example, IT resource configurations provisioned by IT Service Provider(s) are the indirect distribution mechanism of IT service to Customers.

Figure 1 presents the proposed model of ITSS based on S-DL including the main actors IT Service Provider, IT Management, and Customers, and the main interconnections i.e., flows of information and service provision between these actors. In S-DL, service is always exchanged between two actors [6], therefore, it is important to recognize that the depicted interconnections consist of numerous individual strings. In addition, there are several stakeholders in IT offerings and the mechanism

to coordinate the design and the provision of IT service must be well-established and function properly.

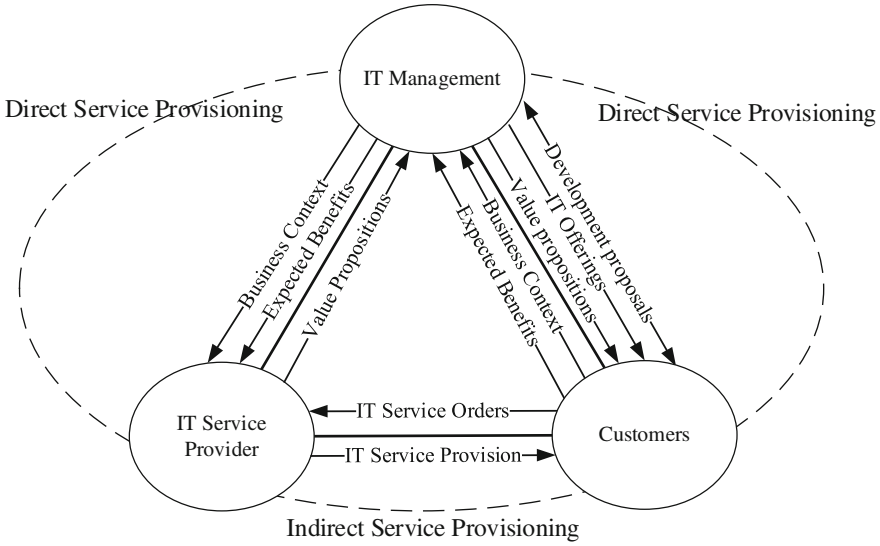

Fig. 1. ITSS based on Service-Dominant logic

The output of ITSS is IT service which can be provisioned either directly or indirectly. The interconnection between IT Management and Customers in Fig. 1 is the main provisioning channel of direct IT service. This channel includes for example, IT actors' inputs in the development of Customers' business operations and information about the present state of IT resource utilization. In their turn, users on the Customers' side provide information about their business contexts and expected IT benefits and thus, this interconnection is the main source for user requirements and business context of the ITSS. This interconnection is also used to communicate the holistic IT offering to customers.

Furthermore, IT Management is interconnected to IT Service Provider who is responsible for indirect IT service provisioning. Indirect IT service comprises numerous IT resource configurations and matching operative IT service including various information system and workstation configurations which are accompanied by matching break/fix service. Through this interconnection IT Management communicates the indirect IT service requirements to various service providers and analyses their corresponding value propositions to construct the holistic IT offering for customers. Additionally, this interconnection enables the access to IT resources from various sources. According to S-DL [6], resources can be accessed from private, market and public sources.

Another interconnection in Fig. 1 connects Customers with IT Service Provider. The efficiency of this interconnection is essential to the wellbeing of Customers' business because their users order and receive indirect IT service through this channel. Therefore, IT Management should monitor this interconnection to identify deviations in agreed

service levels, to recognize emerging problems and their reasons, and to identify development opportunities.

The vitality of ITSS is determined by its capability to perceive how to support customers' business effectively through numerous IT resource configurations from various sources. This capability materializes through for example, enhanced digitalization of business processes and IT utilization related innovations. Engagement in these collaborative activities co-creates value for all involved actors. Additionally, firms should understand how to design and reconfigure markets [6]. In this context, it means to design and reconfigure IT utilization in Customers' business processes. This can be problematic as in complex environments, there may be several decision making points which complicate interactions and may expose the initial information to additional interpretations. Following the view of SD-L where reciprocal value creation is one of the central tenets [6, 8], we reflect competition through service strategy [5] and matching foundational premises (henceforth FP) [6] of SD-L to the design of our model of ITSS and propose the following FPs, which facilitate the development of collaboration between actors in ITSS.

