Engaged in digital service innovation

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Acknowledgement

The summer of 1999 was truly an eventful summer! Two important events happened; I got married to my wife Britt Johansson and I started my new employment at Kristianstad University. I had no idea about research, Informatics and Information Systems when I started to work at Kristianstad University as a lecturer in IT and learning in the teachers’ education. I was just a teacher in mathematics, programming, web-programming, and multimedia. But things changed rather dramatically. The one that guided me during those first intense years at Kristianstad University was Björn Cronquist. I will not forget what you did and I will not forget my first encounters with the researchers and PhD-students in the KIO-network. I was assigned to Linnaeus University as a licentiate student during 2006-2008 and graduated in May 2008. The opponent at the final licentiate seminar was Ulrika Lundh Snis. This was the start of long collaboration: writing papers, presenting at conferences, finding Primark in Hull, seminars, and workshops. So it was rather natural that Ulrika became my supervisor when I got the position as PhD-student at University West. This PhD-thesis had not been possible without you! My other supervisor, Dick Stenmark, your input, and comments have been truly important.

In 2008 I started to work as a lecturer at Halmstad University which gave me the possibility to be involved in innovation projects such as Free2Ride and FIND. I am truly grateful for that opportunity! To all my colleagues at Halmstad University involved in teaching and research, Thanks. You are the ones that have to put up with me! In late 2015 I got the possibility to be employed by University West as a PhD-student, which I am really glad for, Thanks! Also thanks to Digital that funded my research and also provided an exciting collaborative multi-disciplinary research arena. Researchers, lectures, staff-members and PhD-students at EIT/HV the creative and helpful atmosphere that you spread at work, in collaboration and problem solving is remarkable. A big thank you for letting me be a part of your organization.

I would like to mention one guy in particular, my dear old friend Lars Svensson. It is almost 35 years ago since we started our education as Mathematics and Chemistry teachers. Lars S was even involved when I met my wife Britt in the winter of 1986/87. It is a friendship that has lasted for 35 years that has grown stronger and stronger over the years. Thanks for being there!

Last but not least! My family! They are the people that are the most important people in my life. My wife Britt, it is almost 30 years since we got engaged (8/8-88) and our wonderful children Filip and Frida. I love you so much!
Abstract

Title: Engaged in digital service innovation

Keywords: Digital service innovation; Human-Centred Service Systems; value; practice perspective; learning in practice; engaged scholarship research


The research in this thesis has digital services innovation to support Human-Centred Service Systems (HCSSs) from a practice theory perspective as a foundation. Digital service innovation is understood as service system reconfiguration due to digitalization, with the aim to change the service systems in a way that increases the value for the involved actors. There are several challenges in digital service innovation; one of the challenges is to address value for a Human-Centered Service System (HCSS), especially since value is the outcome that is determined by the beneficiary. Another challenge is the complexity of sharing and translation of knowledge among heterogeneous actors. The interaction among the involved actors is crucial to understand because it is through human interaction that knowledge is shared and generated. The research has been guided by two research questions: (1) What constitutes value in HCSSs? And (2) How can perceptions of value be aligned in digital service innovation? The presented research expands our understanding of digital service innovation in HCSSs supporting everyday life from a practice perspective. The overall research approach has been engaged scholarship, where the attached insider perspective has been the main focus. The empirical data is collected in two innovation projects (FIND and Free2Ride), the data comes from activities within the projects such as workshops and interviews. One finding in the thesis is the interplay between different levels of value during digital service innovation. Another finding is that beneficiaries and developers take initiatives to share and translate knowledge. The main contribution of the research is a set of digital service innovation principles. Temporal brokering that leads to leaps in the process of reaching a common understanding and the importance of a learning dimension regarding the roles taken by service beneficiaries are also contributions in this thesis. The research also contributes an exemplification of how learning theories have been applied in order to understand digital service innovation. There are also practical contributions directed to those involved in digital service innovation on a tactical or strategic level. Future research could approach digital service innovation of HCSSs in other service systems and with other perspectives from the practice theory research.
Appended Publications

**Paper A.** Lars-Olof Johansson and Ulrika Lundh Snis, The Dynamics of Interaction: Exploring a Living Lab innovation process from a community of practice perspective. Presented at the Pacific Asia Conference on Information Systems (PACIS 2011) in Brisbane, Australia July 2011. The article is also accepted for publication in the proceedings of the conference (http://aisel.aisnet.org/pacis2011/85/). The main contributor to the text was the first author, who was also responsible for data collection. The literature study, formulating the research question together with the analysis, was a collaborative effort. The conceptual model was to a large extent developed by the first author.

**Paper B.** Lars-Olof Johansson and Ulrika Lundh Snis, Co-Creation in a Boundary Practice: Lessons Learned from an Engaged Scholarship Approach. Presented at the Americas Conference on Information Systems (AMCIS 2013) in Chicago, USA August 2013. The article is also accepted for publication in the proceedings of the conference (http://aisel.aisnet.org/amcis2013/EndUserIS/GeneralPresentations/10/). The main contributor to the text was the first author, who was also responsible for data collection. The literature study on boundary practices, formulating the research question together with the analysis, was a collaborative effort. The related research and the lessons learned were to a large extent done by the first author.

**Paper C.** Lars-Olof Johansson, Ulrika Lundh Snis and Lars Svensson, A boundary practice perspective on co-creation of ICT-innovations. Presented at the Scandinavian Conference on Information Systems (SCIS 2016) in Ljungskile, Sweden, August 2016. The article is also published in the proceedings of the conference, (https://link.springer.com/chapter/10.1007/978-3-319-43597-8_8) The main contributor to the text was the first author, who was also responsible for data collection. The framing of the research, formulating research question together with the analysis, was a collaborative effort. The related research and the derived characteristics were to a large extent driven by the first author.
Paper D. Lars-Olof Johansson, Quality of everyday life supported by digital services – a landscape of practice perspective. Accepted for publication in the proceedings of Researching Work & Learning (RWL 2017). It will be presented at RWL in Grahamstown, South Africa in December 2017. The article is also recommended for a Special RWL10 edition in the journal *Studies in Continuing Education* during 2018.

Other selected publications


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1 Introduction

Digitalization refers to the transformation of existing socio-technical structures and processes that were previously mediated by non-digital artifacts into ones that are mediated by digital artifacts (Yoo et al. 2010) and digital techniques (Tilson et al. 2010). Digitalization not only transforms organizational contexts, it is much broader and influences our everyday life. Just take a look at a group of people and notice how much they use their smartphones. In our daily life, we interact with digital artifacts or artifacts that have embedded computing capabilities (Yoo 2010). According to Yoo (2010), research should focus on a deeper understanding of the user’s experience in everyday life. User needs are, therefore, much broader, reflecting our deeper basic human needs and values.

1.1 Digitalization in everyday life

The research in this thesis has digital service innovation to support everyday life as a foundation. There are several interpretations of digital service innovation. Kleinschmidt et al. (2016) define service innovation as service system reconfigurations, with the aim to change the service systems in a way that increases the value for the involved actors. Accordingly, digital service innovation then refers to changes due to digitalization. A similar description is offered by Åkesson (2017), where a digital service innovation is defined as “new digital services or new re-combinations in service systems, resulting in new practices that are valuable enough for the involved actors to make it sustainable”.

A Human-Centred Service System (HCSS) is described as configurations of people, information, organizations, and technologies that operate together for mutual benefit (Kleinschmidt, Peters et al. 2016). In HCSSs the focus is on human interaction and personal service. HCSSs are a type of service system that is essential in our everyday life. Examples of HCSSs are family households and non-profit social organizations that exhibit complex behaviours due to the relationships among people involved (Peters et al. 2016). In this thesis the focus is on HCSSs that supports individuals that are active in specific communities, which are characterized by strong relations between the individuals (such as family or close friends); the individuals are engaged in specific practices for the community, and these practices could lead to incidents that affect the individuals of the community.
Central to the understanding of service systems is service-dominant logic (SDL) (Vargo and Lusch 2016). Information systems (IS) researchers are in the process of adopting SDL regarding service systems and digitalization. Two fundamental premises in the service-dominant logic are: *value co-creation among involved actors, always including service beneficiary* and *value is always uniquely and phenomenologically determined by the beneficiary* (Vargo and Lusch 2016). Instead of addressing digital artifacts, researchers use the concept of digital services in order to highlight the process of co-creating a context-specific value (Kleinschmidt, Peters et al. 2016). Before we get into details with the thesis I would like to present a vignette, a fictional story that relates to one example of a HCSS.

**Vignette – At the airport**

Leif and his wife Monica greatly enjoy their life as retirees. Leif is a couple of years older than his wife, who just celebrated her birthday; she is now 72 years young. They are an active couple and have a motto: *Don’t fill your life with years, fill your years with life*. Three years ago Monica was diagnosed with dementia; luckily the dementia was in the early stages. So the couple wants to enjoy their life before Monica gets too ill, both of them are fully aware of how dementia progresses over time. Leif is also a member of a support group for next of kin to those suffering from dementia. On a regular basis, they go in for healthcare follow-ups on the progression of dementia. Sometimes Monica’s memory isn’t what it used to be and on other occasions, her mood can change rather rapidly. They want to be active, so Monica and Leif have decided to go on a weekend trip to Vienna in Austria. They will fly directly from the nearby airport, which is rather small, to Vienna. Both of them enjoy opera, which is why they decided on Vienna. They booked the weekend trip on the Internet, and they have also “googled” for operas in Vienna during their visit. They both have smartphones, the grandchildren wanted to “chat” and send photos, and in a sense, they felt obligated to each get one. But now they appreciate their smartphones.

On the day of their flight to Vienna, they drove rather early to the airport. Parked their car and walked to the check-in counter. They had to wait for half an hour before it opened. They went to the security zone, and in the waiting line, Leif realized that Monica was not acting normal. This is only stress, he thought. Who isn’t stressed in that environment? After the security zone, they walked towards the gate and nearby they found a seat for the two of them. They sat down to wait for boarding information. After some time Leif felt that he needed to visit the restroom, and he said to Monica, “Wait here, I just need to go to the restroom”. At the same time, there was an announcement on the loudspeakers: “The flight to Vienna is now boarding”. But Leif had to use the restroom before boarding, now it was rather urgent; he asked again and Monica said, “Okay, I will wait here”. Leif went to the restroom. After he was done he walked towards the seats where Monica should be waiting, but she wasn’t there. Leif started to look for her; near the gate, in the seating area, the women’s restroom, in the restaurant but he couldn’t find her. So he tried to call her on the smartphone, no answer. He knew that Monica will always carry her handbag.

Leif remembered he had installed that new app, “I-Loc8-U”. He started the app, and the app located Monica outside the security zone, on her way in the wrong direction. Leif went to the security zone, talked to one of the staff members and after some persuasion, the staff member left to find Monica. In the search for Monica, the staff member borrowed Leif’s smartphone. The staff member found her and brought Monica back. Leif said to Monica, now we are in a hurry, we have just a couple of minutes before they will close the gate. They walked rather quickly to the gate and they boarded the plane at the last minute. They had a great time in Vienna.
HCSSs that support the individuals’ everyday life and their practices have similarities with individual information systems (IIS). An IIS is an activity system in which individuals perform processes and activities using information and technology (such as digital services) based on idiosyncratic needs and preferences (Baskerville 2011b). The IIS serves individuals and has to account for social as well as functional idiosyncrasy (Baskerville 2011a). An IIS is oriented to the information needs of an individual and perhaps extends to the individual’s home and family. In the vignette, Leif and Monika have been married for many years, the practice is taking care of a demented person, in that practice incidents happen (Monica and Leif got separated). In this thesis, HCSSs will be used, close friends in the community are a part of the HCSS and IIS. The application, “I-loc8-U”, in the vignette is also part of the HCSS. The overriding aim of this thesis is to expand our understanding of digital service innovation in Human-Centred Service Systems from a practice perspective.

1.2 Research questions and contributions

One of the challenges in digital service innovation for HCSSs is to address value, especially since value is the outcome that is determined by the beneficiary (Vargo and Lusch 2016). In order to understand as many aspects of value as possible in a HCSS, a heterogeneous group of actors is involved in digital service innovation. Innovation is a collaborative process occurring in an actor-to-actor network, always including the service beneficiary (Lusch and Nambisan 2015). There are at least two perspectives of value at play in HCSSs: the anthropological perspective (Graeber 2001) and the consumer perspective (Salem Khalifa 2004). The consumer perspective does not cover every aspect of value in HCSSs that supports individuals that are active in specific communities and characterized by strong relations between the individuals. In the anthropological perspective, the conception of value is rooted in culture and influences our decisions. In the consumer perspective, value is grounded in a relationship between supplier and consumer. It has been argued that value is an ambiguous concept that is both overused and misused (Salem Khalifa 2004). This can perhaps partly be explained by the fact that there appear to be no systematic theory of value available (Graeber 2001).

