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Katja Rantala

Professionals in Value Co-Creation through Digital Healthcare Services

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ABSTRACT

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Digitization is changing the dynamics within the service sector, including healthcare. The customer access to information and new ways of interacting with the customer challenge the traditional service within healthcare featured by information asymmetry and autonomous role of professionals in decision making. Digitization introduces new service concepts and roles of service actors benefiting value cocreation among the service network. Customer actively participates in the digital service process, which sets demand for new approach, behavior and skills of the professional interacting with the customer. The present discussion around value cocreation lacks research from the service provider's perspective in the value cocreation process. Further, in relation to digitization of the service there emerges need for focus on the changes imposed on the professionals' work and interaction with the service network and the customer. As value co-creation is yet rather unexploited concept in healthcare the dissertation contributes to the development of value cocreation theory and concept of service-dominant logic as well as of management literature of healthcare by introducing the professionals' perspective on value co-creation.

The empirical material for the dissertation come from single case study representing an organization actively involved in enhancing digital healthcare services with a substantial reference value on its field. The data was gathered through expert interviews, focus group interviews and through observations on multiple occasions within the organization providing in-depth understanding for the research phenomenon.

The findings of the study increase understanding of the complex healthcare environment facing challenges due digitization in the customer interface. The findings confirm that digitization challenges professionals in their work requiring changes in how the professionals operate with digital service processes and integrate existing service processes with new, digital service processes enabling value co-creation. The digital service may be seen as threat to the professional autonomy and implementing digital service processes requires strong organizational and managerial involvement to ensure value co-creation. As digitization is yet rather unstructured phenomena in healthcare, the results of this dissertation have several managerial implications providing a perspective to ensure digitization and value co-creation in healthcare.

Keywords: service-dominant logic, healthcare, value cocreation, digitization, eHealth, professionalism, institutionalism, standard work, digital services

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FOREWORD AND ACKNOWLEDGEMENTS

"Have the courage to follow your heart and intuition."
(Steve Jobs, 2005)

This dissertation journey started in 2014 while working and observing the digital change turmoil in healthcare. The relevance of these changes for healthcare professionals and for the interaction with the customers motivated the dissertation and urged me to approach Professor Heikki Karjaluoto with my application for the dissertation. Professor Karjaluoto responded with an open mind and accepted my proposal for the dissertation.

The journey has been "a dream come true" in terms of challenging myself and surviving in the midst of the exercise while working full-time elsewhere. The journey has brought me tremendous joy and realizations that have carried me forward in the moments of self-criticism and frustration.

My deepest gratitude and respect I wish to express to my supervisor Professor Heikki Karjaluoto. From the very beginning Professor Karjaluoto supported my idea encouraging and providing valuable advice and feedback. Professor Karjaluoto's expression "you can do it" was like a war-cry in moments of doubt keeping the ball in game. I am forever grateful for supporting me through this journey with great patience and with excellent, positive attitude.

I am honored to have had valuable feedback on my dissertation from distinguished scholars in the field of marketing, Professor Chanaka Jayawardhena from the University of Hull and Associate Professor Elina Jaakkola from Turku School of Economics, University of Turku, who served as reviewers of this dissertation.

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Accomplishing such an endeavor would not have been possible without the support and help of so many. I owe my deepest feelings of gratitude to my children, family and friends for encouragement and support. My children have kept me on track and supported with encouraging comments "you are our hero". I wish to express my warmest feelings of gratitude to my spouse Lasse Rasi, who has guarded my peace in writing, supported in all possible ways and shared the joy of success.

This journey has arrived now to the final milestone and I feel such joy and gratitude for God for guidance during the entire accomplishment. Sharing this joy for this accomplishment belongs to all of us.

Jyväskylä, May 2018, Katja Rantala

FIGURES

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1 INTRODUCTION

1.1 Study background and research questions

Digitization of services is accelerating and entering new areas of businesses and of life with the disruptive power to change business logic by reshaping existing ways of working, creating new ones, interacting and cooperating with multiple actors (Loebbecke and Picot, 2015; Orlikowski and Barley, 2001). According to Loebbecke and Picot (2015), digitization will have the biggest impact on knowledge workers, similar to the way in which automation influenced the work and employment of manufacturing workers. The service sector of healthcare is not an exception to this transformation of services through digitization. Healthcare services are in short supply in many countries, and the aging population and increased complexity of illnesses and conditions are creating an ever-increasing demand for such services. To increase the availability of these services, the OECD and several governments have announced their intents to focus on digital solutions (OECD, 2013; WHO, 2014).

Healthcare is widely utilizing multiple IT solutions for service processes and data monitoring, but the new era of digitization, with artificial intelligence (AI), Big Data, and algorithms for services and actions, has disrupted the way these services are provided and utilized. Digitization of services can proceed in many ways. The existing services can be transformed into digital formats or supported by digital solutions, and completely new services based on digital service portals may be developed. The disruption in healthcare caused by digitization influences the work and roles of the professionals and their way of demonstrating expertise in decision-making in the customer interface (Noordegraaf, 2007; Lawrence, Zhang and Heineke, 2016). Further, the digitization of services enables the introduction of advanced algorithms for service processes with the possibility of enhancing data driven-decision-making, increasing the transparency of the service process, and offering more personalized services to customers (Newell and Marabelli, 2015; Prahalad and Ramaswamy, 2004b; Patel et al., 2009, Chang, 2016). Big Data and its possibilities are of interest to many

consultants and academics. However, new technology and Big Data are not unproblematic in decision-making, and there is a need for human insight in interpretations, as reported in a *Harvard Business Review* article by McAfee and Brynjolffson (2012). The problems are often related to tradeoff-effects, such as privacy versus security (Newell and Marabelli, 2015).

Companies have invested greatly in market research to determine customer or consumer preferences and needs. However, despite the huge investments in marketing efforts and the greater variety for selection, consumers are still dissatisfied (Prahalad and Ramaswamy, 2004b). This dissatisfaction is mostly due to changed consumer expectations regarding engagement and more personalized consumer experiences and services (Prahalad and Ramaswamy, 2004b; Ylén et al., 2014b; Chandler and Lusch, 2015; Newell and Marabelli, 2015). Traditionally, customers have mostly been targets of companies' development and marketing or service actions, and the role of consumers has been to choose from or to adapt to service providers' offerings. With the changing customer expectations towards services in matters of personal concern, the service provider is being challenged and put under pressure to recognize these changing roles and expectations and to take action to prepare for successful interactions to meet such expectations (Prahalad and Ramaswamy, 2004a; Barile, Saviano and Polese, 2014; Gulbrandsen et al. 2016; Ouschan, Sweeney and Johnson, 2006).

In an MIT study on leading companies, senior executives were interviewed about their most important targets for digital transformation. The MIT study reported on two dimensions: knowing more about the end customers and operating in an increasingly digital ecosystem. The study described the ecosystem driver model as consisting of relationships offering complementary services of third parties, such as health coaches, various applications, and iTriage, through which users can search for information on symptoms and medications and find nearby hospitals (Weill and Woerner, 2015). Digitization intensifies the pressure to meet customer expectations, as it enables the customer to co-create value with the service provider, allows the customer to have a participative role throughout the service process and in the decision-making, and enables self-care supported by digital service portals (Prahalad and Ramaswamy, 2004a; Ylén et al., 2014b; Carman and Workman, 2017). Digitized services offer new possibilities for customer engagement through self-care in healthcare with support and knowledge embedded in the digitized service process (Lawrence, Zhang and Heineke, 2016).

Value co-creation has been evolving in academia from the idea of value production to value co-creation through definitions of the roles of the service provider and customer and their interactions. Prahalad and Ramaswamy (2004a) introduced the concept of value co-creation. Currently, there are two main schools of thought on value creation, service logic, and service-dominant logic. The first is represented by the Nordic school identified strongly with Christian Grönroos (Gummesson and Grönroos, 2012). The second conception of service-dominant logic is identified with Stephen Vargo and Robert Lusch, among oth-

ers (Vargo and Lusch, 2004). Their distinctive differences involve the role of the customer in interactions with the service provider and the locus of value co-creation (Grönroos, 2011a; Grönroos, 2008; Vargo and Lusch, 2008a, 2008b). Service logic focuses on customer creation of value and value's being co-created only in direct interactions between the service provider and the customer. According to service-dominant logic, value is always co-created with the customer defining the value. Further, service-dominant logic extends the concept of value co-creation to a network and further to an ecosystem perspective. The service-dominant logic idea is expressed in the axioms, according to which multiple actors co-create value and value co-creation is coordinated through institutional arrangements (Vargo and Lusch, 2016). By definition, the service ecosystem consists of actor networks zooming out from the dyadic relationships while integrating resources from many sources, not only from the service provider or the customer, and these networks are linked by dynamic processes. Further, these networks are argued to function for collective well-being (Vargo and Lusch, 2017).

The idea of value co-creation is quite applicable to the healthcare sector, which forms a complex service ecosystem with multiple internal and external network actors and systems and in which strong motivation exists for creating good and seeking beneficial solutions for the customers who are the targets of services and value co-creation (Lusch and Vargo, 2009; Allee, 2009). Despite this benevolent foundation, the healthcare sector is often accused of very often focusing on medical expertise, internal processes, and professional autonomy in decision-making rather than on genuinely collaborating with the customer or multi-professional teams in the actor network (Kreps and Neuhauser, 2010; Nugus et al., 2010; Li et al, 2013). The transformation of services and the creation of new digital services call for collaboration within the service network to carefully define the new service processes and new roles in the process. Further, this definition work requires high managerial involvement in ensuring that new processes can be integrated into the working processes of an organization. The healthcare ecosystem consists of systems and professionals in various areas of medicine, nursing, therapy, IT, and law, among others. In responding to the challenge digitization sets for the services, the expertise of all actors is needed in order to establish sound and reliable digital services that also meet the requirements for medical devices set by regulations and legislative norms (European Committee, 2007). The actor network integrates these resources and relevant information in the development of the system as well as in defining the practices for care or treatment through the digital service.

The value co-creation process is focusing greatly on the interaction between the customer and the service provider (Prahalad and Ramaswamy, 2004a). Further academic discussion on value co-creation and its precedents enlarge the concept of actors involved in the interaction to encompass an entire service network and even to service networks of actors and organizations (Vargo and Lusch, 2016; Vargo, Wieland and Akaka, 2015; Vargo, Akaka and Vaughan, 2017). However, stemming from the marketing science focus on the

customer, the role of the single service provider gains less attention in these academic discussions on value co-creation and according to Grönroos and Voima the role of the single service provider has not been clearly defined in the value co-creation process (Grönroos and Voima, 2013). Based on these findings on the service provider in the value co-creation literature, this study focuses on the role of the service provider by considering the disruptive power of digitization to change the ways of working and interacting within the service network and with the customer. This study discusses this transformation in the value co-creation process both before and after the implementation of a digital service. Further, the changing interaction process with the customer and within the service network of professionals as it relates to power relations is discussed. For managerial purposes, this study takes a multi-disciplinary perspective. The main theoretical foundations of the study are in service-dominant logic with value co-creation and in digitization of services with IT. The implications call for contributions from institutional and organizational sciences. The contexts of value co-creation and digitization both form an intertwined approach to the role of the service provider. The implications and requests regarding the roles of the professional and the service provider in the value co-creation process are the main focus of the study. The transformative nature of digitization in value co-creation highlights changes in the roles and in the interactions among members of the service network. Further, the integration of digital service processes with existing service processes and its implications for value co-creation call for supportive action from management to ensure successful implementation and engagement of professionals with digital services.