FP1. Effective Communication Between Actors. In S-DL, value is always proposed by service providers and created and determined contextually by service beneficiaries [4, 6, 11]. The designers of IT service communicate with service users to learn about expected benefits of IT service and the context where resources are integrated and thus, the value of IT service is determined. In addition, users benefit from the information about potential IT resources which can be integrated and turned into value creating resources. Mutual learning is also one of the core principles of PD [18]. Therefore, it is important that the information remains intact when it flows between the users and designers. Similarly, to facilitate the communication between the relevant actors the dialogue between these actors should be precise, timely and effortless.

FP2. Shared Information About Business Processes and IT Resource Configurations. The usability of offered IT configurations should be monitored as according to S-DL, value can only be created through the use of resources [9]. It is common that an individual IT resource may become integrated into numerous resource configurations. So, a shared IT resource may be utilized in several business processes. The variety of configurations may lead to different challenges in IT resource integrations, which are seen as use situations in PD [19]. Actors who develop IT service collect and analyze information about these challenges to identify their reasons and to develop the suitability of the present and future IT offerings. Moreover, these actors collect and analyze information about business processes to understand the role of a specific configuration in customers' value co-creation activities. Corporate business processes, incident and problem management practices enable relevant actors to retrieve this information from a single source and thus, reduce the need for individual information retrieval practices. In addition, corporate processes may further enhance the effectiveness of user-developer communication.

FP3. IT Actors Participate in the Development of Business Processes. IT resource utilization may enhance the performance of an organization as IT can be used to overcome the constraints of actors and organizations [1, 2]. However, S-DL argues that

appropriate skills and knowledge are required to identify and to transform potential resources into value creating resources [6]. This means that operant IT resources are required to recognize how the value can be drawn from potential IT resources. In organizations, the business context determines how operant resources are divided [5, 6] and it is typical that IT actors' knowledge and skills are specialized. Involving IT actors in the development of business processes may increase the development team's shared IT knowledge space and thus, facilitate the identification of new IT resource integration opportunities and configurations. Moreover, as IT actors learn about the practices of business processes their ability to create successful value propositions is improved.

FP4. Business Actors Co-produce IT Service Offerings. Most of the major decisions which determine how users can apply and integrate IT resources are made during the development of IT service offerings and value propositions. However, in general IT actors are not aware of how users plan to integrate IT resources in their relevant business processes. Therefore, IT actors need to acquire this information from users. Collecting this information may require significant efforts, especially in organizations with numerous stakeholders. S-DL posits that "firms gain competitive advantage by engaging customers and value network partners in co-creation and co-production activities" [5]. Users should be involved in the initial phases of the production of IT service offerings because they can provide IT management with essential insights into their relevant activities, business context and expected benefits. Additionally, when users and designers interact during the co-production of IT offerings, users can ensure that decisions are made in accordance with their needs.

FP5. The Number of IT Decision Making Points is Minimized. Customers and their users have a major role in making IT decisions and thus reflecting the power sharing in PD [19]. Engagement in the IT decision making requires additional resourcing from Customers and distinct IT decision making points may reduce the alignment between the business processes and IT service. We suggest that the number of IT decision making points should be minimized. Organizations have established decision making structures, which can be utilized in making IT decisions if they are working effectively. Interconnections should be created between the appropriate decision making points of Customers and ITSS.

Taken together, the proposed FPs indicate that ITSS should be understood as a co-creation and co-production system, which facilitates actor-to-actor collaboration and thus, enables reciprocal value creation. This approach means that the customers of ITSS are active actors and IT management focuses on facilitating and motivating them to participate in the activities of ITSS.