To understand value in HCSSs the researcher need a combination of perspectives, such as the anthropological perspective together with the consumer perspective. After all, value is in the minds of people, created during cooperation in a specific context (Peters, Maglio et al. 2016). Therefore, the first research question addressed in the thesis is: What constitutes value in HCSSs? In order to change or innovate a HCSS, a challenge is to understand value for the involved actors.
The main arguments for involving different actors have been identifying stakeholder needs, shortening the time to market and of course cutting costs (Eriksson et al. 2005). But the involvement of actors also challenges the process, as we need to find ways to connect, translate, and exchange knowledge between the stakeholders so that innovation will have a higher chance to occur (Lindgren et al. 2008), especially knowledge related to value in digital service innovation. The complexity of knowledge sharing between heterogeneous actors in the design of innovative digital services is also addressed in the literature (Yoo et al. 2009, Yoo et al. 2012). According to Doolin and McLeod (2012), a key challenge is “representing, negotiating and integrating the diverse knowledge, viewpoints and interests of these stakeholders, in order to create a shared understanding of the development work and outcome” (p. 570). In digital service innovation, the outcome is value, as it is determined by the beneficiaries. The interaction among the involved actors is crucial to understand because it is through human interaction that knowledge is shared and generated (Lusch and Nambisan 2015). Lusch and Nambisan (2015) propose that future studies examine the role of beneficiaries regarding their experience of value in the interaction during value co-creation. Therefore, my second research question is: How can perceptions of value be aligned in digital service innovation? It is during the interaction between suppliers and beneficiaries that it is possible to align perceptions of value.

Research on digitally enabled service innovation (in other words, digital service innovation) lacks insights from a practice perspective, see for instance Barrett et al. (2015). Moreover, Ciriello et al. (2017) propose that the level of practice is the appropriate level of analysis to capture the complexity of innovation (digitally enabled). Barrett, Davidson et al. (2015) propose an active engagement by the researcher in order to understand the dynamics of interaction during activities. In the practice perspective, activities and doings are in the foreground (Nicolini 2012). It is in activities during human interaction that the perceptions are aligned (Lusch and Nambisan 2015), but researchers know very little about how perceptions of value are aligned. After all, actors learn from each other in the interaction and in turn this has the possibility to stimulate innovation. But given that the extant literature pays little attention to learning, knowledge sharing, and knowledge translation between heterogeneous actors involved in value co-creation of digital service innovations, it is worthwhile to further explore the interaction from the learning in practice perspective. The alignment of practices (such as perceptions and beliefs) has been addressed within the literature on communities and landscapes of practices (Wenger 1999, Wenger-Trayner and Wenger-Trayner 2015). A community of practice is a group of people that has an identity defined by an interest; members engage in joint activities and develop a shared repertoire of resources.
The contribution of this thesis is *digital service innovation principles* for HCSSs that supports everyday life that are characterized by strong relations between the individuals (such as family or close friends); the individuals are engaged in specific practices for the community, and these practices could lead to incidents that affect individuals in the community. The *digital service innovation principles* will draw from process-oriented design principles in design research (Hevner et al. 2004). The *digital service innovation principles* are from a practice perspective, and are not intended to cover every service system.

In this thesis, which is set up as a collection of papers, the researcher had an engaged scholarship approach (Van de Ven 2007). In line with Barrett, Davidson et al. (2015) suggestion, this thesis has a foundation in engagement by the researcher. Active engagement and involvement are not new in the IS field, see for instance the engaged scholarship approach (Van de Ven 2007) or the action design research approach (Sein et al. 2011). Engagement in the research is as a process that involves “negotiation and collaboration between researchers and practitioners in a learning community; such a community jointly produces knowledge that can both advance the scientific enterprise and enlighten a community of practitioners” (Van de Ven, 2007: 7). This is the second argument to apply learning in practice theories to complement the existing literature on digital service innovation.

The thesis proceeds as follows: the second chapter is dedicated to digital service innovation and value co-creation; this is the problematic area that the research aims to address. In section three the practice perspective is presented. Learning in practice is regarded as the theoretical framework in this thesis. In the fourth section, the research approach is presented, where the foundation is the engaged scholarship approach (Van de Ven 2007). In this section, the two projects, FIND and Free2Ride, where the empirical data is gathered are presented. In the two projects, the researchers collected data during field visits, meetings, online activities, workshops, and interviews. In these two projects, the involved stakeholders were developers, users, consumers, and researchers. In the fifth section, there is a summary of the appended articles. At the end of the thesis, there will be a section on research contribution and concluding remarks. In these two sections implications for future research will be discussed.
2 Exploring digital service innovation

During the last ten years or so, many researchers within Information systems have shifted their focus to digitalization and digital services. Digital services have an enormous economic importance (Kleinschmidt, Peters et al. 2016). According to Ståhlbröst (2012), the economic future is expected to be in services, and in many cases those services are digitally enabled. There are several descriptions of a digital service. According to Williams et al. (2008), a digital service is “services, which are obtained and/or arranged through a digital transaction (information, software modules, or consumer goods) over Internet Protocol (IP)” (p. 506). Another description of digital services is “services enabled by digital technology as value offerings with specific characteristics such as being intangible, relational and interactive in nature - service as a perspective on value creation” (Åkesson 2017). An earlier description of a digital service is offered by Barrett, Davidson et al. (2015), where a digital service is a combination of digital technology and physical products, presented in an MISQ special issue on service innovation in the digital age (Barrett, Davidson et al. 2015). In all descriptions, digital technologies are in focus, but the characteristics of digital technology is put forward by Åkesson (2017). Digital services also have other characteristics, such as: individuals cannot participate in digital services unaided by computer technology (Williams, Chatterjee et al. 2008); a digital service may start digitally, but this does not mean that all interactions are limited to being digital (Williams, Chatterjee et al. 2008); and lastly, the importance of user interaction in digital service design processes (Liu et al. 2016). In order to follow the description of digital services, this section will include four subsections: digitalization and everyday life (2.1); digital service innovation (2.2); value co-creation (2.3) and a summary (2.4). In the summary, digital service innovation principles will be identified from a synthesis of the literature.

2.1 Digitalization and everyday life

Another shift in focus relating to digitalization is an interest in digital services supporting our everyday life. Digitalization is evident in our daily life, as we interact with digital artifacts or artifacts that have embedded computing capabilities on a daily basis (Yoo 2010). According to Yoo (2010), research should focus on a deeper understanding of the experience of use in everyday life. User needs are, therefore, much broader, reflecting our deeper basic human needs and values. Baskerville (2011b) describes individual information systems
(IIS) as activity systems in which individuals perform processes and activities using information and technology (such as digital services) based on idiosyncratic needs and preferences. The IIS serve individuals and have to account for social as well as functional idiosyncrasy (Baskerville 2011a). Another perspective is as a Human-Centred Service Systems (HCSSs) (Kleinschmidt, Peters et al. 2016), which are essential for everyday life. A Human-Centred Service System (HCSS) is a configuration of people, information, organizations, and technologies that operate together for mutual benefit. The HCSSs depend on sharing capabilities where the degree of human involvement is high. Interaction, change, personal services and engagement are fundamental to HCSSs (Kleinschmidt, Peters et al. 2016). HCSSs differ from other service systems because the personal interaction between the different actors is essential for the value creation. Examples of HCSSs are family households and non-profit social organizations that exhibit complex behaviours due to the people and relationships involved (Peters, Maglio et al. 2016).

According to Vodanovich et al. (2010), digital technologies are an intertwined part of our daily lives. In the article, daily life is separated into different contexts (home, leisure, volunteer engagements, etc.) and different activities where digital technologies are used. Some of these digital technologies are embedded and ubiquitous. Scheepers and Middleton (2013) propose personal ICT ensembles (Information and Communication Technologies) as a description for our personal use of digital technologies. The personal ICT ensemble supports our striving to reach a higher quality of life (QoL) based on our underlying motivations. In many cases, it is through the use of smartphones that users achieve diverse benefits (Jung 2014). Jung (2014) also claims that smartphones (with their applications/digital services) have radically transformed the structure of our everyday life. In Sweden, the Digitalization Commission (Digitaliseringskommmissionen) has raised concerns about the digitalization of our everyday life (Gulliksen et al. 2015). One of the concerns is about power: “We can choose to let professional actors get exclusive power over the design of digital services or make it a broad people’s movement” (p. 166).

In line with other IS research, the research in this thesis has digital service innovation to support HCSSs in everyday life as a foundation, but not in every aspect of everyday life. In this thesis, the focus is on digital service innovation for HCSSs that supports specific communities that we take part in, in our everyday life. Those communities are characterized by strong relations between the members, such as family or close friends; the members are engaged in specific practices for the community; and these practices could generate incidents that affect the members of the community.
2.2 Digital Services and Innovation

Digital service innovation could be regarded as consisting of two parts, “digital service” and “innovation”. The second part, innovation, is defined in the Oslo manual from OECD (2005) as “the implementation of a new or significantly improved product (good or service)... in business practices, workplace organization or external relations” (p. 46). Another description is offered by Åkesson (2017), where a digital service innovation is “new digital services or new re-combinations in service systems, resulting in new practices that are valuable enough for the involved actors to make it sustainable”. The key concept is “new”, in both “services” and “practices”.

Digital service innovation could also be divided into “digital” and “service innovation”, where service innovation is defined by Lusch and Nambisan (2015) as “re-bundling of diverse resources that create novel resources that are beneficial to some actors in a given context” (P. 162). Another definition is offered by Kleinschmidt, Peters et al. (2016) where service innovations are defined as service system reconfigurations. The aim of the service innovation is to change service systems in a way that increases the value for the involved actors. Service systems are the basis of an improved value-creation process and in this thesis, the focus is on HCSSs. In Lusch and Nambisan (2015) digitally enabled service innovations is described as new combinations of digital and physical components to create novel market offerings. Lusch and Nambisan (2015) put forward three characteristics of the digitally enabled service innovation: (1) innovation as a collaborative process occurring in an actor-to-actor network; (2) service as the application of specialized competences; and (3) value co-creation, which views value as co-created through resource integration.

The collaborative and co-creative aspects of digital service innovation share fundamental elements with the more open approaches to ICT innovation. The open approaches have involved a network of actors with specialized competences. Among these open approaches are i) open innovation (Chesbrough 2006); ii) user-driven innovation (Hippel 2005); and iii) Living Labs (Eriksson, Niitamo et al. 2005) as forms of various innovation processes relating to innovative ICT artifacts. Together, they involve a multiplicity of stakeholders and information sources that are connected to the innovation process in different ways. In open innovation, inflows and outflows of knowledge is of importance to accelerate internal innovation in order to expand the markets for external use of innovation (Chesbrough 2003, Chesbrough 2006, Chesbrough et al. 2006, Chesbrough 2011). A Living Lab approach is, according to (Bergvall-Kåreborn et al. 2009), an ICT innovation process which is characterized by a user-centric approach. User influence and partner
engagements are important parts of this approach, along with the importance of real-life contexts. Value, realism, and sustainability are three of the key principles in Living Lab (Ståhlbröst 2012). Common within Living Lab is the fostering of everyday life innovations (Tang and Hämäläinen 2012). The third approach, user-driven innovation (Hippel 2005, Hippel 2005, Hippel 2007), also has a focus on users, i.e., those who will benefit from using the product or service. The approaches mentioned above all encourage cross-sector collaboration, openness, empowerment of users, and detection of creative initiatives. The main element of such an innovation process is the collaborative effort of the involved actors.

The innovation process that includes cross-sector collaboration can be described in many ways, but the more recent descriptions highlight the importance of a network perspective. A foundation in the network perspective is the actor-to-actor collaboration between heterogeneous actors from different fields with diverse knowledge bases (Yoo, Lyytinen et al. 2009, Yoo, Boland Jr et al. 2012) that need to exchange knowledge. Pavitt (2006) proposes an innovation process of three broad and overlapping processes in the network: the production of knowledge; the transformation of knowledge into artifacts (products, services, systems, and processes) and matching to market needs and demands. The transformation of knowledge is also important between the heterogeneous actors.

The involvement of users is also important in the network perspective. Bergvall-Kåreborn et al. (2009) have proposed Form-IT as a user-centric innovation process for ICT innovations. One of the fundamental principles behind Form-IT is the empowerment of the users/consumers and the involvement of researchers (Følstad 2008). Form-IT is an iterative and cyclical process of three co-creation phases (Bergvall-Kåreborn, Holst et al. 2009): needs, design, and evaluation. In those three phases, knowledge is transformed between actors in order to describe needs, co-create design, and evaluate. There are several theoretically informed approaches to digital service innovation, which share a core of characteristics. One of them is the innovation process as a collaborative, iterative, and overlapping process. Another characteristic is the involvement of heterogeneous actors (which could include the user) in the co-creation. The more recent literature highlights co-creation of value. As a consequence of the involvement of heterogeneous actors, the sharing and translation of knowledge (integration of resources) also becomes a characteristic. Williams, Chatterjee et al. (2008) emphasize the importance of user interaction in digital service design processes.