1.2 Objectives and establishing the problem

This dissertation studies the digitization of services in healthcare service networks and its implications for value co-creation from a service provider's perspective. Understandably, in marketing science, value co-creation is mostly studied from the customer perspective, and there is less research on the role of the service provider in value co-creation and how the service provider ensures that value co-creation can be supported and made successful (Grönroos and Voima, 2013). Vargo and Lusch (2016) expand the value co-creation process to a multiactor concept involving a network of actors. However, the various roles of the actors and the service providers in the network call for further openings and research. In healthcare customer involvement in the service processes is expressed often as patient engagement, which still is rather limited or only emerging in practical developments and yet focusing mostly on macro-level initiatives for example of National Health Service (NHS) in the UK. The academic discussion on patient engagement has been disputing for example around whom to involve, on which levels to involve (macro-, meso or micro level) and on the relationships between professional providers of the services and the roles customers may assume on the professionals (Martin 2009; Renedo and Marston,

2011; Gibson, Britten and Lynch, 2012). Therefore, the concept of value co-creation has not yet received wider implications within healthcare related academic discussions (Hardyman, Daunt and Kitchener, 2015).

The objective of this study is to increase understanding of value co-creation through digitization of the services from a healthcare service provider's perspective. To reach this aim, the study introduces marketing and service science through service-dominant logic and value co-creation to the healthcare context and contributes to the discussion of the concept of value co-creation. This study focuses more on value co-creation on the individual level from the service provider's perspective, but recognizes the context of the service ecosystem, with organizational and institutional aspects influencing the service network and value co-creation described in Chapter 2 (FIGURE 1). The social implications of digitization can be identified in the organizational context (Orlikowski, 1992). Orlikowski and Iacono (2001) pointed out that typically digitization is expected to be unproblematic after implementation and installation. This study dives into phenomenon of digitizing services, exploring the problems professionals face when implementing and using digital healthcare services in order to perform in the customer interface and within the service network. The study suggests precedents for value co-creation in new digitized service processes. From the managerial contribution perspective, this study strives to offer insights into the service provider's actions; prerequisites for value co-creation; and suggestions to enable the professional as an actor to perform in the service network and in the customer interface, integrating resources for successful value co-creation.

Summarizing these intentions and aims and reflecting Lawson's (1979) question "What needs to be true in order to make this event possible?", the research problem is formulated as follows:

How can the digitization of healthcare services enable value co-creation?

The research problem addresses different aspects of value co-creation and digitization of healthcare services, resulting in the following research questions:

1. How does digitization influence the value co-creation process with the customer?
2. How does the digitization of services influence development work and value co-creation opportunities?
3. What kind of changes does digitization imply for professionals as a precedent of value co-creation?
4. How can management support value co-creation from professionals?

This dissertation consists of four individual research papers or manuscripts, each focusing on the research phenomenon from different perspectives and jointly providing the answers to and insights into the research question. The

articles are presented with an overview and the relationship to the research question in Chapter 1.5, the outline of the dissertation (TABLE 1).

1.3 Research approach and methodology

The study connects to relativism rather than to positivist epistemology (Easton, 2010; Welch et al., 2011) and adopts moderate constructionism with ontological assumptions closely related to Fleetwood's (2004) critical realism, which emphasizes the involvement of humans as recognizers and mediators of reality. Critical realism emphasizes social relations (Lawson, 1999), but moderate constructionism more strongly focuses on the influence of social relations on reality and which social relations are significant to value co-creation. Value is co-created through social interactions, and social roles influence this process (Vargo and Lusch, 2008b; Edvardsson, Tronvall and Gruber, 2011).

This dissertation aims to increase understanding of the implications of digitization of services in the healthcare service ecosystem. In this pursuit, the study utilizes a multidisciplinary approach by combing marketing science with technology in form of e-Health. The nature of the dissertation is descriptive and interpretative due to the complexity of the research environment of healthcare and the attempt to introduce a multidisciplinary approach to healthcare, which has often been called for recently (Keijser et al., 2016; Helman et al., 2015). To study the implications for the service provider and the precedents of the value co-creation process, moderate constructionism with features of interpretivism seemed most appropriate research approach. The selection of the research approach was greatly influenced by the ongoing turbulence of changes in healthcare due to digitization, which aroused the aspiration to understand the disruptive and transformative influence of digitization on the value co-creation process and service actors.

The selection of a qualitative research method occurred rather naturally, as this dissertation stemmed from discussions and observations within a major university hospital in Finland. Based on this national position, the case organization stands for substantial reference value in its development work. The case selection was based on an authentic interest in the specific healthcare organization's actions to develop digital healthcare services with a wide network of other university hospitals and primary care organizations, among others. The motivation for the study was strongly supported by the unique opportunities for more profound observations within the organization, as one of the authors was working at the organization. During the negotiations with the case organization, the organization's representative revealed two newly established digital services for the study. These services are part of a larger digital service portfolio called the "village," and the services in the portfolio are called "houses." These two selected services are the "mental health house" and the "weight control house." As the same organization developed the two services in a similar manner, the author of this dissertation chose not to differentiate between these two

services and instead to treat them as one embedded unit of analysis. The research methodology and the applied methods are discussed more thoroughly in Chapter 3.

1.4 Defining the key concepts of the study

Value co-creation
Service-dominant logic (Vargo and Lusch, 2008a) approaches value co-creation through interaction. Value is co-created in interactions focusing on dialogue in which the customer plays an active role and strongly contributes to the value co-creation process (Prahalad and Ramaswamy, 2004b; Vargo and Lusch, 2004). Co-created value can emerge through experiencing a service, and thus according to Vargo and Lusch (2008a), value is always defined by its beneficiary, typically represented by customers. Therefore, the service provider cannot produce value (Vargo, Akaka and Vaughn, 2017).

Value co-creation aims to realize benefits for the actors involved through integrating resources during the process. Vargo and Lusch (2008a) argued that value co-creation requires more than one actor for resource integration. These multiple actors form a service network in which they collaborate and coordinate network resources for value co-creation (Prahalad and Ramaswamy, 2000a; Vargo and Lusch, 2004, 2008a). Customers are among the actors in the service network and can integrate personal resources and other resources beyond those of a single service provider (Arnould, Price and Malshe, 2006; Baron and Harris, 2008). The foundation for value co-creation is established in the service-dominant logic axioms presented in Chapter 2.1.1.

Digitization
The term "digital" has various definitions, but broadly defined, it encompasses both information systems (IS) and information technology (IT). Both systems and technology are required to create a sound digitization strategy with the development and use of the systems, and defining the required capabilities (Peppard and Ward, 2016). Narrowly, digitization is the conversion of analogue information to a digital format. From a broader perspective, digitization can also be described as a social process transforming the techno-economic environment and socio-institutional operations (Katz and Koutroumpis, 2012). Further, digitization can be described as a revolutionary factor influencing cultural phenomena, with consequences for company strategy and processes, and as a phenomenon providing new tools and environments for marketing, here with the goal of meeting customer needs (Orlikowski and Scott, 2008; Nylén, 2015; Lipiäinen, 2015; Trainor et al., 2011). The disruptive or revolutionary nature of digitization is linked to technological innovations that can mold existing economic structures or even make certain professions obsolete, which has been happening in many industries, including services. This disruption is occurring while it also

creates completely new alternatives for economic structures and professions (Loebbecke and Picot, 2015; Nylén, 2015).

In the service process, digitization transforms communication and even the roles involved in interactions. The transformative nature of digitization is evident as the patient becomes a more active participant through technology, becomes more of a customer making choices, and acts independently of the service provider (Langstrup and Rahbek, 2015). The terms "digitization" or "digitalization" are understood in this study as referring to the transformation occurring in converting traditional face-to-face services to digital formats with broader social and organizational implications (Katz and Koutroumpis, 2012; Orlikowski and Scott, 2008). Digitization of services introduces a forum for value co-creation by shifting the interaction and resource integration to the digital platform (Saarijärvi, 2011). The digital platform presents a mechanism or joint sphere through which resources can be integrated for value co-creation (Grönroos and Voima, 2013; Saarijärvi, Kannan and Kuusela, 2013; Storbacka et al., 2016).

Institutionalization

Institutionalization is a process by which the formal structure of an organization becomes accepted (Tolbert and Zucker, 1983). Digitization represents the new formation of such structures, both formal and informal (Peng et al., 2009). Formal structures are based on rules and norms. They institutionalize organizational practices as routinized action, meaning that these particular jointly agreed-upon rules and procedures are followed in everyday actions. However, human action changes and interprets these norms; therefore, the formal institutionalization is iterated and appropriated (Orlikowski, 2000) through informal institutions. Informal institutions implement and interpret the norms and rules according to the knowledge and skills of the organization's employees, and they reflect the values and beliefs of the organization. (Zucker, 1987; Meyer and Zucker, 1989; Orlikowski, 2000).

Professionalism

Professions are knowledge-based service occupations that typically require specialized education and experience (Evetts, 2009). Professionalism is linked to disciplines that apply such specialized knowledge to give the autonomy of self-regulation and authority for the professionals and the ability to defend this autonomy of the professionals (Noordegraaf, 2007; Lawrence, Zhang and Heineke, 2016). For example, in the UK, medical professionalism has been defined as a set of values, behaviors, and relationships that underpin the trust the public has in doctors. Included in the same definition are the outlined roles and duties of other members of the healthcare team to help create an organizational infrastructure supporting doctors in their exercise of professional responsibilities (Working Party of the Royal College of Physicians, 2005). However, on healthcare teams, there are several professional occupations that are licensed and exert certain authority in the service network, causing the former definition

to be challenged in today's multi-professional teams. Nevertheless, this situation provides insight into the traditional autonomy of professionalism as it relates to the physician's profession. (Nugus et al., 2010; Keijser et al., 2016). This earlier tendency toward a closed system of professional self-regulation is obviously encountering challenges from external actors like customers as well, as they request the openness and transparency digitization enables (Currie et al., 2012).

The professional environment has distinct features related to how the organization is influenced by the professionals. Professional backgrounds or professional demographics within an organization can even shape the organization's strategy (Tilcsik, 2010). Further, implications of the professionals' action extend outside organizational boundaries, as professionals are often connected to professional associations that influence an organization's regulations and innovations from outside by legitimizing and granting certifications related to competencies (Greenwood, Suddaby and Hinings, 1992; Anteby, Chan and DiBenigno, 2016). Some professions can even influence government policies through their associations (Fourcade, 2009).

1.5 Outline of the dissertation

This dissertation consists of two parts: Part I proceeds by introducing the topic and research process, providing a theoretical perspective on the research phenomenon, and answering the research questions based on the original papers introduced in Part II. Part II provides the reprints of the original research papers, each focusing on different aspects of the research phenomenon.

PART I: Part I proceeds with Chapter 2, which reviews the research topic in existing literature while striving to deploy a multidisciplinary approach to provide a theoretical understanding of the research phenomenon in a complex environment. The literature review is divided into two sub-areas of 1) service-dominant logic and value co-creation and their respective manifestations in healthcare and 2) eHealth and digitization of healthcare services with organizational approaches to digitization and discussions of how professionals perceive eHealth and digitization of healthcare services and how they are integrated with existing service processes. The applied methodology of the research is presented in Chapter 3. Chapter 4 presents a summary of the results of each original paper. Chapter 5 provides the findings of the dissertation in relation to the research questions and the main research problem, with a discussion of the conclusions. The theoretical and managerial contributions are discussed, and some managerial recommendations are provided. Part I concludes with an evaluation of the study and its limitations and suggestions for future research.