4 Case Study

In this section, we analyze the ITSS in LUAS applying the model proposed in this paper. This case study is partly based on research done by Lindholm [3] where empirical data has been collected and analyzed. IT service designers, IT managers and representatives of business units in LUAS have been interviewed. Here, our discussion is based on the

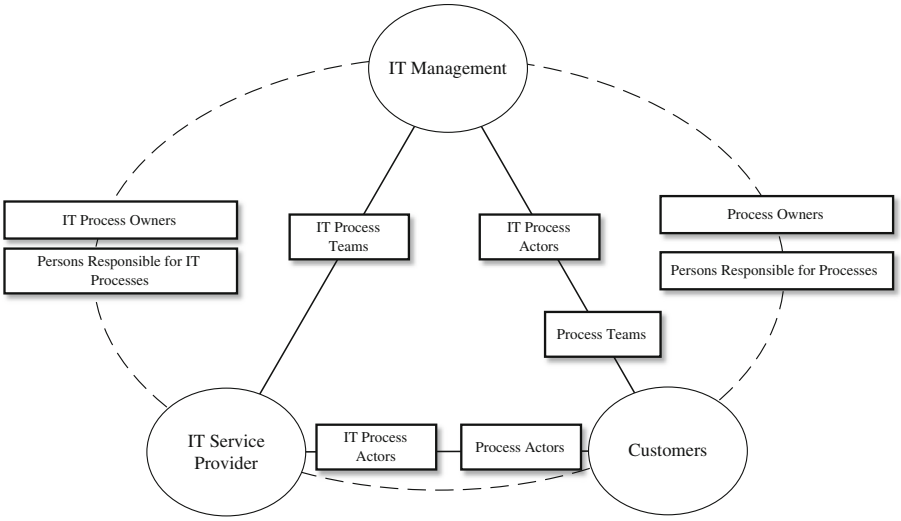

Fig. 2. The ITSS in LUAS

analysis of these interviews which have revealed the decision making structure, the content of information flows, and actors involved.

The main goal of this case study is to check the applicability of the proposed model and its prospective effects on the performance of the ITSS in LUAS. The redesigned ITSS should facilitate the coordination of collaboration between IT Management, Customers (different business units) and IT Service Provider in LUAS, and to enhance the alignment between IT offerings and business needs. Figure 2 depicts the ITSS in LUAS based on the proposed model.

The boundaries and structure of the ITSS are recognized and the main actors within the system are identified based on empirical data [3]. Furthermore, interviews [3] have helped to determine the information these actors possess, with whom they collaborate, and opportunities they have for redesigning and reconfiguring the IT offerings and the business processes in LUAS. For example, the Director of Administration and the Head of Information Management explained the then structure of ITSS in relation to the LUAS management system and how they recognize and address IT service issues in collaboration with other stakeholders. The Customer Manager, in turn, described communication problems with Customers and their users.

Figure 3 presents a collaboration framework visualizing how the ITSS in LUAS should be organized based on S-DL.

Monitoring development initiatives and projects of Customers and IT Service Provider enables the ITSS to react and to participate in the development of business processes. The Head of Information Management function pointed out that several IT related development projects have bypassed the ITSS and thus, complicated the IT budgeting and resourcing. Thereby, it is essential that the ITSS includes well established interconnections with decision making and action points relevant to the development initiatives and projects.

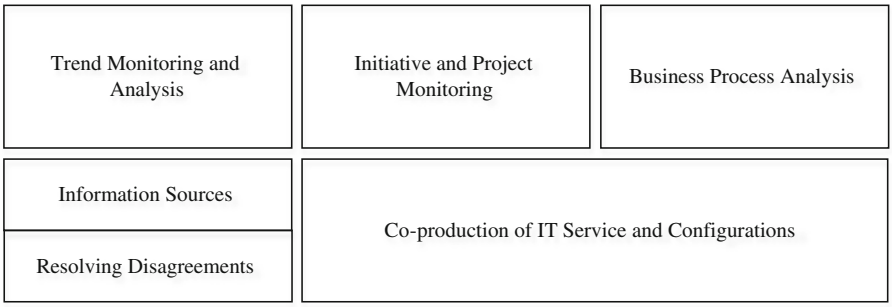

Fig. 3. The collaboration framework in LUAS

The systematic analysis of Customers' business processes provides ITSS with required knowledge of IT resources necessary to support the development and implementation of business processes and how these resources are integrated. During the business process analysis operant resources of the relevant business and IT actors are integrated to identify how IT offerings are currently utilized and what the expected IT benefits are. The important question is how the appropriate actors can be recognized. We propose the configuration based selection meaning that IT actors in charge of a particular IT resource configuration should be responsible for the analysis of business processes where this IT configuration is utilized.