Two traditions that have dealt with co-creation and user involvement are participatory design (PD) and the Scandinavian tradition of IS. Within the
Scandinavian tradition of information systems, the involvement of users in co-creation of IT/ICT artifacts has been present for more than 40 years (Kyng 1991). The same goes for PD research (Kensing et al. 1998). Those two traditions share the fundamental idea of empowering the users and co-creation among several partners. Needs and benefits of the users in relation to the ICT artifact have been in focus within these traditions. Moreover, needs and benefits of the consumer are the foundation in means-ends models and benefit-cost ratio models of value (Salem Khalifa 2004). There are indications (the interest in needs and benefits) that the value literature could benefit from PD literature, even though the concept of value is not explicitly addressed in most articles. One exception is the articles from Iversen et al. (2010), Iversen et al. (2012), where value is defined as something beyond that of economic worth but refers to what a person or group of people consider important in life. According to the authors the designers should be engaged in the dynamic and dialogical process of cultivating the emergence of values. In order to support their grounding. The PD tradition is also evident in Living Labs (Bergvall-Kåreborn, Eriksson et al. 2009) and user-centric innovation (Hippel 2005).

PD has dealt with collaborative processes with users relating to digital services for many years. One example is empowerment of users (Kensing, Simonsen et al. 1998), which could be of interest to digital service innovation researchers. See for instance the DART framework presented by Prahalad and Ramaswamy (2004a) where empowerment of service beneficiaries is explicitly mentioned. In PD the design professionals need knowledge of the actual use context and users need knowledge of possible technological options; therefore the exchange and translation of knowledge are of importance. The knowledge exchange is important in digital service innovation and PD. In PD one stream of research has had a focus on methods, tools, and techniques to support the knowledge exchange. In PD the knowledge exchange between design professionals and users is considered to be most effective through active cooperation (Kensing, Simonsen et al. 1998). The users take an active part in analysis and evaluation of needs, possibilities, and technologies. Moreover, the users are also involved in prototyping. Scenarios and mock-ups are commonly used in the cooperation (Kensing, Simonsen et al. 1998). Sometimes this is referred to as “imagining” (Bratteteig and Wagner 2016). Ehn (2008) suggests that scenarios and mock-ups could be regarded as boundary objects (Star and Griesemer 1989, Star 1990). One of the most interesting approaches in PD is the effect-driven development of ICT (Hertzum and Simonsen 2010). In this approach, the effect of the usage of ICT is in focus for the user. The effect-driven IT development entails a sustained focus on the effects to be achieved by users through their adoption and use of a system. Effects could be effectiveness, efficiency, satisfaction, and usefulness (Hertzum and Simonsen 2010). The effect-driven approach is related
to benefits management, much the same way as value is related to benefits (Salem Khalifa 2004). The differences and similarities between value co-creation and effect-driven IT development are worth exploring in the future.

From the literature collaboration, co-creation, and empowerment are identified as central elements in digital service innovation. However, research also shows that collaboration and co-creation among different groups of stakeholders add complexity and challenges to the innovation process in terms of cultural, linguistic, and epistemological boundaries between stakeholders (Doolin and McLeod 2012). The authors illustrate the challenges by stating:

*A key challenge in this development context is representing, negotiating and integrating the diverse knowledge, viewpoints and interests of these stakeholders, in order to create a shared understanding of the development work and outcome* (p. 570).

In digital service innovation, the outcome is a shared understanding of the value that should be co-created. Therefore the next section will address different perspectives on the co-creation of value, a concept that is considered to be ambiguous (Salem Khalifa 2004).

### 2.3 Value co-creation

The concept of value co-creation has a foundation in the service-dominant logic. The idea of services and the service-dominant logic emerged in the marketing literature (Vargo and Lusch 2016). The first version of the service-dominant logic (SDL) appeared in 2004 and was revised in 2008 and 2016. Four major components (foundational premises, FP) in SDL are: *Service is the fundamental basis for exchange* (FP1) (in the vignette the use of the application “I-Loc8-U”); *Value is co-created by multiple actors, always including the beneficiary* (FP6) (Leif and Monica in the vignette); *Actors cannot deliver value but can participate in the creation and offering of value propositions* (FP7); and *Value is always uniquely and phenomenologically determined by the beneficiary* (FP10). In total there are eleven foundational premises in the service-dominant logic (Vargo and Lusch 2016).

Value co-creation is one way of saying that suppliers and beneficiaries are on the same side of the market, and both of them benefit from the interaction (Galvagno and Dalli 2014). Co-creation is a collaborative process of producing new value, hence the concept value co-creation. There are two research perspectives that have explicitly approached value co-creation (Galvagno and Dalli 2014): 1) *Value co-creation takes place at the marketplace in the interaction between suppliers and beneficiaries*; and 2) *Value co-creation is of importance in open and collaborative innovation processes*. Both perspectives are of interest to the
Information Systems researcher (especially those interested in digital service innovation).

To follow the first perspective, *value co-creation takes place at the marketplace in the interaction between suppliers and beneficiaries* has been addressed in literature, especially from marketing. Around 2008 IS researchers started to take an interest in co-creation of IT value. Kohli and Grover (2008) suggest several future research themes, one of which was co-creation of IT value. Later on, in 2012 a special issue of *MISQ* had the theme co-creating IT value (Grover and Kohli 2012). In that perspective, value co-creation is an active, creative and social process, based on collaboration between firms and end-users (Piller et al. 2011). From 2012 and onwards IS researchers have shown increasing interest in the service-dominant logic, especially the two concepts of service and value co-creation. One example is Sarker et al. (2012) which had value co-creation in the title. Moreover, in 2015 MISQ had a special issue on Service innovation in the digital age (Barrett, Davidson et al. 2015).

One approach to value co-creation is the DART framework presented by Prahalad and Ramaswamy (2004a). DART is short for dialogue, access, risk reduction and transparency. Dialogue means not only listening to the customers, but also interaction, communication, and engagement between two equally empowered problem solvers (Prahalad and Ramaswamy 2002). Access without ownership is desirable for consumers and can be very profitable for businesses, as the customer does not need to own in order to experience value. According to Prahalad and Ramaswamy (2002), risk reduction and the obligations and responsibilities of the firm and consumers for risk management will always be debated. Lastly, transparency is also necessary for consumers of goods and services to become co-creators of value. Moreover, value co-creation as a theoretical concept has been criticized, regarding lack of clarity (Roser et al. 2009).

In a recent article, Lusch and Nambisan (2015) propose that future studies should focus on the experience of value in the interaction during value co-creation of digitally enabled service innovations, especially the role of the service beneficiaries. Interactions among actors are important to understand because it is through interaction that knowledge is shared and generated. Experience of value is also important, especially since value is put forward as the customer experience of the service (Prahalad and Ramaswamy 2002). Service systems are fundamental for service innovation, in order to reach an improved value-creation process (Kleinschmidt, Peters et al. 2016). According to Lusch and Nambisan (2015), research findings imply that the value an actor co-creates may not be directly related to the usage of the related offering (digital service); rather, it may pertain to the broader context. The context is understood as the
connections between actors and other resources. Lempinen and Rajala (2014) claim that the inter-organizational process of value co-creation regarding IT development (in our case digital services) has not yet been sufficiently explored. In this perspective of value co-creation, value is the customer experience, which is a rather narrow view of value compared to the literature review presented by Salem Khalifa (2004). In the vignette, Leif found Monika, which is an example of value directly related to the usage of the digital service “I-Loc8-U”, but there may be other aspects of value that are not covered in the vignette. Involved in the value co-creation are multiple actors (for instance, the staff member at the security zone in the vignette) including the service beneficiary (Vargo and Lusch 2016). The multiple actors involved in value co-creation are sometimes referred to as a network of actors (Lusch and Nambisan, 2015) or a service system (Kleinschmidt, Peters et al. 2016). Noteworthy in value co-creation is the consumer perspective on value, where the value is regarded as the consumer experience.

The second perspective on value co-creation, value co-creation is of importance in open and collaborative innovation processes, has also been researched for many years. Articles within this perspective focus on processes in the interaction between customer and company during innovation, and value creation in general (Galvagno and Dalli 2014). It could be in service innovation or collaborative innovation in new product development.

There are two major concerns in this perspective: heterogeneity among involved actors and participation in value propositions. The involved actors come from different fields with diverse knowledge bases and are therefore considered heterogeneous actors (Yoo, Lyytinen et al. 2009, Yoo, Boland Jr et al. 2012). One of the actors in value co-creation is always the service beneficiary (FP6, service-dominant logic). As a consequence, one challenge is to exchange knowledge, assets and other types of resources. Frow et al. (2014) propose that value propositions link the different actors in the offer of value co-creation opportunities. The relationships between actors are important in shaping the perceptions of value during knowledge exchange. Lindgren, Andersson et al. (2008) put it slightly differently: if we can find ways to connect, translate, and exchange knowledge between heterogeneous actors, innovation will have a higher chance to occur. In the thesis by Lund (2015) the orchestrating of knowledge sharing among heterogeneous actors is of importance during the innovation process.

There are three typical roles that are performed by the service beneficiary in order to share knowledge (Lusch and Nambisan 2015): ideator, designer, and intermediary. The first role—ideator—reflects the capability of beneficiaries to bring knowledge about their needs to envision new services. The designer
reflects the capability of beneficiaries of service offerings to mix and match existing knowledge components or resources to configure (or develop) new services. The third role—intermediary—reflects the capability of beneficiaries to cross-pollinate knowledge across multiple ecosystems and to serve as intermediaries in service innovation. These three roles are grounded in a working context; it could be interesting to explore these three roles in digital service innovation of HCSSs supporting everyday life from a practice perspective. After all, we know very little about the actual interaction between heterogeneous actors. In Payne et al. (2008) the authors argue that value co-creation could be expressed from a learning perspective, where the service beneficiaries could be regarded as customer learning, and the service suppliers as an example of organizational learning.

Interactions among actors are important to understand because it is through interaction that knowledge is shared and generated. In a recent article, Lusch and Nambisan (2015) propose that future studies should focus on the experience of value in the interaction during value co-creation of digitally enabled service innovations. Participation can lead to an understanding of the effects of usage in a broader context. In the airport vignette, Leif uses a digital service to find his wife Monica, which is achieved together with other actors. To Leif and Monica, the digital service is highly valuable, but not for economic reasons, more in a human way, after all, they are married and still love each other. What is valuable in our everyday life is a complicated matter! According to Graeber (2001), it is extremely difficult to find a systematic theory of value. There are at least two research perspectives on value, the anthropological perspective and the consumer perspective. In both perspectives (Graeber 2001, Salem Khalifa 2004), the ambiguity of value is put forward as a problem. One field that has applied both perspectives on value is the health sector (Porter 2010). Healthcare is a process that takes place at home or at institutions such as hospitals. From the involved actors, there is both a consumer and anthropological perspective (Lindroth et al. 2018).

In the anthropological perspective, value is the conception of what is ultimately good, proper or desirable in human life (Sykes 2016). Our conception of value is rooted in our culture and influences the choices people make between different possible courses of action. Graeber (2001) states that value is made in purposeful social action toward what people deem to be important. The anthropological perspective on value has been visible in the research field of participatory design. The design of information systems (or digital services) requires a humanistic value system, a method that enables effective participation that assists the design of human systems (Mumford 1983).
In the consumer perspective (mostly from economic literature), value is regarded as a dynamic concept that evolves over time (Salem Khalifa 2004). From an organizational perspective, customer value leads to customer loyalty and is therefore important. Value as a concept has been criticised for being overused and misused, especially in the management literature. In the literature on customer value, value is grounded in customers perception, not by supplier’s intentions (Salem Khalifa 2004). Value is defined by the customer in the marketplace, not by the supplier in the factory and by what the customer gets out, not what the producer puts in. There are three overlapping categories of customer value (Salem Khalifa 2004): value component models, utilitarian or benefit-cost ratio models, and means-ends models. Value component models invoke the buyer’s desire to own for the sake of ownership. The need for the product or service is of importance for the customer, not the gained value.

In benefit-cost ratio models the costs of obtaining the perceived benefits are of major concern. The customer value represents the difference between “customer’s perceived benefits” and “customer’s perceived costs” (Salem Khalifa 2004). The benefits build value to the extent that the product or service improves the customer’s performance or experience, benefits can be improved, extended, and expanded. Every service or product has a core solution, which generates core values. Extending benefits mean creating solutions for the customers, extending the benefits of auxiliary services that the customer has to perform when using your service. Expanding benefits means adding intangibles to the tangible, to go from a solution to an “experience”. In the health sector extending and expanding benefits has been grouped together within the process of recovery. The treatment process, depending on the progression and complications, uses both extensions and expansions (Porter 2010). From the health sector, a fourth benefit has been proposed, sustainable benefit, from the long-term use of a service (Porter 2010).