PART II: Part II describes the individual research papers of the dissertation. All the papers were written by the author, but finalized for publishing in cooperation with the co-author, thesis supervisor Professor Heikki Karjaluoto. The author of this dissertation is the primary author of these four papers, and

her contribution to each paper ranges from 80% to 90%. The research articles are presented in terms of their focus and contribution to the presented research questions.

Paper I: This research paper opens the theoretical perspective on value co-creation relevant to research questions 1–4 and answers research question 1. The paper sets up the theoretical framework serving the research project by shedding light on and explaining the concepts of value and value co-creation and their evolution and differences as they relate to the customer interface. This paper provides insights into the interactions and roles in value co-creation through digital services. The author of this article was responsible for reviewing the relevant literature and writing the manuscript. The co-author, who supervised this dissertation, gave feedback on the paper in several phases of the writing process. The paper was accepted for a conference and was subject to a double-blind peer-review process resulting in minor corrections to the writing. The author presented the paper at the conference with separate presentation materials. After the presentation of the theoretical perspective on value co-creation, the theoretical framework of the dissertation was iterated and focused on the service provider's view of her role and actions in value co-creation for the subsequent research paper manuscripts 2–4.

Paper II: This research paper answers research question 2 by studying the value co-creation elements of the DART model (Prahalad and Ramaswamy, 2004a). The thematic reference to the value co-creation elements was enriched through interviews. The aim of the paper is to explain how an organization or service provider sees a request for transparency in the value co-creation process. The empirical material from interviews and groupings of the research material revealed a clear emphasis on transparent operations, which necessitate standard work. This emphasis on transparency contributed to the adjustment of the DART model into the DARIO model, with an extension related to transparency (T), the transparency of information (I), and the transparency of operations (O). The research paper was accepted as a conference proceeding after peer-review, which required only some minor specific points relating to the construction of the focus group interviews to be amended. The author was responsible for constructing the theory and its evolvement and for preparing the conference paper and separate materials presented at the conference. The co-author offered valuable insights regarding the theoretical approach and contributed comments on the structure of the paper.

Paper III: This manuscript addresses the implications of digitization from a managerial perspective and answers research question 3. The paper studies the influences of digitization on professional autonomy and the antecedents of value co-creation in the professional's work. The paper utilizes institutional theory as a background in explaining the change digitization caused within the case healthcare organization and among professionals. The aim of the paper is to connect the changes in value co-creation from the organization's perspective and to shed light on the managerial implications of changes in the professional's role that digitization imposes. In addition to the collected interview materi-

al, the author utilized numerous discussions with and observations of the professionals and management representatives of the case organization for further research material. The manuscript was published in a well-distinguished book after editorial review with adjustments to increase the readability in book format. The co-author contributed valuable comments on the structure and writing style of the manuscript.

Paper IV: This manuscript answers research question 4 and increases the understanding of management's role in supporting value co-creation. The paper demonstrates features through which the pitfalls of digitization can be turned into success factors. The paper reflects on previous studies in the healthcare sector on the risks of utilizing technology and data. The earlier findings are combined with the findings of the current research to define the success factors of healthcare service digitization. The organizational perspective is dominant as this paper aims to introduce the steps and actions management needs to take to support successful value co-creation in the professionals. The author was responsible for reviewing the relevant literature and combining the findings of the literature in a meaningful way. The co-author contributed valuable remarks and comments on the theoretical approach of the paper as well on the abstract. The manuscript was published as a chapter in a well-distinguished book after editorial review with some minor corrections to the writing.

These four original research papers or manuscripts are presented with an overview and their relationship to the research questions in Table 1.

TABLE 1 Research articles and their publications

Title	Authors	Publication forum	Research questions and related concepts
Value Co-creation in Health Care: Insights into the Transformation from Value Creation to Value Co-creation through Digitization	Rantala, K., & Karjaluoto, H.	Academic Mindtrek'16, Tampere, Finland (2016)	Question 1: Conceptual overview, interaction with the customer
Combining Digitization with healthcare service processes: Value co-creation opportunities through standard work	Rantala, K., & Karjaluoto, H.	30th Bled eConference, Bled, Slovenia (2017)	Question 2: Opportunities for value co-creation, standard work
Value Co-creation through Digitization	Rantala, K., & Karjaluoto, H.	Routledge (2017) Navigating Through Changing Times: Knowledge Work in Complex	Question 3: Professional autonomy changing, management involvement
Value Co-creation Opportunities: Managerial Transformation of Digitisation Risks into Success Factors	Rantala, K., & Karjaluoto, H.	CRC Press (2018) Management and Technological Challenges in the Digital Age	Question 4: Success factors in implementing, management actions

2 THEORETICAL FOUNDATION

The healthcare service sector, like other service sectors, is currently facing tremendous changes due to digitization of services. This phenomenon is driven both from the inside by service innovations and from the outside by governments eager to increase the availability of these healthcare services and by customers desiring access to information and an active role in the decision-making process in matters of personal concern. Digitization's introducing new ways of interacting and opening new possibilities for increasing the transparency of information and service operations greatly influence the roles of the customer and service provider (Prahalad and Ramaswamy, 2004a; Saarijärvi, 2011).

This chapter reviews the literature related to the research background of this dissertation (FIGURE 1).

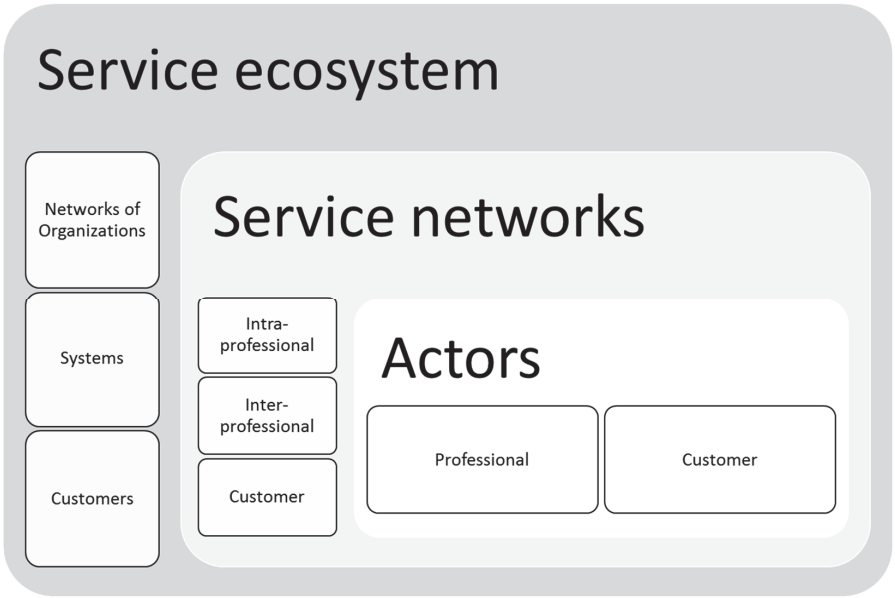

FIGURE 1 Research background of the dissertation

The research background illustrates the three-level conceptualization of actors, with macro, meso, and micro levels (Wieland, Koskela-Huotari and Vargo, 2016; Chandler and Vargo, 2011). The background includes different levels of actor roles: the macro level, from a service ecosystem perspective, includes organizational networks, systems, and individual actors like customers. The service network as a meso level consists of multiple actors, both outside and inside the organization, participating in value co-creation. The meso organizational level consists of actors within an organization who comprise multi-professional teams with different roles. The third, or `micro, level is the individual level of the professional and the customer interacting within the digital service process.

Value co-creation is a non-linear, iterative, and interconnected process (Wieland, Koskela-Huotari and Vargo, 2016) that digitization influences. Digitization of healthcare services and the implications for the service processes will **c**hange the dynamics in the interactions and the roles of the actors involved in these service processes. Digitization invites the study of the prerequisites of value co-creation for the service provider or the professional contributing to the value co-creation process. The professional's ability to implement and utilize digital healthcare services in the customer interface and contribute to value co-creation necessitates a series of actions and procedures within the service network. The framework focuses on value co-creation from the service provider's perspective; therefore, the customer perspective is not reviewed in-depth. Since the context of this dissertation is healthcare, special features and aspects of healthcare are presented in connection with value co-creation.

2.1 Service-dominant logic

Academic research recognizes that competitive advantage is increasingly gained through service and service-related functions, not only through performance related to products (Zeithaml et al., 1985; Grönroos, 2008; Spohrer and Maglio, 2008; Vargo and Lusch, 2004). Vargo and Lusch (2004) have presented their work on the formation of a new dominant logic for marketing and markets: service-dominant logic (S-D logic). Their target is to constitute a theory of markets and marketing based on S-D logic (Vargo, 2011). The S-D logic concept has been discussed, debated, and developed over several years, with scholars actively participating in the discussion through journal articles and conferences with varying perspectives on the foundational premises of S-D logic and on value co-creation (Prahalad and Ramaswamy, 2004a, 2004b; Vargo, 2011a, 2011b; Grönroos and Voima, 2013; Siltaloppi and Vargo, 2014). Spohrer and Maglio (2008) have suggested that S-D logic functions as the philosophical foundation for service science.

This new development in marketing uses the idea of service as a basis for exchange instead of goods being exchanged for money as in the traditional industrial production-oriented approach of marketing with goods-dominant logic. According to S-D logic, service with applied knowledge and skills is the basis

for economic exchange. S-D logic claims to be distinctly different from goods-dominant logic, in which the transfer of ownership of goods (Vargo and Lusch, 2008b) and produced units of output are central elements of exchange (Lusch, Vargo and O'Brien, 2007). Further, according to service science scholars, the main purpose of economic exchange of services is the creation of value (Vargo and Lusch, 2004; Vargo, Maglio and Akaka, 2008).

According to S-D logic, value is always being co-created in a process in which both the service provider and the customer are interacting and generating mutual value (Vargo and Lusch, 2004; Vargo and Lusch, 2008a; Prahalad and Ramaswamy, 2004a; Grönroos and Voima, 2013). Goods-dominant logic focuses on competition or operational efficiency through goods that are supposed to deliver value in customers' processes (Grönroos, 2011b). This idea emphasizes the value embedded in goods as an outcome of production, whereas S-D logic views the service embedded with value and goods as enabling service (Vargo and Lusch, 2008c; Ballantyne and Varey, 2006; Lusch and Vargo, 2009). According to S-D logic's premises, value is co-created; it does not exist until a customer uses an offering, as the customer as beneficiary determines value based on his or her experience during use (Vargo and Lusch, 2004; Chandler and Lusch, 2011; Vargo and Lusch, 2016). S-D logic defines the concept of value co-creation in relation to the service, the actors involved, and the customer's perception of value (Vargo and Lusch, 2008c; Vargo and Lusch, 2017).

Prahalad and Ramaswamy advocated for value co-creation in 2000. They described the relationship between the customer and the service provider with a case from healthcare in which the customer was actively involved in the planning of the treatment for herself and acting as a source of competence. This involving the customer was done by engaging the customer in an active and ongoing dialogue (Prahalad and Ramaswamy, 2000). Such dialogue and interaction are essential for value co-creation between the service provider and the customer, but there are differing perspectives on whether the interaction should be direct or whether it can be spatially and temporally separated (Payne, Storbacka and Frow, 2008; Grönroos, 2011a; Grönroos and Voima, 2013; Vargo and Lusch, 2004, 2008c; Chandler and Lusch, 2015). Further, instead of the traditional dyadic relationship of the service provider and the customer, S-D logic encompasses a service network of multiple actors committed to collaborative processes of value co-creation, utilizing their knowledge and abilities for increasing the well-being of customers (Vargo and Lusch, 2016). In their article on the prospects and theory development of S-D logic, Vargo and Lusch (2016) introduced the idea of service ecosystems and drew from system thinking along with the increased ecosystem thinking in marketing and business. In alignment with natural sciences, Vargo and Lusch (2017) stated that ecosystems cannot be separated from their environments and critiqued some discussions in which ecosystems are considered networked constellations of firms focusing on one central actor. However, this critique seems to contradict the earlier reasoning of Vargo and Lusch (2016). In the development of S-D logic and in the pursuit of a generic theory of market, the focus seems to go beyond marketing, integrating broad-

er perspectives with social sciences and institutionalism (Vargo and Lusch, 2017).