The main element of the collaboration framework shown in Fig. 3 is Co-production of IT service and configurations. This element addresses FP4 and is supported by two other elements: recognized information sources and a procedure to resolve the emerging disagreements at decision making points. Both the Quality Manager and the Customer Manager noted that it is challenging to motivate users to participate in the co-production of IT offerings, even though it is clear that they experience difficulties when they utilize accessible IT service and resources. So, the Customer Manager, who is an IT actor in our model, pointed out that it is common that users try to solve their IT related challenges without consulting the actors of IT Management or IT Service Provider. She also suggested that the reasons for this include their previous experiences of inefficient decision making, lack of established corporate processes and users' inability to identify appropriate communication channels.

The implementation of the three last elements depicted in Fig. 3 allows the ITSS to overcome the identified challenges in the integration of operant IT and business resources. Moreover, these elements may increase the capability of the ITSS to develop user oriented IT service. According to FP5 the utilization of existing properly functioning decision making structures may reduce the need for IT specific decision making and thus, further enhance the match between business processes and IT service. In addition, actors who participate in the co-production of IT service learn about the contexts of other actors and thus, increase their shared knowledge space.

The implementation of the initiative and project monitoring element in the collaboration framework is currently in progress in LUAS. Collaborative relationships have been established between the ITSS and workgroups who are in charge of the develop-

ment of the main education and other processes in LUAS. In addition, the ITSS is now properly interconnected with the management of business initiatives and projects and thus, has a clear view of the holistic development of LUAS' operations. Moreover, the implementation of these elements has increased the ITSS' capability to design and reconfigure IT utilization in Customers' business processes.

There have been challenges in the implementation of business process analysis and co-production of IT service and configuration elements of the framework. The reasons for these have mostly been technological i.e., there have not been appropriate information systems to store collected information and organizational i.e., appropriate IT actors have not been recognized. However, technological challenges have now been solved in collaboration with business actors, and thus, the LUAS steering committee has decided to further support the implementation. In this paper, we have proposed a configuration based view to recognize appropriate IT actors for business process analysis.

The ongoing implementation of the S-DL based design of the ITSS in LUAS has already increased the collaboration between relevant actors. In addition, mechanisms to convey information from the actors of IT management to Customers have reduced the need for separate IT decision making points. The currently realized outcomes of the implementation are in the line with the proposed FPs and facilitate collaboration between relevant actors. However, we propose that co-production of IT service offerings should be more integrated into the development of business processes. This can be done by appointing appropriate IT process team actors in Customers' Process Teams depicted in Fig. 2. This may further reduce the challenges of user participation as the development of IT utilization takes place in customers' business context. Moreover, appointing IT actors to these teams may increase the ITSS' capability to develop the IT utilization in business processes proactively.

5 Conclusions

This paper presented a new way to think about the analysis and design of ITSS based on S-DL. The model emphasizes collaboration between IT Management and Customers to develop IT service offerings. Furthermore, the model includes 5 FPs which facilitate this collaboration. These FPs emphasize the need for efficient and effective communication, the use of shared information and collaboration between providers and customers of IT service. Finally, the case study tested the applicability of the proposed model.

We suggest that the main purpose of an ITSS is to facilitate the user participation in the co-production of IT offerings. Moreover, it was shown that the value of IT service can only be created through the use of provisioned IT service. This means that value of IT service is always realized and determined by users in their own contexts.