In means-ends models, customers acquire and use services to accomplish favorable ends (Salem Khalifa 2004). Value is regarded as a personal value, representing underlying customers’ needs and goals. Does the service enable him or her to achieve his or her desired end states? There are five consumer values (Sheth et al. 1991): functional (utility), social (positive in the social setting), emotional (our feelings), epistemic (curiosity and learning) and conditional (situations). The five consumer values are from a product and brand perspective, not the service-dominant logic. The customer’s resulting experience includes one or a series of related events leading to an end result or a consequence that is measurably specific.


2.4 Summary

For researchers interested in digital service innovation a common core is in the service-dominant logic (Vargo and Lusch 2016), value (Salem Khalifa 2004), value co-creation (Galvagno and Dalli 2014) and innovation (Lusch and Nambisan 2015). As mentioned in the introduction, the contribution of the thesis is digital service innovation principles (DSIP) for HCSSs supporting everyday life. In this summary, five tentative DSIPs will be derived based on a synthesis from the literature on digital service innovation and value co-creation. In this thesis, tentative DSIP should be understood as a first version of DSIP that should be elaborated on in the final parts of the thesis.

The participation by the service beneficiary is of importance in digitally enabled service innovation (Lusch and Nambisan 2015). Participation has been addressed and problematized in participatory design (PD). PD is not only about participation but also about empowerment of the beneficiaries (or the user). Another aspect is the heterogeneity among actors, either as differences between groups of actors (Yoo, Lytyinen et al. 2009, Yoo, Boland Jr et al. 2012) or differences within a group. The beneficiaries are not a homogeneous group, instead, there could be diverse viewpoints that need to be addressed in value co-creation. Lindgren, Andersson et al. (2008) suggest that if we can find ways to connect, translate and exchange knowledge between heterogeneous actors, innovation will have a higher chance to occur. Therefore the first tentative principle (DSIP 1) is the principle of participation and empowerment of heterogeneous actors, including service beneficiaries.

One common and challenging element of digital service innovation that needs to be handled is collaboration. Collaboration is emphasized as important in the literature on digital service innovation (Yoo, Lytyinen et al. 2009, Yoo, Boland Jr et al. 2012). Galvagno and Dalli (2014) emphasize inter-organizational collaboration in value co-creation. Within PD the importance of active collaboration (cooperation) should not be underestimated (Kensing, Simonsen et al. 1998). The second tentative principle (DSIP 2) is therefore the principle of active inter-organizational collaboration in digital service innovation.

In the literature, there is a consensus about the importance of sharing and translation of knowledge. But the literature offers little information about the process of how to achieve the sharing and translation of knowledge. There is one exception, the idea of using boundary objects (mock-ups, prototypes, scenarios, etc.) in the sharing and translation of knowledge (Star and Griesemer 1989, Star 1990). Boundary objects are used during activities that are examples of cooperation. The third tentative principle (DSIP 3) is therefore the principle of using boundary objects in the sharing and translation of knowledge.
In the literature, there are two perspectives on value, the consumer perspective and the anthropological perspective. In the setting of everyday life with strong relations between individuals, both are important. One area that has combined both perspectives is the health sector (Porter 2010). A common characteristic in the two perspectives is the understanding of a broader context (Lusch and Nambisan 2015). Context and realism are also emphasized as important in understanding value (Ståhlbröst 2012). Another characteristic is the perception of what is important, not only from a consumer perspective but from an anthropological perspective. Therefore it is important to combine the human and consumer perspective of value. The fourth tentative principle (DSIP 4) then becomes the principle of understanding our perception of value based on importance in a broader context in the human-centred service system.

The fifth tentative principle also relates to value. In the value co-creation literature, value is the effects of usage (or the experience), instead of the direct usage. Within PD there is research addressing the effects of usage as benefits. Although value is described implicitly, to my knowledge the concept of value is not explicitly addressed in the majority of articles in the field of participatory design. There are examples that address value, for instance Iversen, Halskov et al. (2010), Iversen, Halskov et al. (2012), that relates to the anthropological perspective on value. Interestingly, neither different value levels nor different value types have been explicitly addressed in relation to value co-creation in the open and collaborative innovation processes. Therefore the fifth tentative principle (DSIP 5) is the principle of co-creating for different levels of value and different types of value.

The five tentative digital service innovation principles for HCSSs (DSIP 1-5) derived from the literature are:

- DSIP 1: the principle of participation and empowerment of heterogeneous actors, including service beneficiaries
- DSIP 2: the principle of active inter-organizational collaboration in digital service innovation
- DSIP 3: the principle of using boundary objects in the sharing and translation of knowledge
- DSIP 4: the principle of understanding our perception of value based on importance in a broader context in the human-centred service system
- DSIP 5: the principle of co-creating for different levels of value and different types of value

The five tentative digital service innovation principles for HCSSs could be regarded as the first version of principles. All five digital service innovation principles (DSIP 1-5) relate to an understanding of the actual practice: activities, interaction, and outcomes. Lusch and Nambisan (2015) have put forward that
future studies examine the interaction during digitally enabled service innovations from a practice perspective. According to Ciriello, Richter et al. (2017), the appropriate level of analysis to capture the complexity of innovation is the level of practice.
3 A practice perspective as theoretical framework

In the research presented in this thesis, the guiding framework has a foundation in the practice perspective (Nicolini 2012). There are several descriptions of the practice perspective, ranging from foundations and characterization to key principles. The practice perspective on the design of digital services has been pointed out by Barrett, Davidson et al. (2015) as a future research direction.

3.1 Foundations of the practice perspective

In the practice perspective, the importance of activities are foregrounded (Nicolini 2012). As a consequence, the practice perspective is process oriented (for instance, Leif’s search for Monica in the vignette). Therefore organizations are regarded as bundles of practices. Another understanding of practice is a “recurrent, materially bounded and situated action engaged in by members of a community” (Orlikowski 2002). The outcome of the practice perspective is knowledge about: practices (Goldkuhl 2011) and the use of objects in performance during activities (Nicolini 2012). (In the vignette the smartphone is the object.) When organizations are studied from the practice perspective, actual activities and the result of activities are in focus. The meaning-making and knowledge sharing that take place during activities are regarded as components of the practice. The practice perspective also puts a focus on the roles of the actor and relation between actors (such as Leif, his wife Monica and the staff member at the security zone). Therefore the importance of power is also taken into account. In the practice perspective, the unit of analysis is the practices, in other words, roles, relations, power dynamics, activities and their outcomes (Nicolini 2012).

There are several examples on the study of work and organizations from the practice perspective (Nicolini 2012): communities of practice (Lave and Wenger 1991, Wenger 1999); activity theory (Engeström et al. 1999, Engeström 2008) and technology as a practice (Orlikowski 1992, Orlikowski and Yates 1994, Orlikowski 2002). All three practice perspectives have had an impact on information systems. In the presented research the focus is on the literature presented on communities of practice due to the focus on the situated learning that has the possibility to emerge when heterogeneous groups of actors (communities of practices) interact across boundaries (Leif and the staff
member at security zone). The two practice perspectives (activity theory and technology as a practice) have been widely recognized within information systems, especially the work by Orlikowski, but they are beyond the scope of the presented research.

3.2 Learning in the practice perspective

The research on communities of practice has evolved since the early 1990s. It started with situated learning (Lave and Wenger 1991), introduction of communities of practice (Wenger 1999), a managerial perspective on communities of practice (Wenger et al. 2002), boundary practices in IS (Vashist et al. 2011, Johansson et al. 2016) and lastly a framework to understand learning in a landscape of practices (Wenger-Trayner and Wenger-Trayner 2015). The rest of this section will be structured as follows. It will start with an introduction of communities of practice, followed by a presentation of the characteristics of a boundary practice. The boundary practice will be followed by a description of the learning in a landscape of practice. Last in this section will be an argumentation about boundaries as a learning asset.

A community of practice (CoP) is a group of people that share a concern (or a set of problems) and deepen their knowledge by interacting on an ongoing basis (Wenger, Mcdermott et al. 2002) (such as the support group in the vignette). A CoP has three characteristics (Wenger 2006): It has an identity defined by an interest, members engage in joint activities, and they develop a shared repertoire of resources (maybe the application I-Loc8-U was a recommendation from another member of the support group). Learning is described as an ability to negotiate new meanings within a CoP, to create engagement in CoP, and to deal with boundaries between CoPs (Wenger 1999). Learning and working are interrelated, compatible, intertwined, and connected to innovating (Brown and Duguid 1991). Learning is situated in the practice and built on participation. A CoP is of course in a state of continuous change — a way of seeing, a way of doing, and a way of interpreting — due to the boundary relations that take place between different COPs. One example is the boundary practice (Wenger 1999).

Wenger (1999) presents three forms of membership in a CoP: core members, active members, and peripheral members. Core members typically initiate different projects and function as leaders of the community. Furthermore, core members are engaged in the progress and development of the CoP. Active members are also involved in projects and engage actively but in different negotiations. Active members seek advice from core members and lack the mandate to develop and change the CoP. The peripheral members are observers of the interaction in the community and do not contribute to the creation of meaning in the practice of the community.
A boundary practice is a practice that “provides an ongoing forum for mutual engagement” (Wenger 1999) between different communities of practice (CoP). The purpose of the boundary practice is to maintain connections and interaction between several CoPs (Vashist, McKay et al. 2011). Hence, we regard the groups of stakeholders participating in the innovation process as different communities of practice. At the same time, we consider a boundary practice as a social configuration of different CoPs taking action in a temporal project, such as a user-driven ICT innovation process. Inter-community practice, such as a boundary practice, is important (Cook and Brown 1999) because it helps to overcome some of the problems a community creates for itself (Brown and Duguid 1991).

![Diagram of Boundary Practices](image)

Figure 1. Boundary practices according to Wenger (Wenger 1999)

The connection between the boundary practice and the CoP is by members acting as brokers, and their use of boundary objects (Figure 1). Wenger (1999) define this as reification and participation. Participation is used to introduce elements from one practice into another by being a broker. Two different types of brokering (process and product brokering) are suggested by (Johansson et al. 2011). A boundary practice uses boundary objects (forms, documents, sketches, etc.) to interconnect CoPs. Such boundary objects are any objects that are relevant to the practices of multiple communities but are used or viewed differently by each of them (Star 1990, Brown and Duguid 1991, Star 2010). One important aspect of boundary objects is their interpretive flexibility (Star 2010), which allows for multiple interpretations by the multiple parties utilizing them. As a consequence boundary objects become meaningful and commonly applied across communities.

A landscape of practice is a “a complex system of communities of practice and the boundaries between them" (Wenger-Trayner and Wenger-Trayner 2015). The authors also state that most professional and non-professional endeavors are constituted by a complex landscape of practices (such as the incident at the
airport). The theories presented by Wenger are regarded as socio-cultural learning theories, where the practice is the unit of analysis.

In order to understand the complexity of a landscape of practices Wenger-Trayner and Wenger-Trayner (2015) advance two important characteristics: (1) the landscape is flat, i.e., the local nature of practices, where each practice has a locality and each practice takes place in the context of a landscape of practices; and (2) the landscape is diverse, i.e., boundaries of practice, which relates to the boundaries between different practices. Boundaries are described as places for misunderstanding and confusion.

Learning in the landscape is regarded as a journey where engagement, imagination, and alignment are important factors regarding our identification. Engaging in the practice is the way an actor handles their relation to the practice, talking, listening, designing, debating or even reflecting. Imagination is about constructing, reflecting, and exploring possibilities in the future based on the current practice. Alignment with the context or other communities of practice is also regarded as important.

Boundaries are regarded as learning assets (Wenger-Trayner and Wenger-Trayner 2015) or as a place where learning mechanisms can be triggered (Akkerman and Bakker 2011). A boundary is understood as a dialogical phenomenon that gives rise to discontinuities in interaction and action based on sociocultural differences (Akkerman and Bakker 2011). In order to overcome boundaries, avoid misunderstandings and overcome differences, the participants need to engage in negotiations (such as the interaction between Leif and the staff member). Another part of negotiation is how the competence from one community of practice could be fruitful for another community of practice.

Wenger-Trayner and Wenger-Trayner (2015) suggest three more concerns on how to encounter boundaries: brokering (Wenger 1999); boundary objects (Star and Griesemer 1989, Star 1990, Star 2010) and reflection (Boland and Tenkasi 1995, Bjerg Hall-Andersen and Broberg 2014). Brokering and the boundary objects (Leif and the application “I-Loc8-U”) are further described in the boundary practice section. Reflection as a learning asset or a learning mechanism that can take place at boundaries is also identified by Akkerman and Bakker (2011). Reflection is closely related to interventions in a practice or several practices. One important aspect is to learn something new in the intersection of practices. Much of this learning is done by making knowledge explicit in a cyclic process of perspective making and perspective taking (Boland and Tenkasi 1995). Relating to boundaries Wenger-Trayner and Wenger-Trayner (2015) propose the concept of knowledgeability as the ability to handle the
relationships among a multitude of practices in the landscape. Competence is related to a single community and knowledgeability to a multitude of practices.