2.1.1 Developing the content of S-D logic

In the development of S-D logic, Vargo and Lusch (2004) extended the concept of and established the framework for value co-creation by introducing the foundational premises of S-D logic. The foundational premises have evolved into eleven premises and a more condensed five axioms (Vargo and Lusch, 2016). The relevance of these foundational premises can be seen in the development of the axioms and the enhancement of the academic debate on S-D logic. The formation of the five axioms of S-D logic made some of the foundational premises more encompassing, and so some of the original premises were not included in the axioms. The axioms outline the emphasis on developing S-D logic to provide a more comprehensive understanding of ecosystem dynamics and institutional perspectives in value co-creation (Vargo and Lusch, 2016, 2017). The axioms as presented in FIGURE 2 as defined by Vargo and Lusch (2016, 18).

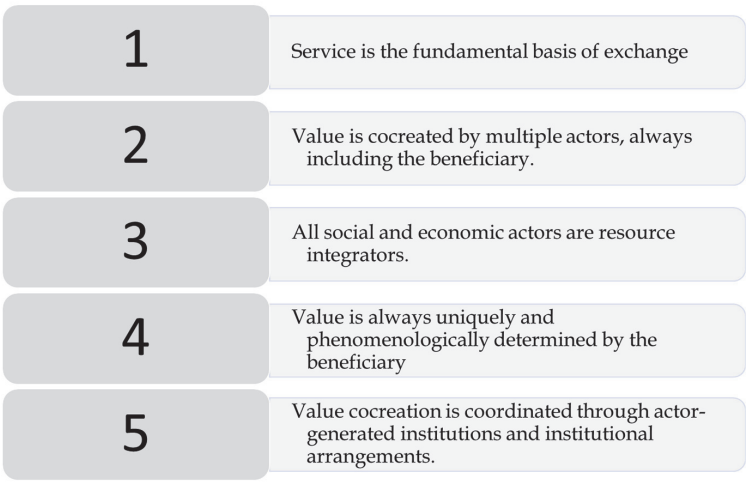

FIGURE 2 Service-dominant logic axioms by Vargo and Lusch 2016

The original foundational premise of the first axiom was more descriptive, stating that service is an application of specialized skills and knowledge and that these resources help make service the basis for exchange (Vargo and Lusch, 2004). Professionals in the healthcare sector typically focus on specialized skills and knowledge, as they are often licensed, unequally restricting access to knowledge and causing asymmetry of information. The information asymmetry is related to cognitive distance, which may influence service interactions (Barile, Saviano and Polese, 2014; Edvardsson, Tronvoll and Gruber, 2011). The service process in healthcare utilizes experts' skills and knowledge. The customer par-

ticipates by sharing information during this process, which balances the information asymmetry and makes exchange of information a major defining factor of service exchange in healthcare. In Finland, like in many other countries with comprehensive public healthcare, the economic exchange related to these public healthcare services is indirect, as the money transfer does not occur directly between the customer and the service provider but through tax-based funding and possibly with only a minor direct payment for the service by the customer. Due to this indirect public healthcare financing, the exchange of service in the customer interface is typically an exchange of such intangible resources as information, support, and benefits (Allee 2009; Kowalkowski, 2011).

The traditional perspective of marketing and management sciences involves discussing the competitive advantages of firms through tangible assets or goods (Kotler and Rath, 1984; Shaw, 2012) or rare resources, such as specialized skills or knowledge difficult to imitate or gain (Barney, 1991). According to S-D logic, goods are only carriers or transmitters of operant resources like knowledge and distribution mechanisms for service, enabling the customer to benefit from the company's offerings (Vargo and Lusch, 2004; Vargo, Maglio and Akaka, 2008). Grönroos shares this view and defines the role of goods as a platform for services (Grönroos, 2006). However, Grönroos, among other scholars, criticized S-D logic for continuing to focus on goods rather than service, as S-D logic establishes service as the basis of exchange, which causes service to be treated as "goods" (Grönroos, 2011b; Heinonen et al., 2010). Grönroos argued that service is a mediating factor in reciprocal value creation and thus a fundamental basis for business. Thus, according to Grönroos, the focus is not on the exchange but on the reciprocal process (Grönroos, 2011b). Further, with the concept of value, the discrepancy between value-in-exchange and value-in-use lies in the fact that value-in-exchange refers to financial elements, and in the exchange of services, monetary compensation is not necessarily given (Kowalkowski, 2011; Vargo, 2011b).

According to the second axiom of S-D logic, value is co-created by the beneficiary and multiple actors. The service provider cannot create value on behalf of the customer but can only offer value propositions based on applied competencies (Vargo and Lusch, 2008b, 2016). Value propositions are also co-created through systemic human action and are not the sole creation of a single actor (Wieland, Vargo and Akaka, 2016). Differing perspectives exist also on whether value is being co-created or co-produced (Payne, Storbacka and Frow, 2008; Ranjan and Read, 2016). Further, in relation to marketing, the earlier perspective is that marketing is a value-adding function of the firm (Porter, 1985), while S-D logic distinctively states that value is always co-created, not produced or added on. In healthcare, the term "value-added" is still the prevailing concept, which demonstrates the industry's lack of familiarity with marketing science and confirms the call for more interdisciplinary collaboration (Vargo and Lusch, 2017; Nugus et al., 2010; Keijser et al., 2016). First, there needs to be a definition of value and who defines what is of value before any adding-on of value can occur. Second, according to S-D logic and value co-creation concepts,

value cannot be added, meaning that the service provider cannot produce it. Value is always co-created as a joint function of the actions of the service provider(s) and the customer or beneficiary (Prahalad and Ramaswamy, 2004b; Vargo and Lusch, 2008b).

S-D logic represents value co-creation as a collaborative and interactive process involving multiple exchange relationships among several actors and organizations, which serve society through integrating multiple resources (Vargo and Lusch, 2016). The third axiom of S-D logic states that all social and economic actors involved in the service network are resource integrators (Vargo and Lusch, 2016). With his critique, Grönroos limited the interaction to a reciprocal process and accused S-D logic of being all-encompassing as it relates to the concept of interaction and therefore of not making a critical theoretical contribution to value creation (Grönroos, 2011a). Grönroos claimed that S-D logic handles interaction as a consequence of value creation, whereas Vargo and Lusch (2016) included multiple actors in the value co-creation process through interaction. Interaction through dialogue is a basic element of value co-creation (Prahalad and Ramaswamy, 2004b).

The third axiom also refers to resources. By definition, service is a process of applying one's competencies, like knowledge and skills, for the benefit and support of another (Vargo and Lusch, 2016; Grönroos, 2011b). Organizational competencies based on employees' knowledge and skills are part of a wider concept of operant resources creating strategic benefits or competitive advantages (Vargo and Lusch, 2008b; Vargo, Lusch and O'Brien, 2007). These resources become the fundamental source of competitive advantage for the benefit of the other (Vargo and Lusch, 2004a; Vargo and Lusch, 2016).

According to the fourth axiom of S-D logic, the beneficiary determines value (Vargo and Lusch, 2016). The customer as a typical beneficiary is in the position to determine value based on his or her co-creating experience, or collaborating through the service process. Thus, since value is experiential, it cannot lie in the manufacturing process or in the product or service itself but is based in the use of these and can only be co-created (Vargo and Lusch, 2004; Vargo, Lusch and O'Brien, 2007; Chandler and Lusch, 2015). This service-centered view of the market or competitive advantage focuses on the beneficiary, or the customer. In accordance with Holbrook's (1996) relational perspective on value, the processes of service and value co-creation are relational, meaning that value co-creation and value are context-dependent and influenced by the beneficiary of the service and of the interactive systems (Holbrook, 1996; Vargo and Lusch, 2004; Lusch, Vargo and O'Brien, 2007; Grönroos and Voima, 2013; Ranjan and Read, 2016). The relational service process includes the idea of value-in-use within the process and suggests that value is dependent on customer experience, which is not static and may vary (Vargo and Lusch, 2011; Chandler and Lusch, 2011). Further, as the customer defines the value of the service, in the context of healthcare, the value of a service cannot be defined by the medical professionals or by preset quality criteria regarding the care or treatment or its outcome. The customer determines value based on his or her

experience during use and on interpersonal factors, such as context of use (Zainuddin, Russell-Bennett and Previte, 2013).

Central to S-D logic are the ideas that only the beneficiary or the customer can define value and that the service provider or multiple actors in the service network can only present value propositions (Vargo, Wieland and Akaka, 2015; Vargo and Lusch, 2016). However, value propositions refer to a predefined constellation of the service, with elements of predefined outcomes or expectations of value-in-use that may limit customer involvement in the service process (Siltaloppi and Vargo, 2014). Siltaloppi and Vargo (2014) discussed the institutionalization of these value propositions through rules and connected resources of value co-creation. These resources express shared meaning and align the acts of multiple actors for value co-creation. Both formal institutions regulating the services and service processes through legislation or other regulations and informal institutions implementing and interpreting these regulations through the knowledge and skills of the organization's employees comprise the institutional arrangements (Peng et al., 2009; Orlikowski, 1992). The institutionalizing of value propositions concludes in the fifth axiom, "Value co-creation is coordinated through actor-generated institutions and institutional arrangement" (Vargo and Lusch, 2016). Reference to these institutional arrangements can be found as early as Aristotle's statements in the 4th century B.C. that a "state cannot exist without rulers" and that there has to be a "defined manner in how the services for the people are organized."

Marketing scholars have facilitated the development of the five axioms with several contributing as well as controversial insights. As the axioms are comprehensive, S-D logic's influence may extend beyond marketing (Gummesson, Lusch and Vargo, 2010) to operations management, IT, and human resources, to name a few. With their review of "service-dominant logic in 2025," Vargo and Lusch (2017) expressed confidence that the concept of S-D logic will develop into a general theory of value co-creation. This development still requires further extension of the theoretical framework and concepts in all crucial areas of S-D logic. Further, Vargo and Lusch call for interdisciplinary collaboration in this development and input from theories like complexity and structuration theories to expand the applicability of S-D logic and for further studies on institutions and institutionality in relation to value co-creation.

2.1.2 Reviewing the development of the value concept

The definition of value is multilayered and not clear-cut. Aristotle described two purposes for everything a man possesses: the use and the exchange. He also noted that setting a monetary value measure made the exchange, especially in exports, easier. In addition to providing this definition of value, Aristotle described who defines the value-in-use by stating, among other examples, that "the guest will judge the feast better than a cook" and "the knowledge of the house is not with the builder only, but the master of the house is in a position to better judge the house he lives in" (4th century B.C.). But, although he empha-

sized that value-in-use is more significant than the value that the provider sets, the definition of value was still lacking.

Marketing literature has traditionally emphasized increasing competitive advantage as a means of providing value based on the improved performance of an organization in promoting its products (Kotler and Rath, 1984). According to the goods-dominant logic, in which goods are objects of exchange, typically for money, value is linked to the properties of the goods (Ylén et al., 2014a). The performance approach to service emphasizes paying for performance, which refers to what the service provider does for the customer (Spohrer and Maglio, 2008). This traditional perspective of marketing science focusing on performance through goods or service is evident in Porter's 2010 article about value in healthcare. Porter defined value as an outcome of the system (apparently a service system of healthcare) in monetary terms, with a focus on health outcomes achieved per amount spent (Porter, 2010). Porter recognized the need for a shift from volume to value, but still argued that value is measured by costs and outcome through process measurement. This approach defines value based on the medical condition of the patient and the desired outcome. Meeting these predefined needs is regarded as producing value, and the success of this value production is measured in monetary terms based on costs (Porter, 2010).