These research findings enhance our understanding about the development role of users in the IT utilization in business processes. Users should be seen as active actors and thus, their participation is essential in the development of the IT service offerings. Therefore, actors in charge of the analysis and development of ITSS should focus on the development of processes which facilitate collaboration between stakeholders of IT service. We also suggest that involving users in the co-production of IT service offerings may optimize these offerings in the long-run.

The actual IT service co-production process and how the business requirements can be translated efficiently into specific resource configurations are considered a subject of further research. Additionally, further case studies on the application of the proposed model in other organizations would be an interesting research direction.

References

1. Kim, H., Lee, J.-N., Han, J.: The role of IT in business ecosystems. Commun. ACM **53**, 151–156 (2010)
2. Pang, M.-S., Lee, G., DeLone, W.H.: IT resources, organizational capabilities, and value creation in public-sector organizations: a public-value management perspective. J. Inf. Technol. **29**, 187–205 (2014)
3. Lindholm, T.: IT service management based on service-dominant logic: case Lapland University of Applied Sciences. Master's thesis, Lapland University of Applied Sciences, Tornio (2015)
4. Vargo, S.L., Lusch, R.F.: Evolving to a new dominant logic for marketing. J. Mark. **68**, 1–17 (2004)
5. Lusch, R.F., Vargo, S.L., O'Brien, M.: Competing through service: insights from service-dominant logic. J. Retail. **83**, 5–18 (2007)
6. Lusch, R.F., Vargo, S.L.: Service-Dominant Logic. Premises, Perspectives, Possibilities. Cambridge University Press, Cambridge (2014)
7. Van Bon, J. (ed.): Foundations of IT Service Management Based on ITIL V3. Van Haren, Zaltbommel (2010)
8. Iden, J., Eikebrokk, T.R.: Implementing IT service management: a systematic literature review. Int. J. Inform. Manag. **33**, 512–523 (2013)
9. Mora, M., Raisinghani, M., O'Connor, V., Gomez, J.M., Gelman, O.: An extensive review of IT service design in seven international ITSM processes frameworks: part I. Int. J. Inf. Technol. Syst. Approach **7**, 83–107 (2014)
10. Brocke, H., Hau, T., Vogedes, A., Schindlholzer, B., Uebernickel, F., Brenner, W.: Design rules for user-oriented IT service descriptions. In: 42nd Hawaii International Conference on System Sciences, pp. 1–10. IEEE Computer Society, Washington (2009)
11. Grönroos, C., Ravald, A.: Service as business logic: implications for value creation and marketing. J. Serv. Manag. **22**, 5–22 (2011)
12. Akaka, M.A., Vargo, S.L.: Technology as an operant resource in service (eco)systems. Inf. Syst. E-Bus. Manag. **12**, 367–384 (2013)
13. Gummesson, E., Lusch, R.F., Vargo, S.L.: Transitioning from service management to service-dominant logic: observations and recommendations. Int. J. Qual. Serv. Sci. **2**, 8–22 (2010)
14. Löbler, H., Lusch, R.F.: Signs and practices as resources in IT-related service innovation. Serv. Sci. **6**, 190–205 (2014)
15. Edman, K.W.: Exploring overlaps and differences in service dominant logic and design thinking. In: 1st Nordic Conference on Service Design and Service Innovation, Oslo, Norway (2009)
16. Takeyama, M., Kahoru, T., Yoshitaka, S.: Resource oriented service ideation: integrating SD logic with service design techniques. In: Proceedings of the 4th Service Design and Service Innovation Conference, pp. 344–353. Linköping University Electronic Press, Lancaster, United Kingdom (2014)

17. Holmlid, S.: Participative, co-operative, emancipatory: from participatory design to service design. In: 1st Nordic Conference on Service Design and Service Innovation, Oslo, Norway (2009)
18. Halskov, K., Hansen, B.N.: The diversity of participatory design research practice at PDC 2002–2012. Int. J. Hum. Comput. St. **74**, 81–92 (2015)
19. Frauenberger, C., Good, J., Fitzpatrick, G., Iversen, O.S.: In pursuit of rigour and accountability in participatory design. Int. J. Hum. Comput. St. **74**, 93–106 (2015)