In the title of the thesis, “Engaged in digital service innovation”, digital service innovation is understood as a service system reconfiguration (Kleinschmidt, Peters et al. 2016) with digital services. According to Kleinschmidt, Peters et al. (2016), the aim of the service innovation is to change service systems in a way that increases the value for the involved actors. The empirical data are from two projects with the aim to increase value for the involved actors in a service system, where both systems are regarded as examples of a Human-Centred Service System. Involved actors were beneficiaries and providers, and the interaction between these actors was in focus. Lusch and Nambisan (2015) have put forward that future studies examine the interaction in service innovation from a practice perspective. In this thesis, the practice perspective is learning in practice (Wenger 1999). This theory has provided insights about the interaction between communities, such as: boundaries as learning assets; engagement; imagination; alignment; brokering boundary objects and reflection. These concepts have been adopted during analysis of the interaction in digital service innovation. Moreover, the appropriate level of analysis to capture the complexity of innovation (digitally enabled) is the practice level (Ciriello, Richter et al. 2017). Research on digital service innovation lacks insights from a practice perspective, see for instance Barrett, Davidson et al. (2015). The interaction among the involved actors in digital service innovation is crucial to understand because it is through human interaction that knowledge is shared and generated (Lusch and Nambisan 2015). Lusch and Nambisan (2015) propose that future studies examine the role of beneficiaries regarding their experience of value in the interaction during digitally enabled service innovation.
The presented research is based on an engaged scholarship approach (Van de Ven 2007). Since the book on engaged scholarship was published (Van de Ven 2007), engaged scholarship has received a lot of attention from Information Systems (IS) researchers (Mathiassen and Nielsen 2008, Simonsen 2009). For a number of years, ICIS (International Conference on Information Systems) had a special track on engaged scholarship (Kuechler and Mathiassen 2010), ICIS 2011 (Baskerville and Chiasson 2011) and ICIS 2012 (Henfridsson et al. 2012).

I was engaged in two projects (FIND and Free2Ride) in order to understand more about digital service innovation of Human-Centered Service systems (HCSSs). The general idea was to take part and learn more about value and HCSSs during digital service innovation. As a consequence, I was engaged in the negotiation and collaboration that took place between actors. In the early phases of my research I referred to this as action oriented research, where the researcher is a kind of problem solver (McKay and Marshall 2000). This did not fit very well with my approach, grounded in negotiation, collaboration and reflections. Therefore I started to look for approaches that supported something more than action. One such approach is the action case approach (Braa and Vidgen 1995, Vidgen and Braa 1997) another is the engaged scholarship (Van de Ven 2007). Both approaches are used in the appended papers (Paper B-D). In engaged scholarship, Van de Ven (2007) highlights knowledge about complex problems that could illuminate a practice researcher and taking part in a learning community. An approach closer to the research in this thesis

4.1 Foundations of engaged scholarship

Engaged scholarship is primarily concerned with how academic researchers can engage with practitioners, in ways that somehow meet their often diverse needs (Van de Ven 2007). Further on, engaged scholarship is about studying complex problems where the perspectives of different stakeholders are important. It is defined as:

\[
\text{participative form of research for obtaining the different perspectives of key stakeholders (researchers, users, clients, sponsors, and practitioners) in studying complex problems (Van de Ven, 2007: 9)}
\]
Engagement in the research is a process that involves:

> negotiation and collaboration between researchers and practitioners in a learning community; such a community jointly produces knowledge that can both advance the scientific enterprise and enlighten a community of practitioners (Van de Ven, 2007: 7)

One of the elements in engaged scholarship is the grounding of problems in practice (or reality) (Van de Ven 2007), which matches the intentions and goals of FIND and Free2Ride. Both FIND and Free2Ride are examples of digital service innovation for HCSSs. In that process, a foundation was the different perspectives of the actors (developers and a heterogeneous group of beneficiaries) and the negotiations between researchers and the members of different practices. A central concern in the projects was the level of involvement of the actors during activities. Therefore, many activities were set up as workshops based on techniques and tools used in participatory design. The setup of the projects is in line with another element in engaged scholarship: obtaining different perspectives among involved actors.

The third element in engaged scholarship is to ground the action in interaction with the actors (Van de Ven 2007). The interaction should have as a foundation, engagement and collaboration between researchers and practitioners (users and developers) in a learning community, also evident in the two projects. In FIND and Free2Ride, the action was to design and develop a digital service that addressed problems perceived by the beneficiaries in a service systems that is essential in everyday life. Such a service system is referred to as Human-Centred Service Systems (HCSSs).

Four different forms of engaged scholarship are identified (Figure 2): informed basic research, design/evaluation research, collaborative basic research, and action research. In informed basic research and design/evaluation research the researcher acts as a detached outsider (Figure 2). This means that the researcher is engaged in understanding and describing the problem of interest. The researcher could be doing a literature review, talking to experts, conducting observations (“fly on the wall”) or coding empirical data.

The last two forms of engaged scholarship (collaborative basic research and action research) are examples where the researcher has the attached insider perspective (being involved) and takes part in the activities along with the different stakeholders. The attached insider researcher develops context-specific knowledge that can guide action by dealing with the complexity of the problem. In the planning, evaluation and specification of learning from the projects the
researchers took both roles: attached insider and detached outsider. In carrying out the projects, the researcher’s focus was on the attached insider.

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**Figure 2: Forms of engaged scholarship, inspired by (Van de Ven 2007)**

When acting as an attached insider (Figure 2) one research methods is the action research. The underlying philosophy in action research is pragmatism (Baskerville and Myers 2004). The article by Baskerville and Myers (2004) elaborates on four premises for action research that have pragmatism as a philosophy: before the action research starts to establish the purpose of any action; practical action should be conducted in the problem setting; the practical action must inform the theory; and the reasoning and action must be socially situated. In the appended papers (Appendix A-E), the four premises have been adopted in the two projects FIND and Free2Ride.

The detached outsider researcher has a focus on being engaged in the understanding and description of the problem of interest. The understanding is, of course, related to interpretive perspective (philosophy). The interpretive perspective is one of three underlying philosophies commonly referred to in information systems, while the other two philosophies are critical perspective and positivism (Myers, 1997).

A common theme in the five appended papers (Appendix A-E) is the adoption of engaged scholarship (Van de Ven 2007). In four articles (Appendix A-C, E) an action-oriented research approach has been applied together with the other three forms of research in Van de Ven (2007). In the fourth article, Appendix D, the researcher took an outsider perspective (Informed Basic Research). In a research project you can combine the four forms of engaged scholarship, as Van de Ven (2007: 283) writes: “In practice, there are many variations and overlaps (too numerous to discuss here) among the four forms of engaged scholarship”.

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The interpretive perspective considers knowledge about reality as socially constructed. The aim of the interpretive perspective (Walsham 1995, Klein and Myers 1999) in information systems is to produce an understanding of the phenomenon in focus, in my case, digital service innovation of HCSSs. In the interpretive perspective analysis of qualitative data is a must. In the presented research qualitative data was collected and analyzed. The qualitative data was analyzed with an approach similar to a combination of the process and narrative analysis, a combination of which supported the development of episodes used most of the time. The analysis is closely related to a deeper understanding of the practice during digital service innovation.

### 4.2 Innovation projects as a research context

As mentioned above, the empirical data comes from two different innovation projects, the FIND project and Free2Ride. The starting point of the FIND project was a meeting between the researchers at Halmstad Living Lab and the ICT developers. The project lasted for about four months in early 2010. During that meeting, the developers presented a prototype that consisted of a sender and receiver that worked together on a mission to find missing objects. The missing object could be almost any physical object such as a car, motorbike or glasses. The developers wanted to customize their solution so that it could be used to find missing persons. One category of people that sometimes goes missing is people who suffer from dementia. The caretaking of people who suffer from dementia is mainly done by relatives and next of kin. Therefore it became relevant to explore the needs of next of kin to demented people in order to design for them.

The planning of the Free2Ride project started in August 2009. One of the main ideas was to involve the stakeholders from the beginning, in the writing of the research application. During two months two members of the equestrian clubs, the CEO from the ICT developers together with researchers from Halmstad Living Lab wrote the application. The application was granted funding in early November 2009. One of the parts in the application was a detailed description of the phases and activities in the project. In the application three different scenarios were presented where ICT could facilitate and improve communication and safety. The scenarios were grounded in the everyday practice that takes place at equestrian clubs. Free2Ride started with an open approach, as we did not know what direction the project would take or what kind of digital service should be designed and developed, only that it should facilitate and improve the everyday practice.
The execution of the project started in November 2009 and ended in March 2011. After the end, some interviews were done with the CEO and five members of the equestrian clubs.

4.3 Data collection

In the FIND project it was decided on a process that consisted of four iterations. The iterations started with a planning meeting (preparing the workshop) that lasted for about one hour. After that we had the workshop with the developers and next of kin, with every workshop lasting about three hours. The first workshop focused on the needs by the beneficiaries versus the functionality provided by the early prototype. In the second workshop the focus was on “new” functionality. In the following workshop the focus was on designing the new digital service and in the last workshop an evaluation was made.

The workshops were held at an apartment specially designed to help next of kin of those who suffer from dementia (Figure 3). The iterations ended with a follow-up meeting with the developers, these meetings lasting for about one hour.

![Figure 3: Workshop in the apartment](image)

During the workshop, we collected data by field notes, photos, sketches and documents presented by the next of kin (Figure 4). In total there are about 20 hours of empirical data plus different kinds of documents.
In *Free2Ride*, the workshops were considered to be the most valuable activity (from an output perspective). Therefore twelve workshops were conducted (Table 1). In every workshop, participants from the different communities were present. Each workshop took approximately three hours; the preparation and summing up are excluded.

After about three months of *Free2Ride*, it was suggested by the equestrian clubs to do a questionnaire (Table 1) among people who are engaged in horse riding. The main reason was to have a broader perspective on the created scenarios. Another reason was to use the result from the questionnaire as support in our decision. Other examples of data gathering (Table 1) were field visits, meetings, online activities (a platform was set up) and interviews. The field visits took place in the equestrian clubs. The goal of the first visit at each of the equestrian clubs was to get a handle on the activities and work that took place, and field notes were taken during the visit. Most of the meetings were between the researchers from Halmstad Living Lab and the ICT developers, usually at the ICT developers’ main office. The online activities were initiated in August 2010 and lasted until October. The main idea was to enhance the interaction between the developers and the members of the equestrian clubs, regarding the progress of the prototypes. The online activities were not a success, as most of the participants did not go online to comment or to interact in other ways. After about a month it was decided that one person should document her riding in an online diary. After that, there were a bit more activities, but not much.

The interviews (Table 1) took place after the project was finished. The first interview was a face-to-face interview with the CEO (ICT developers) regarding the effects of the project at the development company. The last five interviews were done by email mainly in order to clarify different issues revealed in the analysis, such as initiatives.
<table>
<thead>
<tr>
<th>Period</th>
<th>Data collection</th>
<th>Time period</th>
<th>Descriptions</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before F2R</strong></td>
<td>Workshops (2 x 3 h = 6h)</td>
<td>Autumn 2009</td>
<td>Preparing the application together with members of the equestrian clubs</td>
<td>Project application</td>
</tr>
<tr>
<td><strong>During F2R</strong></td>
<td>Workshops (9 x 3 h = 27 h)</td>
<td>November 2009 to December 2010</td>
<td>9 workshops where at least 15 people from two different communities of practice where active.</td>
<td>The design specification</td>
</tr>
<tr>
<td></td>
<td>Questionnaire (25 questions, 5 scenarios)</td>
<td>Feb to April 2010</td>
<td>Descriptive statistics to guide the direction of the project</td>
<td>Decision on direction</td>
</tr>
<tr>
<td></td>
<td>Field visits (2 at each of the equestrian clubs, 2 h each in total 8 h)</td>
<td>April 2010 and November 2010</td>
<td>Understanding and documenting the activities that take place in the equestrian clubs</td>
<td>Revised description of needs and concepts</td>
</tr>
<tr>
<td></td>
<td>Meetings (3 meetings with the developers)</td>
<td>May, August and November 2010</td>
<td>The meetings took place between the researchers and the ICT developer and were related to the progress of the project.</td>
<td>To-do lists</td>
</tr>
<tr>
<td></td>
<td>Online activities</td>
<td>August to October 2010</td>
<td>Blogs, questionnaires, videos, news and comments.</td>
<td>Suggestions for improvements</td>
</tr>
<tr>
<td></td>
<td>Evaluation of the prototype</td>
<td>Nov- Dec 2010</td>
<td>Video and online diary</td>
<td>Shortcomings</td>
</tr>
<tr>
<td><strong>After F2R</strong></td>
<td>Interviews (6 interviews, 1 face to face, 2 hours and the rest by email)</td>
<td>Jan 2011 and Sept 2012</td>
<td>Follow-up interviews focusing primarily on questions related to expectations in contrast to the actual outcomes.</td>
<td>Clarify different issues revealed in the analysis.</td>
</tr>
<tr>
<td></td>
<td>Workshop – Close the project (3 h)</td>
<td>March 2011</td>
<td>Discussion about the future</td>
<td></td>
</tr>
</tbody>
</table>
4.4 Making sense of the data

In order to make sense of the collected data from each project (FIND and Free2Ride), I adopted an approach that have similarities with process analysis (Langley et al. 2013). In process studies, there is always a temporal dimension, for example, a sequence of activities leading to an outcome. Who did what, why and when? The analysis also aims to understand the underlying logic behind temporal progression. The first step was to structure the empirical data based on two levels: overview level (activities in the projects) and detailed level (interaction during activities). On the overview level, every activity, such as workshops, meetings, and interviews, was sequenced from the beginning of the project to the final workshop (Figure 5). The input and output from the activities were registered. Objects in particular, such as photos, scenarios, sketches, and prototypes, were identified.