Spohrer and Maglio (2008) measured service value through the differential between supply and demand, which creates the idea of high value potential. The relevance of supply and demand in healthcare services is not as straightforward, as the goal is not to create high value potential for exchange by controlling availability. In healthcare, the focus is rather on increasing the availability and supply of service to meet the ever-increasing demand (OECD, 2013; WHO, 2014). The availability of service is creating a bottleneck, so value has become difficult to reframe. The difficulty lies in how and by whom value can be defined. According to S-D logic, only the customer can determine value, and value is rather context-dependent and relational and thus hardly directly measurable (Vargo, Akaka and Vaughn, 2017; Vargo and Lusch, 2011; Holbrook, 1996; Grönroos, 2011a).

According to S-D logic, the beneficiary, typically the customer, always defines value based on the use of the service (Vargo and Lusch 2004; Lusch, Vargo and O'Brien, 2007). The relativistic dimension of value defines customer value being comparative, personal, and situational and therefore context-dependent (Holbrook and Hirschman, 1982; Holbrook, 1996). Vargo expressed the interactivity and relativity of value through the term value-in-context, replacing the term value-in-use (Vargo, 2008). Contextual value involves multiple actors, knowledge, and other resources applied in the value co-creation process, making the experience unique. Because of the contextual and dynamic nature of value co-creation, value is not static; it evolves during the usage experience (Holbrook and Hirschman, 1982; Holbrook, 1996; Vargo and Lusch, 2014; Grönroos, 2011b; Grönroos and Voima, 2013). As multiple actors form a social system or network, contextual value is extended to value-in-social-context, refer-

ring to the influence of these actors in a social context (Edvardsson, Tronvoll and Gruber, 2011).

Prior to using a service, customers have expectations concerning it, and they compare these expectations with their actual experiences (Gummesson, Lusch and Vargo, 2010; Chandler and Lusch, 2015). Experiential value-in-use is not static, as experiences differ from customer to customer and change during the usage process (Ranjan and Read, 2016). The changing customer experience influences the perceived quality of the service or value co-creation process. Therefore, service quality is difficult to assess from a value point of view (Vargo, Akaka and Vaughn, 2017; Gummesson, Lusch and Vargo, 2010). In healthcare, the outcome of the service is often considered "value for the customer," although the service process may involve issues like lack of empathy. Therefore, even if the outcome is of the highest medical quality, such experience may cause dissatisfaction, reducing the perceived value (Rasche and Floyd, 2017). In S-D logic, the idea of quality is embedded in the central term "value" (Gummesson, Lusch and Vargo, 2010). Thus, the reference to service quality is not only technical or related to the service provider's detailed knowledge but also considers value to be the comprehensive customer experience of the service.

The customer or the beneficiary needs to be an active participant in the interaction with the service provider to be able to determine value (Vargo and Lusch, 2008a; Holbrook, 1996). Grönroos underlined interactivity as a crucial precedent for value co-creation (Grönroos, 2011a), and Prahalad and Ramaswamy defined interactivity as dialogue taking place between the actors (Prahalad and Ramaswamy, 2004b). The dominant concept is that value co-creation occurs in interactions during the service process and that value co-creation is embedded in communication interactions in which both parties are active, transparent, truthful, and influencing each other (Ballantyne and Varey, 2006; Grönroos, 2011a; Lush and Vargo, 2009). However, in accordance with dynamics related to value, value can extend over time beyond the interaction and can emerge later without the instant direct interaction but still be based on co-creation (Ranjan and Read, 2016; Edvardsson, Tronvoll and Gruber, 2011).

2.1.3 Resources and actors in value co-creation

In recent years, the debate on value and on the focal point of where value is actually being created and by whom has contributed an increasingly wide perspective on actors and their resources in the value co-creation process (Vargo and Lusch, 2016). In their work on the foundational premises or axioms of S-D logic, Vargo and Lusch (2008b) defined value co-creation as a process integrating the actors' resources. The concept of resources encompasses operant and operand resources of the actor network, which are being deployed in interaction and integrated for co-creation of value (Vargo and Lusch, 2004). Operand resources are physical and static in nature (physical products or materials) and understood to be an outcome of the utilization of operant resources (Lusch, Vargo and O'Brien, 2007). Operant resources are typically human skills and knowledge or organizational routines, cultures, and competencies (Hunt and

Derozier, 2004; Lusch, Vargo and O'Brien, 2007). Operant resources are dynamic and can be altered and replenished and as such have been considered to be the primary source of competitive advantage or means of creating value (Hunt and Derozier, 2004; Vargo and Lusch, 2004; Kowalkowski, 2010). The resource-based view defines resources of the firm with assets and capabilities. Assets correspond to the operand resources used in the firm processes, whereas capabilities are analogue to operant resources and are repeatable patterns of action in the use of assets (Fink, Yogev and Even, 2017). Technology integrates knowledge and ideas for innovation and acts as an operand resource or asset in utilizing and mediating operant resources or competencies like knowledge. This view of technology as a physical asset aligns with Orlikowski's idea of technology as an artifact mediating knowledge and skills (Orlikowski, 1992; Akaka, Vargo and Wieland, 2017; Fink, Yogev and Even, 2017).

Waseem, Biggeman, and Garry (2017) argued that operand and operant resources are resources of the service provider and that such a perspective on resources contradicts the S-D logic idea that all actors are resource integrators, so the customer also provides operant resources, such as information, through interaction and dialogue for value co-creation (Lusch, Vargo and O'Brien, 2007; Vargo and Lusch, 2016). Orlikowski pointed out that there is a certain asymmetry of resources involved in interaction (Orlikowski, 1992), which leaves room for balancing them through integration, in which the customer as an active participant provides personal information related to the service and his or her user experience. The operant resources or capabilities of various actors involved within the service network are used and integrated during the interactive value co-creation process (Waseem, Biggeman and Garry, 2017; Vargo and Lusch, 2011; Vargo and Lusch, 2016). With such competencies, actors can solve problems, meet customer expectations (Vargo and Lusch, 2004; Edvardsson, Tronvoll and Gruber, 2011), and create competitive advantages or strategic benefits difficult to imitate or transfer (Barney, 1991; Lusch and Nambisan, 2015; Vargo and Lusch, 2106; Fink, Yogev and Even, 2017). Therefore, the perspective on integrating resources can be changed; as in the value co-creation network of multiple actors, the service provider may act as a hub, integrating the resources of organizational actor competencies, norms, and culture into the actor network. (Wikström, 1996; Zhang and Chen, 2008; Hunt and Derozier, 2004; Vargo and Lusch, 2004; Vargo and Lusch, 2016; Waseem, Biggeman and Garry, 2017).

In relation to this concept of the hub role, Vargo and Lusch (2017) took a critical approach to network constellations in which one firm or service provider is the central actor. Vargo and Lusch (2016) argued that the coordination is actualized through actor-generated institutions, but their "actor-generated institutions" remain somewhat vague. Siltaloppi, Koskela-Huotari, and Vargo (2016) claimed that the generic actor role does not mean that all actors of individuals and firms are identical but rather that they form a distinctive identity in the network or institutional arrangements and hold capacity to act. Also, the asymmetry of resources in interaction influences the actor's role in the network (Orlikowski, 1992). However, the coordination and these institutional arrange-

ments do not just happen and require specific expressions of responsibility, purpose, and agreements (Nugus et al., 2010) or as Orlikowski (1992) suggested, meaning, power, and norms as elements of social interaction.

In healthcare, power is strongly connected to the responsibility for the customer, which fundamentally lies with the physician with licensed and legitimized permission to execute the profession and make decisions. The actor network must recognize this power and responsibility, as the network or multiple actors cannot supersede this responsibility of professionals based on legitimacy (Sullivan, 2000; Nugus et al., 2010).

Grönroos and Voima (2013) structured the value co-creation process by proposing a three-dimensional environment of value-creating spheres. They proposed three spheres of importance: the service provider's sphere, the joint sphere, and the customer sphere. Actions in the service provider sphere take place to prepare for value co-creation in the joint sphere. The role of the service provider is crucial to the value co-creation process, as the service provider has the knowledge and skills to support the customer in the service process and thereby enhance value co-creation. In other words, with this expert knowledge and skills, the service provider can make value propositions for the customer, but value is co-created in the joint sphere (Grönroos and Voima 2013). This expert knowledge is accumulated through experience and time and forms an essential operant resource that can be used to benefit the customer (Vargo and Lusch, 2004; Lusch, Vargo and O'Brien, 2007).

The customer has the dual role of both a provider and a beneficiary of the healthcare service (Zainuddin, Russell-Bennett and Previte, 2013). The customer's input in the service process to co-create value can range from minor to major as the customer integrates resources of the service provider with resources outside the service provider's sphere (Grönroos, 2011a; McColl-Kennedy et al., 2012). Customers can co-create value through self-activities, which, in the context of healthcare, refer to ways of engaging in self-care by utilizing knowledge both from the service provider and outside the traditional healthcare environment. Customers have access to other resources than those of the service provider, such as various customer communities in which experience and information are shared (McColl-Kennedy et al., 2012; Prahalad and Ramaswamy, 2000). The idea of a customer's creating value without the service provider may contradict the idea of co-creation, as Silpaloppi and Vargo (2014) explained that a single actor alone can never create value, and Vargo and Lusch overtly claimed that value is co-created in a network of actors (Vargo and Lusch, 2011). Self-activity or self-service in relation to the value co-creation process falss on a continuum in the customer sphere (Grönroos, 2011a; McColl-Kennedy, 2012) but is still part of the co-creation process, as the customer utilizes resources like knowledge that the service provider or the service network provides. This self-activity is an example of both the temporal and the spatial service separation resulting from digitization's changing the interaction between service provider and customer. The customer can access information and participate in self-care tasks recommended by the service provider and so contribute strongly to the

service outcome (Gulbrandsen et al., 2016; Ouschan, Sweeney and Johnson, 2006). Thus, the idea of an interconnected service system in which value is always co-created prevails in indirect interaction as well (Vargo, Akaka and Vaughn, 2017; Vargo and Lusch, 2008a; Siltaloppi and Vargo, 2014).

The dyadic approach to firm-customer interaction is broadened with S-D logic's noting that there are multiple actors in the service system and that value can be co-created among them, emphasizing the service network idea of value co-creation (Vargo and Lusch, 2011; Vargo and Lusch, 2016). The recent discussion of value co-creation encompasses value networks and customers' own independent service networks in the customer sphere (Allee, 2009; McColl-Kennedy et al., 2012; Grönroos and Voima, 2013; Wieland, Koskela-Huotari and Vargo, 2016; Vargo and Lusch, 2016). Service networks such as organizations can be considered value networks creating social and economic good through complex exchanges of value (Vargo and Lusch, 2011; Allee, 2009). The actor-to-actor approach demonstrates that value is co-created in networks and that each integration of resources changes the network in some way. The nature of the network involves social positions and varying roles that are influenced by and influence the value co-creation process (Vargo and Lusch, 2008b; Edvardsson, Tronvall and Gruber, 2011). Therefore, an understanding of the relationships among the network actors needs to exist for identifying the locus of value co-creation and how value is being co-created (Peppard and Ward, 2016).

Allee (2009) divided the value networks into internal value networks and external or outward-bound value networks. Internal value networks focus on activities and relationships among work groups. In healthcare, this focus appears in multi-professional teams involved in the customer relationship throughout the treatment process. External value networks consist of actors outside the service provider's own organization that each participate in the integration of resources for the shared purpose of value co-creation (Allee, 2009; Wieland, Koskela-Huotari and Vargo, 2016). Vargo and Lusch described this external value network by zooming out to a network orientation instead of the dyadic orientation. In this network, multiple actors are all performing the same task of integrating resources and thus participating in the value co-creation process (Vargo and Lusch 2011; Vargo and Lusch, 2016).

Value co-creation occurs in a social context in the broader institutional frameworks or service networks of healthcare (Edvardsson, Tronvoll and Gruber, 2011; Martin, Currie and Finn, 2009). The purpose of these service networks is to contribute to and jointly co-create value as each actor offers his or her competencies to the process. Thus, Waseem, Biggeman, and Garry (2017), in their study on actor competencies, approached these competencies as resources but with the notion that these competencies emerge only with behavioral intent. Although their study focused on the internal competencies of one firm for value co-creation, the findings are worth studying because they reflect an internal network of actors, their technical and behavioral competencies, and the influence of these competencies on value co-creation.

Waseem et al. (2017) summarized their findings under the headings of 1) organizational citizenship behavior, 2) understanding of work, and 3) actor engagement. The individual actor's commitment to acting and ability to act in the organization or network comprise organizational citizenship. Through extra-role behavior, organizational citizenship behavior directly or indirectly contributes to organizational objectives. However, this study falls short in that it does not define how the organizational objectives are being created; in the context of value co-creation, the objectives for service should be established jointly with other actors in the network, including the customer.

The second behavioral competency in the findings is the understanding of work, referring to an individual's understanding of how the work and the way it is carried out contribute to organizational goals. Jointly agreed-upon rules and ways of applying methods set a frame for the work within the organization and thus contribute to achieving targets and co-creating value. Especially in healthcare, the work to be done, i.e. the care and treatment, is organized through a negotiated order of acceptable actions in interaction with the actors involved (Nugus et al., 2010). The conceptual understanding of work and the approach to work in the larger context of the organization contributes to value co-creation.

The third behavioral competence, actor engagement, explains how the experience of being engaged in interpersonal relationships with competent individuals influences engagement in value co-creation within the organization. Actor engagement emphasizes the influence of individual behavioral competencies, such as trustworthiness and supportiveness, and interaction quality in enabling value co-creation (Waseem, Biggeman and Garry, 2017; Chandler and Lusch, 2015).

Service ecosystems consist of relatively autonomous units operating together in a framework of common principles (Peppard and Ward, 2016). Service ecosystems in healthcare also consist of multiple networks and institutional arrangements with such common principles intersecting and overlapping among the micro, meso, and macro levels of social interactions (Chandler and Vargo, 2011: Beirão, Patricio and Fisk, 2017; Peppard and Ward, 2016). Service ecosystems are dynamic in nature, meaning that each network or actor within the ecosystem can change the nature of the system through resource integration and exerting power in the work (Akaka, Vargo and Wieland, 2017; Peppard and Ward, 2016). Within the service ecosystem, institutions influence the co-creation of value and emphasize the importance of interaction and the social context of the service system as they integrate and recombine resources (Akaka, Vargo and Lusch, 2012; Edvardsson, Tronvoll and Gruber, 2011). The resource integration with collaborative practices within the service ecosystem not only drives value co-creation but also enhances innovations. Value co-creation shapes both technologies and markets, and collaborative efforts in the service ecosystem to find or develop new possibilities for value co-creation drive innovation. Integrating existing network resources in a new way by developing new relation-

ships, new services, and new ways of creating value drives innovation as well (Akaka, Vargo and Lusch, 2012; Vargo and Lusch, 2016).

2.2 eHealth and digital healthcare services

Technology has a dual role, physical and social, which is reflected in research on IT that focuses on developing innovations and proposing practical solutions for new or existing problems in contemporary life utilizing IT (Akaka, Wieland and Vargo, 2017; Orlikowski and Barley, 2001; Nylén, 2015; Trainor et al., 2011). By IT, Dewett and Jones (2001) referred to information systems and information technologies that offer certain benefits like efficiency or the ability to coordinate resources. Applications of IT have expanded greatly due to the development of IT in new fields. The service sector has transformed greatly due to technology and has reached strategic importance with embedded changes in social rules and regulations, making services central to value co-creation. Understanding the new logic of business networks and ecosystems with IT and engaging in value co-creation have become almost prerequisites to remaining competitive (Saarijärvi, Kannan and Kuusela, 2013). The growth of services has changed the economic landscape and created new possibilities for increasing competitiveness (Zysman and Breznitz, 2012). Peppard and Ward (2016) reviewed the strategic impact of the changes in IT through evaluating the degree and the pace of change. If the degree of change is strategic and the pace of change is measured, the transformation requires radical redesign and supports dramatic performance improvement. A rapid pace of change calls for focused innovation, creating competitive advantages (Peppard and Ward, 2016). In the healthcare ecosystem, with its multiple actors, systems, regulations, and laws, rapid changes hardly occur, or at least the definition of rapid is relative. The development seems more evolutionary than stepwise, although changes may be of strategic nature and influence competitive advantage. In healthcare networks, especially in public healthcare, the logic of competitiveness is connected to the effective use of allocated resources for the benefit of the customer. This effectiveness is called for by governmental actors, which also insist on increased use of digitization to support efficiency and availability of services (OECD, 2013). This demand has started a change process in many service sectors, including healthcare, through which a new logic of business networks emerges, not only in collaboration among public and private service providers but also in competition for customers. Further, this business logic is changing as digitization of services introduces new ways of offering service operations and interactions and influences organizational and institutional structures and cultures with new roles and rules (Orlikowski and Barley, 2001; Nugus et al., 2010; Helman et al., 2015).

Digital services have changed the interaction with the customer, and the patient in the traditional sense has become more of a customer or even a consumer in relation to his or her interaction with the service provider. The pa-

tient's role is not directly comparable with the traditional role of the consumer in that the patient is not searching for the "best deal," but the role involves active participation, contribution, and even self-care as part of the value co-creation process with relations of care and trust with the professional (Sullivan, 2000; Keijser et al., 2016; Koch, 2013). Generally, in business, companies recognize and respond to the customer's need to be heard and to be engaged in dialogue. Companies also acknowledge the need for transparency and open and empathetic communication (Karjaluoto, Mustonen and Ulkuniemi, 2015; Prahalad and Ramaswamy, 2004a).

In their analyses of service science or S-D logic, Saarijärvi, Kannan, and Kuusela (2013) connected the service system with people, technology, and value propositions, capturing the mechanism through which the resources of the actor network are integrated in the value co-creation process. Saarijärvi et al. (2013) saw technology as a mechanism for or a mediating factor in transferring resources effectively for the use of other actors in the service network, one that changes the actor (customer and service provider) roles. Storbacka et al. (2016) supported this idea of a mediating factor, discussing systems, technology, or, as here, digitization as platforms functioning as intermediaries between actors in the value co-creation process. The value propositions or value co-creation opportunities can be institutionalized with rules and resources for value co-creation (Siltaloppi and Vargo, 2014). Digitization can represent a form of institutionalizing these value propositions (Siltaloppi and Vargo, 2014) through an agreed-upon way of working and interacting. Institutionalization can be enabling or constraining when influencing actors in the process of value co-creation (Edvardsson et al., 2014). Vargo and Lusch (2016) regarded institutions in the form of routinized and coordinating mechanisms as drivers and enablers of value co-creation.

2.2.1 Development of eHealth

Digitization of healthcare is not a new phenomenon, as health information technology is crucial for today's hospital and healthcare ecosystems and has widely acknowledged positive effects related to preventive measures, service processes, and creating access to service in remote locations (Christensen and Hickie, 2010; Mair et al., 2012). However, there is a difference in the digitization of healthcare with IT systems and the digitization or creation of new digital services in the customer interface. In each of these areas of research, value co-creation, technology, IT, and eHealth, an understanding of cross-disciplinary approaches emerges (Vargo and Lusch, 2017; Orlikowski, 2000; Keijser et al., 2016) to better link the service ecosystem with digital services and with interactions and human actions in the service networks.

So far, with the increasing literature on medicine, technology, and business, there has been confusion about the terminology of eHealth, which is still distinctly separate for each discipline (Helman et al., 2015). The term eHealth is very encompassing and refers to health information websites, online support networks, interactive electronic medical records, web portals, mobile health

communication devices and applications, and recent Big Data and AI developments. A few of these concepts are grouped in Figure 3. All of these seek to enhance the quality of care, reduce costs, and increase transparency and collaboration among actors (Kreps and Neuhauser, 2010; Helman et al., 2015; Dedding et al., 2011; Martin et al., 2009).

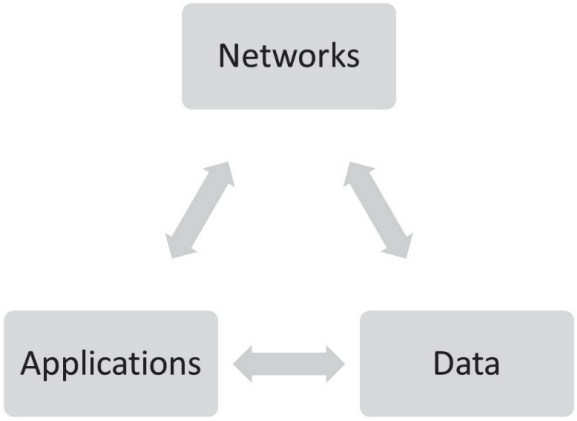

FIGURE 3 eHealth elements

Kreps and Neuhauser (2010) regard it as a responsibility to further design eHealth for effective communication and for exchanging information in healthcare actor networks consisting of customers, service providers, and policy makers. Further they named as key features of eHealth enhanced user control, interactivity, information customization, and social networking aimed at improving health outcomes and called for interactive communication ensuring the engagement of the actors. A challenge in the development of eHealth is adapting eHealth applications to diverse populations with specific interests, needs for information, and communication orientations, but digitization also enables the creation of the personalized services or service processes customers call for (Kreps and Neuhauser, 2010; Newell and Marabelli, 2015).

Helman et al. (2015) described the development of eHealth as a result of IT breakthroughs causing changes in intra- and inter-organizational power and exchange relationships and in conceptions of time and space. The entire healthcare ecosystem is subject to these changes including the impact of empowered healthcare customers (Helman et al., 2015). Helman et al. (2015) presented a case using telemedicine in neurodevelopmental disorders in which eHealth was utilized to bridge the gap between expert knowledge and practitioners with little experience. The means to bridge the gap were from consulting, procedural interventions, and educational conferences through digital solutions (Helman et al., 2015). This case serves as an example of the service ecosystem interactions and interventions for value co-creation through enabling technolo-

gy defined as a combination of practices, processes, and symbols for human purposes (Akaka and Vargo, 2014).

eHealth reaches new spheres with AI and Big Data integrated with healthcare service processes. AI involves the use of IT to generate intelligent behavior with minimal human interventions (Hamet and Tremblay, 2017). Big Data describes not only a vast amount of data but also the combining of this massive data volume with sophisticated data analytics to acquire new insight and knowledge. Big Data as a data paradigm emphasizes diagnosis and insight based on data rather than on expert intuition and seeks to extract intelligence from data and transform it into business advantages (Chang, 2016; McAfee, Brynjolfsson and Davenport, 2012). Through various electronic medical records, monitoring devices, and other means, huge amounts of data are gathered, but the challenge is in how to structure the data and utilize them in such a way that they are of value to the institution and the user (Chang, 2016). AI is closely connected to Big Data in that it provides information, but with AI data and digital solutions, the utilization can be taken further in providing knowledge directly to the users and even making direct interpretations based on the data analyzed through system algorithms. AI has attracted stronger interest the in healthcare field since the early 2000s, although the European Society for Artificial Intelligence in Medicine (AIME) was established in 1986 to foster AI research for medical care (Hamet and Tremblay, 2017, Newell and Marabelli, 2015). AI with advanced software has benefitted professional decision-making, supported reasoning in situations of uncertainty, and even enabled autonomous decision-making through the closer integration of Big Data in value co-creation activities (Patel et al., 2009; Loebbecke and Picot, 2015).