![Figure 5. Describing the overview level in Free2Ride](image)

On the overview level the researcher zoomed in on activities, especially the interaction that took place during activities (the detailed level). On the detailed level, each separate activity (such as workshops) was divided into four phases: start-up, assignment, presentation, and summary. Nearly all of the workshops followed these four phases. Of special interest was the interaction between heterogeneous actors taking place during assignment and presentation. On some
occasions, the start-up was changed at the last minute, mostly due to the fact that actors had brought material to the workshop.

The second step in making sense of the data was a wandering between the two levels, overview and detailed. This wandering was guided by addressing practical problems in each project. One such example is from the Free2Ride where the placement of the transmitter on the horse was addressed on several activities. It started with that one of the members of the equestrian clubs (ECM 1) could not attend a workshop (Figure 6), instead, she made a questionnaire (Paper B – questionnaire episode) that her pupils had to fill out. In the answers from the questionnaire, the pupils proposed that the transmitter should be placed on the bridle.

On the following workshop, another equestrian club member (ECM 2) presented some drawings on the placement of the transmitter on the bridle (Figure 6). ECM 2 had made these drawings between workshops. After the drawings was presented a roundtable discussion started between beneficiaries and developers. In that discussion, it was decided to involve a saddler. The saddler would propose how to attach the transmitter to the bridle.

The third and last step was to understand the process of addressing practical problems from the learning in practice perspective. ECM 1 and 2 both took initiatives outside the workshop, from learning in practice perspective; they showed engagement in addressing practical problems. ECM 1 and 2 also explored the practical problem by suggesting different solutions; they showed an ability to imagine a future possibility. Therefore the headline in Figure 6 is Engagement and imagination.

In parallel with the third step, the narrative strategy was adopted to tell stories based on interaction during activities in the project. The stories were later named as episodes. Those episodes were intended to make the learning in practice visible, such as engagement and imagination.
In the presented research the literature on learning in practice was applied in order to understand the underlying logic. For instance, learning in the landscape of practices is regarded as a journey where engagement, imagination, and alignment are important factors (Wenger-Trayner and Wenger-Trayner 2015). The learning in practice regarding learning as processes were: *boundaries* (Wenger 1999, Wenger-Trayner and Wenger-Trayner 2015) in Papers A-D; *negotiation* (Papers A, C, and D); brokering (Wenger 1999) in Papers A-D; *boundary objects* (Star and Griesemer 1989, Star 1990, Star 2010) is put forward in all papers and *reflection* (Boland and Tenkasi 1995, Bjerg Hall-Andersen and Broberg 2014) in Papers A, C and E are important to consider. The theories presented by Wenger are regarded as socio-cultural learning theories, where the practice is the unit of analysis.
5 Research papers

There are five papers appended to this thesis. The papers in appendix A-C are published (Johansson and Lundh Snis 2011, Johansson and Lund Snis 2013, Johansson, Snis et al. 2016). The fourth paper, Appendix D, has been accepted for publication in the proceedings of Researching Work & Learning (RWL 2017) in Grahamstown, South Africa, December 2017. Furthermore, the paper is also recommended for a Special RWL10 edition in the journal Studies in Continuing Education during 2018. The fifth paper, Appendix E, is submitted to the Information Systems journal System, Signs and Action (http://www.sysiac.org), is in the second round of review (November 2017). An early version of the last article was presented at the Pre-ICIS Workshop 2016 on Practice-based Design and Innovation of Digital Artifacts in Dublin, Ireland in December 2016.

The journey of writing the papers included in this thesis started in late 2010. Free2Ride was in the final stage and the period of making sense of the data from Free2Ride had just begun. The sense-making of data from FIND had already started in the middle of 2010. At that point, the researchers had realized that the interaction between involved groups of people had similarities to the interaction between two communities of practices (Wenger 1999) (Paper A). Later on, the researcher adopted the more specific concept of boundary practice (Wenger 1999) to understand the interaction (Papers B-C). The interaction also had similarities with boundary spanning-in-practice (Levina and Vaast 2005) (Papers A-C). Boundary practice (Wenger 1999) and boundary spanning-in-practice (Levina and Vaast 2005) both aim at relating practices in one field to practices in another by negotiating their meaning. Put differently, relating (heterogeneous) actors from different practices; with different backgrounds and different knowledge. This was the start of developing a theoretical framework, with a foundation in practice-based theories, which had a focus on the overcoming of differences (boundaries).

The development of the theoretical framework is visible in the papers (Table 2). It started with communities of practice (Paper A), moved on to boundary practices (Papers B-C) and ended with landscapes of practices (Paper D). At the same time, boundary spanning-in-practice becomes less visible in the papers and was excluded in Papers D and E.
During the same period of time, there was a similar development regarding the related research (Table 2). Free2Ride and FIND were both regarded as Living Lab projects (Ihlström-Eriksson and Svensson 2009, Bergvall-Käreborn and Ståhlbröst 2010) and Living Lab is explicitly mentioned in the title of the first paper (Paper A). One interesting part of Living Labs is the user-centered approach based on co-creation to design and develop ICT innovations, which shares similarities with the participatory design approach (Kensing and Blomberg 1998, Boedker et al. 2004). The role of the Living Labs is toned down in Papers B and C but the interest in ICT innovation processes based on co-creation is apparent (Papers B-C), see Table 2. Appearing in Papers B and C are references to marketing literature on co-creation (Prahalad and Ramaswamy 2002, Prahalad and Ramaswamy 2004b) together with references to ICT innovation processes based on co-creation (Hippel 2005, Chesbrough, Vanhaverbeke et al. 2006). Interestingly, Papers B and C do not address value explicitly, but the interest in digital service innovation (and value co-creation) had started to grow. When comparing articles in the special issue on service innovation in the digital age (Barrett, Davidson et al. 2015) with Free2Ride and FIND, I realized that digitally enabled service innovation and value co-creation matched what I had done. Quality of life for next of kin and equestrian club members is an expression of value. The interest in digital service innovation and value co-creation are visible in the last two papers (Papers D-E).

The aim of this thesis is to expand our understanding of digital service innovation in a Human-Centred Service Systems from a practice perspective. In the first three appended papers (Papers A-C), the perspective of ICT innovations and co-creation were the related research. During the research process, the field of information systems started to adopt the service-dominant logic (Barrett, Davidson et al. 2015) and became more interested in digitally enabled service innovations. At the same time, the presented research adjusted direction, in order to be more service-oriented (Papers D-E), see Table 2.
The practice perspective is the theoretical framework used to propose *digital service innovation principles* for HCSSs that supports everyday life. The third foundation, the theory building, is grounded in the practice perspective and directed to those interested in digital service innovation. The practice perspective has slightly changed during the research process, as it started with the communities of practice perspective (Paper A). In Papers B-C the focus was on the boundary practice and in the last two papers (D-E) the research has adopted the landscape of practices perspective. All three have a foundation in communities of practice (Wenger 1999, Wenger-Trayner and Wenger-Trayner 2015), see Table 2.

The theoretical framework and related research have evolved over time, but the foundation of the practice perspective and interest in the process of designing and developing digital (or ICT) solutions (or services) are at the core throughout the papers. It could be argued that the evolution of the related research in this thesis has similarities with the evolution of IS researchers’ interest in the service-dominant logic (Vargo and Lusch 2016).

**Paper A** (Appendix A) – “The Dynamics of Interaction: Exploring a Living Lab innovation process from a community of practice perspective” is placed in Figure 2 on the boundary between design/evaluation research and action research. The project started with a prototype, that prototype should be designed and further developed to meet the needs of next of kin to people suffering from dementia. In the article situations and activities that played a vital role in the innovation process in terms of boundary interaction dynamics are identified. The contribution of the article is a combination and further exploration of the boundary-spanning and communities of practice theories. We have developed a conceptual model describing the dynamics in boundary interactions of an ICT innovation process with regard to boundary objects-in-use and brokering. The conceptual model highlights two different levels of brokering: i) inner-level brokering and ii) outer-level brokering. In retrospect, the next of kin of persons with dementia took part in workshops relating to their needs but what they actually contributed were descriptions of how the digital service could improve their quality of life. But not only that, the next of kin told rich stories and asked a lot of questions: they had become engaged in the project. They were active in the digital service innovation of their Human-Centred Service System. The understanding of value (finding a missing person and safety) was at the centre and supported by the digital service.

**Paper B** (Appendix B) – ‘Co-Creation in a Boundary Practice: Lessons Learned from an Engaged Scholarship Approach’, is placed at the boundary between collaborative basic research and action research (Figure 2). The oscillation between collaborative basic research and action research is also put forward in...
the actual paper, where engaged scholarship is the related literature. The empirical data comes from Free2Ride and in the paper, there are two episodes. This was the first time empirical data was presented as episodes. In the first article (Paper A), dynamics in boundary interactions is put forward as a description. In this article we adopted the boundary practice lens (Wenger 1999) together with co-creation as a framing for the dynamics of the interaction. The article has been presented at research seminars on later occasions. Where there have been discussions on the placement between collaborative basic research and action research, instead it has been suggested to place the article between action research and design research. The argument has as a foundation the more co-creating aspects of design research that are visible in the Scandinavian tradition of information systems. The contributions from the article are four lessons learned directed to the inside researcher: act as a facilitator during collaborative problem-solving in co-creation; consider emergent topics during the dialogue; be permissive for alternative perspectives reaching a mutual understanding; and lastly identify boundary objects and utilize them in co-creation.

**Paper C (Appendix C)** – “A boundary practice perspective on co-creation of ICT innovations” is placed in Figure 2 at the boundary between informed basic research and action research. In the article, the action case method is adopted (Braa and Vidgen 1995, Vidgen and Braa 1997). Action case is built on balancing intervention (Action Research – going for a change) and interpretation (soft case study – reaching an understanding). Action case is similar to the borderline between informed basic research (with an interpretive perspective) and action research. The multi-stakeholder co-creation is explored and understood from a boundary practice perspective. In such a multi-stakeholder environment heterogeneity among actors needs to be addressed. The focus on co-creation in describing needs, not value co-creation, is notable. The empirical data is presented as episodes, but one difference is a rather detailed description of the main actor involved in the episodes. Four characteristics are the result of the boundary practice perspective on co-creation: core members of CoPs become core members of a boundary practice; from boundary spanning-in-practice to boundary practice-spanning, a boundary object-in-use becomes a tool for dialogue in boundary practice-spanning and boundary objects are catalysts for decision-making that support the progress of the innovation process. Between the lines in the second set of characteristics, there is critique directed at the boundary-spanning literature, evident in the characteristic “boundary-practice spanning”. Boundary spanning literature has to an extent not taken socio-cultural boundaries into account but instead has focused on organizational boundaries. The importance of boundary objects-in-use as a catalyst in decision-making should not be underestimated. Boundary
object-in-use as a catalyst relates to a common understanding of the value co-created in the use of the digital service. In the presented empirical data, in retrospect, an interesting finding is the initiatives taken by equestrian club members and the developers. The outcome of the initiatives was a clearer picture of the benefits provided from the co-created ICT innovation; what was fuzzy had become clearer. A second outcome was a more focused process; what was explorative had become the focus and more oriented towards the benefits.