The possibilities for generating personalized data from online monitoring and by combining data for increased accuracy of diagnosis and further treatment or care have increased exponentially. One example of AI is IBM Watson, which is already effectively used for cancer data analytics (Chang, 2016). However, there are issues related to the use of, processing of, and access to the data. Further, data security is of great concern. With AI, the system can learn with repetition based on data and develop even greater data interpretation accuracy, but worries may arise related to who actually has access to the data and how far AI-generated interpretations can be relied upon. These worries are related to internal errors, technical breakdowns, and data processing issues. With digital services, AI offers new and still-emerging opportunities. Instead of actor-to-actor human relations, AI can be used to provide certain professional knowledge and apply that knowledge within the service portal. The full effect of AI depends greatly on integrated environments that enable the merging of knowledge-based tools with other applications, emphasizing the strategic role of new technology in healthcare services.

The increased generation of and access to relevant data is said to be accelerating the process of transforming medicine from art produced by artisans to a science- and data-focused culture (Patel et al., 2009, Chang, 2016). There are concerns that healthcare will be depersonalized through digital services and AI,

but there are unquestionable benefits to supporting physicians in their decision-making with accurate information (Chang, 2016). With medical data and by combining human and machine intellect, Big Data and AI or digitization in general are argued to be contributing to a philosophical transformation in the healthcare ecosystem and business model (Chang, 2016; Loebbecke and Picot, 2015).

Digitization is developing and defining not only a service process but also related software, so there some remarks on the regulatory side of the development work of eHealth solutions are worth mentioning. Medical devices, which include digital service portals, are tightly controlled by legislation and regulations both on the country level and internationally, such as through EU directives and US legislation (European Committee, 2007). In their study on agile practices in software development, McHugh et al. (2017) discussed ways of achieving regulatory conformance in the development lifecycle through the use phase of the system. The study findings report that using mixed agile practices like Scrum could benefit the development of a plan-driven software development lifecycle to meet both organizational and developmental needs (McHugh et al., 2017). The systematized development work ensures regulatory conformance and reduces the need for changes or corrections in the use phase (McHugh, 2017; Mair et al., 2012). Nevertheless, the technical development of eHealth or digital services is not in the scope of this dissertation and therefore is left with this remark only.

2.2.2 Digitization: Changing healthcare actor dynamics

Healthcare organizations are systems of negotiated order that emphasize medical dominance aligned with the distribution of power (Nugus et al., 2010). The healthcare professions rely on this negotiated order for role relations in an interdependent environment of actors (Abbott, 1988; Keijser et al., 2016). Further, the way the healthcare organizations perform significantly reflects the professional's expertise instead of considering the customer's perspective (Rasche and Floyd, 2017). Traditional patient management includes traditional elements of power distribution, in which the physician coordinates a multi-professional healthcare team (Nugus et al., 2010; Keijser et al., 2016). This dominance of physicians in a service network may create issues as the patient begins to take on the role of a customer, expecting increased participation in decision-making and treatment (Kreps and Neuhauser, 2010; Ylén et al., 2014b) The tradition of firm distributions of roles and power, with the doctors holding the formal responsibility for patient care, is confronting not only the changing role of the customer but also a redistribution of work in the service network enabled by digital services (Nugus et al., 2010). Thus, here digitization represents an institutional force influencing the redistribution of work among professionals in a service network consisting of both intra-organizational and inter-organizational actors (Orlikowski and Scott, 2008; Dewett and Jones, 2001).

In an organizational setting, internal value networks (Allee, 2009) reflect the value co-creation constellations. Activities and relationships among work

groups that are active in the customer value co-creation process comprise the internal value network. A study on inter-professional relationships in healthcare (Nugus et al., 2010) focused on the role-based power of physicians' overruling other professionals in decision-making. Nugus et al.'s (2010) findings on these inter-professional relations indicate that doctors were exercising role-based power over other professionals making decisions on a case while regarding themselves as team players. There was pressure for more team involvement in decision-making advocating requirements for changes in the institutional and cultural settings of the organization, which supports the idea of new digital organizations and in healthcare of distributing power and leadership through collaborative practices (Nugus et al., 2010; Keijser et al., 2016). Modern multi-professional teams in healthcare consist of several actors from varying professions who are all involved in patient care, or customer service. However, the digital interaction takes place between the professional and the customer and not openly among the members of the team. There is an imminent need for further study on the different roles the professionals will adopt within the digital service context (Keijser et al., 2016).

Ensuring multi-professional team collaboration with digital services has become critical and requires careful consideration in planning the service processes. For the actors involved in the digital service portal, the service is transparent in terms of the knowledge and process, but involving the team and other actors in the service process requires new ways of working as a team. This may become challenging, as in healthcare, the professions are not typically balanced in terms of their responsibility for treatment and power relations. This phenomenon is strongly related to organizational culture (Nugus et al., 2010; Keijser et al., 2010). The actor interdependency involved in digital services can enable seamless service or care, as in the healthcare field, but doing so increases the complexity of the service system (Ostrom et al, 2015; Koch, 2013). The digitization of services enhances a rather different aspect of managing the service process, and the service process becomes more institutionally structured and steered by the digitized process. This change will evidently influence the organizational culture and power balance among professions and even transform the occupational professionalism to a more organizational professionalism (Evetts, 2009; Keijser et al., 2016). These changes align with the challenges imposed by the increased involvement of the customer in the digital healthcare service process, addressing the need for multi-actor involvement and for redefining actor roles in the value co-creation process (Vargo and Lusch, 2016; Waseem, Biggemann and Garry, 2017).

The threat of organizational professionalism is in its implications for the professional autonomy of occupational professionalism as it relates to changing roles, sharing work, and enabling the active participation of the customer through the digital service process (Evetts, 2009; Keijser et al., 2016). Medicine or healthcare is argued to have largely resisted any attempts to interfere in its scope of practices. This resistance is not merely due to issues related to expert, exclusive knowledge and responsibility; in a more social context, it is related to

the professional autonomy and power relations within the service network of healthcare professionals (Nugus et al., 2013; Keijser et al., 2016; Orlikowski, 1992). Nugus et al. (2010) distinguished power as a positive and collaborative competency, utilizing dialogue with power based on authority and competition. Orlikowski (2004) defined power in social interactions as possessing the transformative capacity to accomplish outcomes, and this feature of power relates to Nugus et al.'s (2010) conception of power as a positive competency. According to Orlikowski's definition, power can be executed in an authoritative way towards actors in the service network or in an allocative way towards other resources. Authoritarian power is not necessarily competitive or dominating, as it can be relational and dependent on other actors, role expectations, and negotiated order in the service environment (Nugus et al., 2010). The asymmetry of resources like in case of knowledge is connected to power and thus have influences on the interaction beyond the immediate environment (Nugus et al., 2010; Orlikowski, 1992; Edvardsson, Tronvoll and Gruber, 2011). For example, customers and even their informal caregivers as part of integrated healthcare teams are increasingly participating in the collaboration (Koch, 2013). Empowering the customer means enabling active involvement and participation through shared information and the ability to interact, which challenges the traditional authoritative approach to the customer (Ouschan, Sweeney and Johnson, 2006; Gulbrandsen et al., 2016; Martin et al., 2009). Adopting empowering communication and interaction styles with customers is reported to reduce the long-term need for healthcare (Ouschan, Sweeney and Johnson, 2006; Vernarec, 1999).

The role of customer has changed to that of information creator, and customers now look for more valuable and meaningful information in the interaction with professionals (Donnelly, Shaw and van den Akker, 2008; Zhang et al., 2016). Ouschan et al.'s (2006) findings on customer empowerment in healthcare emphasize the necessity of the supportive role of the professional in building trust with the customer. Trust directly improves the customer's perception of the value of the service (Zhang et al., 2016; FitzPatrick et al., 2015). The motivation for value co-creation is related to trusting the professional, and yet again, trust is built through the way the professional supports the customer, reduces the asymmetry in knowledge, and allows the customer to participate in the decision-making (Barile, Saviano and Polese, 2014; Gulbrandsen et al., 2016; Ouschan, Sweeney and Johnson, 2006). In the relationship with the customer, Ouschan et al. (2006) found that the support from the professional is reflecting the behavior towards the customer. The authoritative way of sharing health information can be perceived as intimidating and depowering (Kreps and Neuhauser, 2010; Donnelly, Shaw and van den Akker, 2008). Such behavioral roles of the professionals are changing through requirement for supportive role. The requirements for changing behavioral roles are challenging the relationships and cultures within organizations while influencing the traditional boundaries of the professional and the customer related to access to information and decision-making (Donnelly, Shaw and van den Akker, 2008; Helman et al., 2015;

Waseem, Biggemann and Garry, 2016; Gulbrandsen et al., 2016; Erlingsdóttir and Lindholm, 2015; Allee, 2009).

Nugus et al. (2010) suggested implementing a socialized role expectation for doctors determining to what extent they allowed input from other actors of different professional backgrounds. Based on the service network thinking of S-D logic, a digital service system is included in the network of actors, and its role can be determined based on the socialized role expectation of the doctor. Despite the expectations regarding the role of doctors, there is a strong cultural need for cooperation and the contributions of different roles within the service system (Nugus et al., 2010). Organizational culture has a strong influence on how professionals see their roles and how actively they accept technologically advanced service processes. If a culture that is strongly steered by resisting authority prevails, there is a risk that the social influence will hinder the effective implementation of digital healthcare services. Moreover, the social influence is very much related to experience, and therefore professionals are often hesitant about implementation when changes are imposed on their roles, responsibilities, and routines (Keijser et al., 2016; Orlikowski, 1992).

The digitization of healthcare service introduces a substantial change in the service process, as it influences the entire service process and involves changes in actor roles, interactions, and involvement in the value co-creation process. The speed of change can vary from moderate to rapid depending on the complexity and strategic importance of the change (Peppard and Ward, 2016). Radical changes are rare in highly institutionalized environments like healthcare, and therefore resistance to required changes may be rather extensive (Greenwood and Hinings, 1996; Modell, 2001). Institutional scholars have studied the influence of institutional control practices from the point of adaptation to changes in performance measurement. The analogy to control practices lies in the controlling mechanism of measurement and in the coercive form of digital service's enforcing certain procedures. In gaining the full benefit of eHealth, there are issues related to mismatch between targeted benefits and actual outcomes, causing problems in the implementation and use phases of digital healthcare services. The impact of social dynamics and the human factor needs to be addressed to ensure better results from eHealth solutions. (Newell and Marabelli, 2015; van Gemert-Pijnen et al., 2011). Further, there are tradeoffs in adapting to digital services, such as in relation to user control of privacy versus security or freedom versus control (Newell and Marabelli, 2015). The privacy of the users of the digital service system may be in conflict with the security if the healthcare professionals' actions can be followed and controlled to ensure a more systematic and secure process and therefore more consistent quality of service. Customer data privacy is another issue, and in healthcare, generally one of great concern and a target for precise measures. The freedom versus control issue with the digital service relates to the idea of limiting and controlling behavior by introducing certain practices to be consistently followed instead of providing freedom to choose how to deal with the customer (Newell and Marabelli, 2015; Wieland, Koskela-Huotari and Vargo, 2016). If digitization is used as

an institutional control mechanism, the adaptation to digitized service processes can be relatively passive, causing organizational paradoxes and leading to some unwanted consequences, especially if the professionals fear their professional autonomy is being jeopardized (Evetts, 2009; Brignall and Modell, 2000; Newell and Marabelli, 2015; Anteby, Chan and Dibenigno, 2016).