**Paper D** (Appendix D) – “Quality of everyday life supported by digital services – a landscape of practice perspective” is placed within informed basic research in Figure 2. The article takes the detached outsider perspective in order to understand digital service innovation and value co-creation from the landscape of practice perspective. In the literature review on digital service innovation and value co-creation, it becomes obvious that the understanding of the interaction between heterogeneous actors has been under-researched, the same goes with artifacts created in or between activities in practice. The literature does highlight the importance of knowledge sharing and the knowledge flow on a general level. One approach to understanding the interaction is the literature on the landscape of practices. The landscape of practice has also provided researchers with a vocabulary of theoretical concepts in order to improve our understanding of the interaction. Examples are **brokering**, **boundaries**, **negotiation**, **boundary objects**, **engagement**, **imagination**, and **alignment**. **Boundaries** are regarded as a learning asset in the landscape of practice literature. The idea of boundaries as a learning asset has been neglected in digital service innovation and value co-creation and thereby **brokering; negotiations;** the use of **boundary objects;** the importance of **engagement;** ability to imagine a future situation (**imagination**) and the **alignment** of practices. In the article there are also practical recommendations for the project leader involved in value co-creation: i) act as facilitator for temporal brokering - if the end-users got the possibility to act as brokers they did for a limited period of time; and ii) look out for recurring descriptions, such as safety during outdoor horse riding.

**Paper E** (Appendix E) – “An engaged practice research approach to digital service design supporting everyday life” is placed in Figure 2 next to paper C at the boundary between action research and informed basic research. The research approach is a combination of practice research (Goldkuhl 2011) and engaged scholarship (Van de Ven 2007). In the article there is a methodological contribution; engaged practice research is put forward, based on a synthesis of engaged scholarship, practice research, and experiences of value co-creation in the digital service design. The article also contributes four design implications: The outcome of the research is four process-oriented design implications regarding i) mutual responsibility for (understandable) interaction in co-creation.
throughout the process; ii) facilitation could be regarded as an activity performed by the service beneficiary in reaching a deeper understanding of value; iii) identify and integrate recurring and interconnected intangible resources throughout the process; and iv) expanding the scope of the digital service in relation to the co-created value. This is the first article in the thesis where the importance of understanding value among heterogeneous actors is directed to the actual process of value co-creation regarding the everyday life situations. It is also the first article where responsibilities are highlighted. A part of the empirical data also relates to initiatives of the next of kin, much related to empirical data from Paper C. In the title of the paper, digital service design is expressed. In retrospect, this was a mistake; instead, the title should be directed to digital service innovation. A natural part of digital service innovation is design activities and these activities could be grounded in participatory design.
6 Research Contribution

The starting point for the research presented in this thesis was an interest in the practice of digital services innovation for a Human-Centred Service System (Kleinschmidt, Peters et al. 2016) to support everyday life. In digital service innovation the interaction among the involved actors is crucial to understand because it is through human interaction that knowledge is shared and generated (Lusch and Nambisan 2015). One of the challenges in the interaction during digital service innovation for HCSSs is to address value, especially since value is the outcome that is determined by the beneficiary (Vargo and Lusch 2016).

6.1 Perceptions of value

What constitutes value in HCSSs?

Before we address the first question, let’s go back to context of the research, both Free2Ride and FIND are examples of Human-Centred service systems, where the idea was to change the service systems in a way that increases the value for the involved actors, in other words examples of digital service innovation (Kleinschmidt, Peters et al. 2016). Digital service innovation is regarded as service system reconfiguration.

In this thesis the focus is on digital service innovation of Human-Centred Service systems that supports individuals that are active in specific communities, which are characterized by strong relations between the individuals (such as family or close friends). In HCSSs, the personal interaction between the different actors is essential for the value creation. This means that changes in the value creation is affected by the relationship and activities in the different communities.

In both Free2Ride and FIND the core functionality of the developed digital service was to locate a missing person in case of an incident during activities. The use of the digital service involved at least two actors, where both of them could be regarded as beneficiaries due to the strong relationship, such as husband – wife or mother – daughter. It is important (even valuable) for the actors to locate the missing person. Value is made in purposeful social action toward what people deem to be important (Graeber 2001). Salem Khalifa (2004) describes core value as generated by core solutions or as it is in FIND and Free2Ride, the core functionality of the digital service. Therefore locating a
missing person could be regarded as an example of core value. Locating a missing person could also be regarded as an example of functional value as it is described by Sheth, Newman et al. (1991).

In both Free2Ride and FIND, safety was regarded as an important effect when using the digital service. The father and/or mother of a horse riding daughter/son know that they could find their daughter/son in case of an incident during horse riding. Both actors (father and/or mother and daughter/son) regarded this as an improvement of safety. A similar situation was evident in FIND between the next of kin to a demented person and the one suffering from dementia. But it was expressed from the perspective of the next of kin to a demented person. Salem Khalifa (2004) describes expanding values as the experience, to go from the solution to an experience. Much in the same way as safety could be regarded as the experience of knowing that you could find a missing person. Therefore I argue that safety could be regarded as an example of expanding value. Related to the experience are also the emotions between the involved actors. In the empirical settings, we have love, strong friendships, and family relations. Our loved ones, friends, and family are important. In other words, strong relations affects our feelings! Sheth, Newman et al. (1991) relates feelings to emotional value. Therefore, I would also argue that safety is an example of emotional value.

Notable from the empirical data is the wandering between “locating a missing person” and “safety” during activities. Both expressions were used in order to describe the digital service. The wandering makes sense in relation to the two different levels of value, core and expanding values presented by Salem Khalifa (2004). In FIND there was a third expression used by the involved actors, reducing anxiety or stress. By interacting with the receiver the next of kin could locate the demented person, an effect was a reduction of anxiety. By knowing that they could locate the person with dementia another outcome was a feeling of safety. I would argue that the expression, reducing anxiety, is an example of what Salem Khalifa (2004) describes as expanding value. Then we have two examples of expanding values; reducing anxiety and safety. The relationship between those expressions of value regarding the long-term effect, sustainable value (Porter 2010), was not fully explored during this research. Maybe future research could focus on the relationship between expanding values and sustainable values (Porter 2010) in a practice similar to those described in FIND, because sustainable value is related to individuals well-being and quality of life.

The insight that locating a missing person; reducing anxiety; and safety are examples of value, has gradually grown in the process of making sense of the papers in relation to digital service innovation of human-centred service
systems. All three examples of value relate to our deeper human instincts and behaviours. After all, value is always determined by the beneficiary (Vargo and Lusch 2016). The examples on value has been related to two perspectives on value, the anthropological perspective (Sykes, 2016) and the consumer perspective (Salem Khalifa 2004). In Porter (2010), a fourth level of value is proposed, sustainable value.

How can perceptions of value be aligned in digital service innovation?

In the second research question, the focus is on the alignment of perceptions of value. Visible in the empirical data (Papers A, C-D) are initiatives from service beneficiaries and service developers. These initiatives were grounded in overcoming boundaries and supported by objects, such as drawings or newspaper clippings. Interestingly, the initiatives by the service beneficiary had a focus on understanding the everyday life situation (the broader context), mostly the effects of the interaction with the digital service, experience, and sustainable value. The result of the initiatives was a common understanding among involved practices regarding the value of the digital service, in other words, the perceptions of value were aligned. The initiatives are important in aligning perceptions of value among involved practices and thereby the co-creation process took a leap forward in the attempt to co-create a digital service that provided value in the everyday life.

In the empirical data (Papers C-E) initiatives from service developers are also visible. One example is from Free2Ride when a developer presents sketches (wire frames) of the application on the smartphone. In this initiative, it was a focus on the interaction and structure of the application. In the negotiation that followed the presentation, the developers used words and concepts that were familiar to members of the equestrian clubs. Boundaries are understood as a dialogical phenomenon that gives rise to discontinuities in interaction and action. The overcoming of these boundaries was done by presenting the sketches and adopting “the language” from the equestrian club members.

Overcoming boundaries in the interaction in innovation is mentioned as a key challenge (Doolin and McLeod 2012). The interaction is important to understand because it is through human interaction that knowledge is shared and generated (Lusch and Nambisan 2015). The five presented digital service innovation principles are examples of process-oriented operational knowledge intended to address the key challenge of overcoming boundaries. The leap in the innovation processes due to the initiatives of the developers and beneficiaries confirms the importance of addressing the key challenge of interaction. According to Lusch and Nambisan (2015), a common understanding among actors influences the innovation outcome, such as the examples of temporal brokering by service
beneficiaries. Another important finding is that temporal brokering led to decisions, which in turn affected the co-created digital service. The temporal brokering affects digital service innovation and the understanding of value co-creation (leaps in the process and decisions).

Learning during the interaction in digital service innovation is not mentioned specifically in relation to understanding value in a human-centered service system. The interaction that takes place between actors is of importance for learning. It is about engagement by the beneficiary in the interaction: listening; debating; asking questions, and even reflecting. Another aspect of learning is imagination; it is not only about bringing ideas and design propositions about the future. Imagination is about exploring future possibilities in the interaction to reach a common understanding. The last aspect of learning in practice is alignment. The interaction is regarded as a process of aligning the current practice with the context and other communities of practices. Therefore I would like to highlight the importance of a learning dimension in the understanding of heterogeneous actors in digital service innovation.

The theoretical framework that has guided the research thesis has its foundation in learning theories from the practice-based perspective. These theories (communities of practice, boundary practice, and landscape of practices) have a vocabulary and concepts to describe the interaction between heterogeneous actors that are involved. Therefore, I would argue that the presented research in this thesis could be of interest to researchers within workplace learning and nearby fields, as an example where learning theories have been applied to understand digital service innovation for HCSSs. It is especially interesting that in digital service innovation for HCSSs, the boundaries between work and everyday life are blurred. From a practice perspective, the projects could be regarded as an opportunity to study learning in the practice of digital service innovation for a HCSS. In this sense, learning occurs in a framework of both work as well as everyday life participation. The developers who designed the digital services and the continuous work with maintenance and updating the digital service is done in a work context, whereas the practice of the service beneficiaries in a HCSS take place in the everyday life.

In the above text the two research questions have been discussed and addressed in order to fulfil the aim of this thesis, to expand our understanding of digital service innovation in a Human-Centred Service Systems from a practice perspective. Moreover, the text also leads to a set of revised Digital Service innovation principles for HCSSs.
6.2 Digital Service innovation principles for HCSSs

In section 2, exploring digital service innovation, five tentative digital service innovation principles (DSIP 1-5 in Table 3) was derived from the literature for HCSSs. From the practice perspective the theories on communities of practice (Wenger 1999), boundary practice (Wenger, Mcdermott et al. 2002) and landscape of practices (Wenger-Trayner and Wenger-Trayner 2015) have guided the understanding of the interaction during the practice of digital service innovation.

Table 3: Revised digital service innovation principles

<table>
<thead>
<tr>
<th>Tentative Digital service innovation principles</th>
<th>Revised Digital service innovation principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSIP 1: the principle of participation and empowerment of heterogeneous actors, including service-beneficiaries</td>
<td>DSIP 1R: the principle of negotiations between equally empowered heterogeneous groups of actors always including the service beneficiaries</td>
</tr>
<tr>
<td>DSIP 2: the principle of active inter-organizational collaboration in digital service innovation</td>
<td>DSIP 2R: the principle of engagement by involved actors in the active inter-organizational collaboration in digital service innovation</td>
</tr>
<tr>
<td>DSIP 3: the principle of using boundary objects in the sharing and translation of knowledge</td>
<td>DSIP 3R: the principle of temporal brokering using boundary objects in the sharing and translation of knowledge</td>
</tr>
<tr>
<td>DSIP 4: the principle of understanding our perception of value based on importance in a broader context in the human-centred service system</td>
<td>DSIP 4R: the principle of understanding value in relation to the broader context in the human-centred service system</td>
</tr>
<tr>
<td>DSIP 5: the principle of co-creating for different levels of value and different types of value</td>
<td>DSIP 5R: the principle of exploring, describing and aligning levels of value based on actors’ perception of value in digital service innovation</td>
</tr>
</tbody>
</table>

The first tentative principle, *the principle of participation and empowerment of heterogeneous actors, including service-beneficiaries*, does not offer any guidance about the practice of participation and empowerment. In the literature on learning in practice (Wenger 1999, Wenger-Trayner and Wenger-Trayner 2015), negotiations are necessary in order to overcome boundaries between different practices. In other words, negotiations are important for the sharing and
translation of knowledge. In three of the papers (Papers A, C, and D), negotiations are put forward as important to avoid disruptions in the interaction between heterogeneous groups. Negotiations took place at almost every workshop in both projects. The negotiations between the different practices usually started with a presentation from one practice, which led to follow-up questions from other actors. After a while, a consensus was reached before the loop of presentation and negotiation started again. After one of these loops in FIND, one of the developers stated, maybe this is the first time we really understand the life situation of the service beneficiaries. A foundation in FIND and Free2Ride was the empowerment of the user (service beneficiaries). Negotiations are regarded as important to overcome boundaries; avoid misunderstandings and to overcome differences (Wenger 1999). Another aspect of negotiation is how the experiences from real life in one practice could be fruitful for another community of practice, especially in those situations where both practices are active in the same service system. Therefore, the first principle will be revised and include negotiations between heterogeneous actors (Table 3). The revised principle (DSIP 1R) is the principle of negotiations between equally empowered heterogeneous groups of actors always including the service beneficiaries.

The second tentative principle, the principle of active inter-organizational collaboration in digital service innovation (Table 3), highlights the importance of active collaboration over boundaries. One example of active collaboration is designing (scenarios, prototypes, etc.), debating and collective reflection (Wenger-Trayner and Wenger-Trayner 2015). It is apparent in Papers A-D that the actors that took part in activities became engaged in the activities and the following negotiations led to an alignment of the involved practices. In the first project, FIND, during a follow-up interview with one of the participants, he said that he became engaged (telling real-life stories) because the developers were engaged in our wellbeing. The developer's engagement was visible mainly from how they acted during workshops, i.e., being interested and asking questions. In a sense, engagement by one actor leads to engagement by another actor. Engagement is also visible in Free2Ride (Figure 6), where engagement also led to engagement. Further on, engagement also leads to alignment (Wenger 1999). In engaged scholarship (Van de Ven 2007), the researchers also engage in inter-organizational collaboration between practices. In both projects, wellbeing is put forward as important. Wellbeing could be regarded as a value with a central concern in human-centered service systems. The mutual engagement by the practices led to initiatives by actors in order to align perceptions of value. As a consequence, the second principle will be revised and include engagement (Table 3). The revised principle (DSIP 2R in Table 3) is the principle of engagement by involved actors in the active inter-organizational collaboration in digital service innovation.
The third tentative principle, *the principle of using boundary objects in the sharing and translation of knowledge* (Table 3), advances the idea that objects (such as scenarios, mock-ups, prototypes, etc.) are central in sharing and translation of knowledge. From participatory design (Ehn 2008) those objects are referred to as boundary objects (Star and Griesemer 1989, Star 1990, Star 2010). Boundary objects are a central concept in overcoming boundaries between practices (Wenger 1999), especially if socio-cultural boundaries exist (Wenger-Trayner and Wenger-Trayner 2015). Another related concept is brokering (Wenger 1999): brokers introduce elements from one practice into another. According to Wenger (1999), brokering and boundary objects are parts of a duality. From the empirical data, two themes have been selected that relate to translation and sharing of knowledge: strong relations and placing the transmitter. The strong relations refer to relations between the service beneficiaries. In FIND the beneficiaries were the person with dementia or that person’s next of kin and in Free2Ride there were also strong relations, such as a mother (who used to be a dedicated horse rider) and daughter (often a dedicated horse rider). In order to understand the strong relations between the actors, the caring of other actors, actors become brokers and tell stories about their life situation, an understanding which is crucial in order to improve the service system. In both projects, placing the transmitter was a challenging issue. In Free2Ride drawings (boundary object) of the transmitter on the horse led to a discussion about placing the transmitter. In FIND the placement of the transmitter was the theme for a prototype workshop; the beneficiaries designed and created prototypes of the transmitter. The prototypes were presented to the developers who asked a lot of questions. In Papers A-D, brokering and boundary objects are used together to share and translate knowledge. Actors took initiatives for a shorter time period to share knowledge, in order to help the others to understand the actors used boundary objects (newspaper clippings, etc.). Therefore temporal brokering will be proposed and accordingly, the third principle will be revised and include temporal brokering (Table 3). The revised principle (DSIP 3R) is *the principle of temporal brokering using boundary objects in the sharing and translation of knowledge*.

The fourth and fifth tentative principle both address value. The fourth tentative principle (DSIP 4), *the principle of understanding our perception of value based on importance in a broader context in the human-centred service system*, indicates a deeper understanding of value in a specific context. The fifth and last tentative principle (DSIP 5), *the principle of co-creating for different levels of value and different types of value in digital service innovation of the human-centered service system*, indicates that there are different levels of value and different types of value.
The broader context highlighted in FIND is well-being in everyday life situation. In Free2Ride the broader context is often related to practices before, during and after horse riding; even though it is a human-centred service system, the wellbeing of the horse is important. Wellbeing is crucial in both HCSSs. One type of value is the emotional value, emotional value relates to our feelings; the stronger the relationships between the actors in a community, the more feelings are at stake. In each HCSS there is love, strong friendships, and family relations. Another type of value is the functional value; functional value is related to utility, in each HCSS, finding a missing person. The emotional value is the motive behind the functional value which can be understood in the context of the HCSS. According to Graeber (2001), value is made in purposeful social action toward what people deem to be important. From the empirical settings there are indications that the different types of value (functional and emotional value) are dependent on the context of HCSSs, therefore the fourth revised principle will be (DSIP 4R) the principle of understanding value in relation to the broader context in the human-centred service system. In other words, the different types of value are removed from DSIP 5R.

Co-creating value and understanding perceptions of value are also related. Co-creating value among heterogeneous actors is dependent on the actors’ perception of value, which is dependent of the boundaries between the actors. Visible in the empirical data was initiatives by service beneficiaries and developers to overcome boundaries in relation to perceptions of value. There were conceptual descriptions and prototypes of the digital service in the service system, designed by the involved actors. The service beneficiaries and developers constructed, reflected, and explored possibilities (such as value) in the future. In other words they used imagination to overcome boundaries, which is a challenge in digital service innovation (Wenger-Trayner and Wenger-Trayner 2015). In the appended papers locating a missing person, reducing anxiety, and safety are put forward as expressions of value. The process of understanding value had differences between the two projects. In FIND it started with locating a missing person, then the reduction of anxiety, and lastly the feeling of safety. In Free2Ride the opposite took place, as it started with safety and later addressed locating a missing person. The process of value co-creation is not only about the understanding of value or identifying value; it is about aligning descriptions of value based on the actor’s perception of value (Table 3). The fifth revised digital service innovation principle DSIP 5R will have a focus on the process of co-creating an understanding of actors perception of value. Therefore I propose (DSIP 5R) as: the principle of exploring, describing and aligning levels of value based on actors’ perception of value in digital service innovation.
The five revised digital service innovation principles (DSIP 1R – DSIP 5R) are not intended to cover every aspect of digital service innovation for HCSSs supporting everyday life. Instead, the focus is on specific communities, which are characterized by strong relations between the members, where the members are engaged in specific practices for the community, and where these practices could lead to incidents that affect the members of the community. Moreover, the list of digital service innovation principles is not exhaustive. Instead, the list has emerged throughout the research process. The digital service innovation principles have not yet been tested or evaluated in any other digital service innovation project related to the transformation of HCSSs. It is important to evaluate these contributions in practice during research on digital service innovation, which could lead to insights for the researcher interested in digital service innovation.

6.3 Reflections on the research approach

There are several aspects of engagement (or being engaged) in this thesis. First of all, engagement is part of one of the digital service innovation principles (DSIP 2R). Engagement is put forward in both the related research and the theoretical framework. In the related research, engagement is considered important during dialogue in value co-creation (Prahalad and Ramaswamy 2002). Engagement is also an important aspect of the landscape of practices (Wenger-Trayner and Wenger-Trayner 2015). A third aspect of engagement is the engaged scholarship approach which relates to the research approach (Van de Ven 2007).

The collaboration between researchers and practitioners in order to advance the scientific enterprise and illuminate practices are the foundation of engaged scholarship. Engaged scholarship (Van de Ven 2007) as research approach is an example of a multimethod approach (Mingers 2001). In this thesis, there are three forms of engaged scholarship: action research, design research and informed basic research. Of those research methods, the dominant research method has been action research. The underlying philosophies have been a combination of the pragmatism perspective (Baskerville and Myers 2004) and the interpretive perspective (Walsham 1995, Klein and Myers 1999).

A driving force in action research is an interest in research together with an interest in problem-solving (McKay and Marshall 2001). But the action research within engaged scholarship is slightly different (Van de Ven 2007): “produces knowledge that can both advance the scientific enterprise and enlighten a community of practitioners” (2007: 7). Where McKay and Marshall (2001) are explicit about problem-solving, Van de Ven (2007) highlights knowledge about
complex problems that could illuminate a practice, an approach closer to the presented research in this thesis.

Another characteristic of engaged scholarship is the oscillation between forms of research and the role of the researcher, such as detached outsider during informed basic research. In the presented research there was oscillation between understanding the problem and producing knowledge about the problem.

A similar research approach, practice research, has been presented by Goldkuhl (2012). In practice research, the situated inquiry is of importance in understanding local practices. Practice research is directed to an understanding of organizations in practice, not the practice of everyday life. I would argue that the situated inquiry is of importance in understanding digital service innovation for HCSSs as a practice based on the engaged scholarship approach. Therefore I would like to propose engaged practice research for everyday life when engaging in the practice of value co-creation for everyday life (Paper E). One aspect of engaged practice research is to engage in local practices but produce knowledge for general practices based on findings in the local practices. In this thesis, the practical contribution in 6.4 is an example of knowledge for general practices. Here the local practices (or HCSSs) are Free2Ride and FIND, two projects where the researchers acted both as an engaged researchers and project leaders.

6.4 Practical contribution

The practical contributions will be directed to those involved in digital service innovation on a tactical or strategic level. The practical contribution of this thesis has a foundation in experiences when acting as an inside researcher in engaged scholarship (Van de Ven 2007). The practical contribution concerns the importance of a common understanding among the actors regarding how the service beneficiary experiences and determines value. First, always involve the service beneficiaries, as they are the ones that can actually express and describe value, but keep in mind that service beneficiaries are a heterogeneous group. A consequence of this is that the beneficiaries from different practices need to be identified. Second, value from co-creation has different levels (core, experience and sustainable), map and relate expressions of value on different levels to each other. Third, don’t underestimate the importance of a facilitator during interaction between heterogeneous actors, especially when the service beneficiary and developers have equal power. As a consequence, emergent topics during the interaction are important, so be permissive to alternative perspectives during the interaction. Alternative perspectives have the ability to initiate reflection among the involved actors and thereby could lead to a common understanding. Another task for the facilitator is to look out for recurring descriptions; it means that something is
important and could be related to value. It could be months between the occurrences, but it is still important. It indicates that something has been stuck in the back of someone’s head and when the time is right it appears. Lastly, look out for initiatives involving objects such as drawings or extracts from the newspaper created between activities. They are a sign of engagement which also could lead to a common understanding.
7 Concluding Remarks

The aim of this thesis is to expand our understanding of digital service innovation in Human-Centred Service Systems from a practice perspective. In focus have been Human-Centred Service systems that support individuals that are active in specific communities, which are characterized by strong relations between the individuals (such as family or close friends) and incidents do happen in the practice of the community. In this thesis theoretical concepts and their relations applicable to understand digital service innovation in Human-Centred Service Systems from a practice perspective. Moreover, examples of different levels and types of value has been demonstrated and related to theoretical concepts relevant for digital service innovation in Human-Centred Service Systems. Further on, the alignment process relating to perceptions of value have been described and related to theoretical concepts. Important in the process was initiatives from service beneficiaries and service developers. The initiatives were grounded in overcoming boundaries and as an effect, the process of digital service innovation made a leap. It is also noteworthy that the initiatives affected the process of making decisions.

The thesis also proposes five digital service innovation principles for HCSSs that supports individuals are active in specific communities. The proposed digital service innovation principles are a response to the call for research on the interaction among the involved actors from a practice perspective. The interaction is important to understand because it is through human interaction that knowledge is shared and generated. The proposed digital service innovation principles provide new insights that extend our understanding of digital service innovation.

The research has adopted the practice perspective in the development of the theoretical framework, but the practice perspective has also been an important part of the engaged scholarship when the researcher acts as an attached insider. The mix of practice research and engaged scholarship resulted in a methodological contribution: engaged practice research for everyday life. The presented research had a focus on the attached insider, which means that researcher is both engaged and involved. Similar research on digital service innovation from the engaged scholarship approach could have a focus on the detached outsider. The researcher could still be engaged, but not that actively involved in addressing practical problems.
The digital service innovation principles are limited to HCSSs with a special set of characteristics. Future research could propose digital service innovation principles directed for HCSSs that are more general or other types of service systems. The theoretical framework had the practice perspective as a foundation. In this research, the practice perspective is limited to communities of practice, boundary practices, and landscapes of practices. There are other practice perspectives made by prominent researchers such as Giddens, Bourdieu, and Engeström, to mention a few. Future research could apply those practice perspectives in order to understand more about digital service innovation for HCSSs.

From my perspective, digitalization of everyday life has just started. I realize that it has been going on for years, but now we begin to see the impact. The digital services that need to be designed, developed, and implemented in different kinds of service systems in order to co-create value are a foundation in digitalization. There will be value propositions offered to service systems from developers of digital services, and hopefully those propositions are grounded in an understanding of value from the users’ perspective. It is in activities during the human interaction that the understanding emerges. Interestingly, one consequence of the practice perspective on digital service innovation of human-centered service systems related to everyday life is that practices, service developers, and beneficiaries all have responsibilities. One such responsibility relates to the overcoming of knowledge boundaries in the process of understanding value from the users’ perspective. Otherwise, the service developers get exclusive power over the design of digital services for everyday life that we as individuals will use, and which in the long run could generate risks relating to safety and integrity.
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