2.2.3 Integrating new digital and existing service processes

The interdependencies in the service ecosystem (FIGURE 4) among people, systems, and organizational structures are complex in the healthcare environment, and the social dynamics related to professions call for participatory development and implementation process for digital services (Newell and Marabelli, 2015; van Gemert-Pijnen et al., 2011).

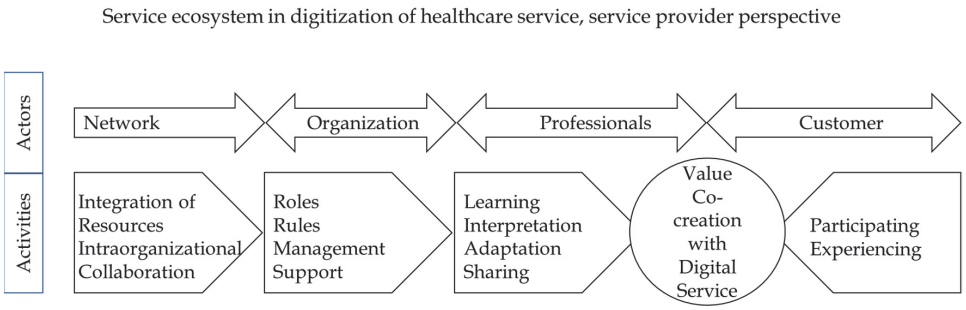

FIGURE 4 Actors in and activities for implementing digital healthcare service

Figure 4, which lists various actors and their activities, presents a simplified version of a multidimensional and multilayered service ecosystem in which the proceedings are not as linear as in a real organizational context, in which each phase is embedded in the following and previous phases and the customer experience further influences all other phases and levels of the service ecosystem (Chandler and Vargo, 2011). Bi-directional arrows reflect this embeddedness.

The internal value or service network (Allee, 2009) of a healthcare organization consists of multiple professionals like physicians, therapists, psychologists, and nurses. Further, in the integrated healthcare teams, the customer actively participates in this network (Koch, 2013). The implementation of a digitized service or a digital service process influences the interactions, roles, and processes among these actors. However, the research on the need to reconstruct professional boundaries among these actors due to technology is still scarce (Martin et al., 2009). Although the service ecosystem is a relatively self-contained and self-adjusting system of service networks and actors, especially when deploying digital technology (Akaka, Vargo and Wieland, 2017; Snow, Fjeldstad and Langer, 2017), it is unlikely that the actors and the customer would self-adjust themselves independently to redefine and coordinate the re-

sources from the social structures of the organization and the formal responsibilities of the customer in healthcare. An actor-oriented organization relies on protocols, infrastructure, and coordination instead of hierarchy in self-adjustment, which can emerge as a result of integrating digital services with existing services but requires systematic support to succeed (Snow, Fjeldstad and Langer, 2017; Akaka, Vargo and Wieland, 2017). There is a risk that unintended consequences can occur if new digital processes are not properly aligned with existing service processes (Keijser et al., 2016); therefore, managerial engagement is needed to support collective action in integrating the service systems (Mair et al., 2012). Erlingsdóttir and Lindholm's (2015) study findings support this idea, pointing out the necessity of external involvement in enhancing the implementation of digital services and enforcing their use among professionals. The external involvement can be from the organization's upper management, governmental bodies, or legislation exerting its power or showing leadership and commitment in encouraging the individual professional (Keijser et al., 2016).

Technology influences social relations and organizational structures, and the acceptance of technology becomes evident in how people use technology in their everyday practices (Newell and Marabelli, 2015; Orlikowski, 2000). These practices include the interactions among people, technologies, and social action. The use of technology forms certain structures for using the technology (technologies-in-practice), meaning that the rules for and ways of using technology are formed in interaction with the technology by the actors within the organization. Technologies-in-practice are never fully stabilized, as technology changes, and the people implementing and using it are exposed to political, cultural, and environmental influences and interpret practices or scripts in their own use of technology (Orlikowski, 2000).

The expected benefits for treatment outcomes or the perceived usefulness of digital services are strong predictors of a healthcare professional's acceptance of a digital solution, but support is needed for the professionals to successfully adapt to new roles and service processes with advanced algorithms and co-create value (Li et al., 2014; Akaka and Vargo, 2014; Newell and Marabelli, 2015; Keijser et al., 2016; Hennemann, Beutel and Zwerenz, 2017).

The ease of use is another relevant factor in the acceptance of digital solutions among healthcare professionals (Li et al., 2013). If the integration of the service processes is failing, the ease of use of the digital service will remain low, and the digital service process will be seen as adding complexity to the service or as a separate, extra tool or task not linked with the service process and therefore causing extra work and concern. An additional factor in professionals' resisting the use of digital services is the fear of inadequate or inappropriate interpretations based on the information provided through the digital service system (Erlingsdóttir and Lindholm, 2015; Kreps and Neuhauser, 2016 Keijser et al., 2016). The performance issue is of concern because the professional interacting through the service portal will encounter the problems directly in the customer interface if the digital platform does not perform according to the service re-

quirements (Keijser et al., 2016). In their user acceptance model of technology, Venkatesh et al. (2012) presented the concept of performance expectancy, which is related to the preconception of technology and its ability to enhance the effectiveness of a job and improve job performance. Orlikowski's (2000) study reported increased effectiveness in customer service and increased efficiency in communication when new technology was applied. In healthcare organizations, the professionals' engagement with new technology and acceptance of digital healthcare services may vary greatly. There are differences in the way upper management regards the possibilities of digitization, the way operational management is involved in implementing digital services, and the way individual professionals view their role in performing the service actions. Healthcare professionals have a crucial role in implementing digital services, as they act as agents for attitude formation for customers and coworkers (Hennemann, Beutel and Zwerenz, 2017). All this relates to Orlikowski's (2000) institutional conditions that reflect the organization's structures, norms, and culture.

Orlikowski (2000) compared implementation and institutional conditions for acceptance and use of technology in the work. If the institutional conditions were more individualistic and hierarchical, the users expressed little or no interest in integrating technology into their work and greater interest in maintaining current practices. If the institutional conditions were team-focused and learning-orientated instead of hierarchical, the interest and willingness to implement and engage in technology in work was reported to be high or very high. In the comparison constellation, the organizational conditions were team-focused and cooperative. When people actively engaged with new technology and acquired the competence required with the technolgy, doing so redefined their work, collaboration styles, and learning.

A study by Erlingsdóttir and Lindholm (2015) described the opening of customer medical records for use and how the empowerment of the customer through digitization caused conflict with the professionals. The initiative to open the medical records did not come from the professionals themselves but from an IT strategist. In light of Orlikowski's (2000) study, the cooperative institutional conditions supported the intrusion of an external actor in the professionals' service process. Typically, healthcare has a reputation for largely resisting any attempts to interfere in its scope of practices (Nugus et al., 2010). With the opening of the medical records, Erlingsdóttir and Lindholm (2015) identified two main risks: patient data security and the patient's ability to act on or understand the information in the medical records. With the risks of data insecurity and data misinterpretation, the professionals' resistance to opening the medical records was substantial. Other studies have also recognized this risk of inadequate or inappropriate interpretations (Kreps and Neuhauser, 2016; Keijser et al., 2016). Erlingsdóttir and Lindholm (2015) reported that due to the increased transparency of information through available medical records, there was a genuine worry among the professionals concerning the control of their work. Professionals may feel threatened by a customer's use of information and act defensively, authoritatively asserting an expert opinion (Kreps and Neu-

hauser, 2016; Nugus et al., 2010). Yet again, the tendency is to engage the customer in shared decision-making within the service network of professionals, and this calls for cooperation in analyzing the information so that the professional may guide the customer to reliable sources of further information (Kreps and Neuhauser, 2016; Donnelly, Shaw and van den Akker, 2008).

The successful implementation of digital healthcare services and the transformation of healthcare are strongly related to necessary changes in group norms and behaviors, and physicians play a crucial role in encouraging the use of eHealth services (Keijser et al., 2016; Li et al, 2013). For the upper management, the process of integrating digital and existing service processes creates a multi-level challenge, as change management and medical leadership are required for successful implementation and integration (Keijser et al., 2016). Healthcare service providers and the management in healthcare organizations need to consider the perceptions of the differing roles of each actor or individual, especially their differing abilities and interests in or acceptance of these roles. The implications of a new digital service may call for new business models to be considered (McColl-Kennedy et al., 2012; Saarijärvi, Kannan and Kuusela, 2013). Further, in accordance with S-D logic, value co-creation challenges management at all levels to serve all actors and to enhance the competitive advantage through servant leadership (Lusch, Vargo and O'Brien, 2007).

In their study, Keijser et al. (2016) presented six themes on successfully introducing virtual teamwork in healthcare. A virtual team works through digital encounters and utilizes eHealth. The findings show that clearly defined roles and responsibilities, together with standardized work processes, are essential for effective day-to-day team operations and information sharing. Another study on factors promoting or inhibiting the implementation of e-Health systems reported that roles and responsibilities were less important and instead stressed the relevance of training team members to engage in the implementation while considering the division of labor and workloads within the team (Mair et al., 2012). Management should note the need for sufficient training in completing technical tasks and skills for using the digital system. Virtual teams can experience misunderstandings due to the lack of close interpersonal contact, and there are proposals from team members on regular face-to-face encounters to sustain optimal relationships (Keijser et al., 2016). These findings apply to implementing digital services in the customer interface and integrating them with the existing services because the customer is considered a member of the integrated care team (Koch, 2013; Keijser et al., 2016).

Learning can be considered a result of value co-creation. Implementing a new digital service requires the customer to understand and learn the new service as well. Learning also contributes to the formation of new roles or identities within the service process (Brown and Duguid, 2001). In the digital service process, the customer has a substantially more active and participative role in contributing to the service outcome when a coaching professional supports his or her actions. Although Vargo and Lusch (2004) regarded attempts to define the outcome types of service unnecessary, achieving the transparency called for

in the value co-creation process (Prahalad and Ramaswamy, 2004b) with new digital service processes requires a new service typology with understandable scripts. Service typologies and instructions for the service process provide guidance on how to run the service process or complete certain actions by clarifying the important and less important activities (Eichentopf, Kleinaltenkamp and Stiphout, 2011). The actions and ways to ensure the adoption and efficient use of the system need to be trained. The adoption of these new, defined procedures created during the development and implementation processes is influenced by how well the staff and customers are introduced to and trained in the new procedures. In the new digital service process, which may contain new and existing actions, the complexity of the process increases, which makes the new procedures more difficult to learn (Eichentopf, Kleinaltenkamp and Stiphout, 2011). Adapted from Eichentopf et al.'s (2011) model of scripts with subdimensions, a model of adoption and the importance of new service procedures is presented in Figure 5. Moving across the horizontal axes reveals the degree of adoption and the degree of importance of the procedure. For example, with a higher degree (+) of standardization, the adoption of the procedure increases, or if tasks can be varied and there is less requests on task similarity (-), the procedures are less important.

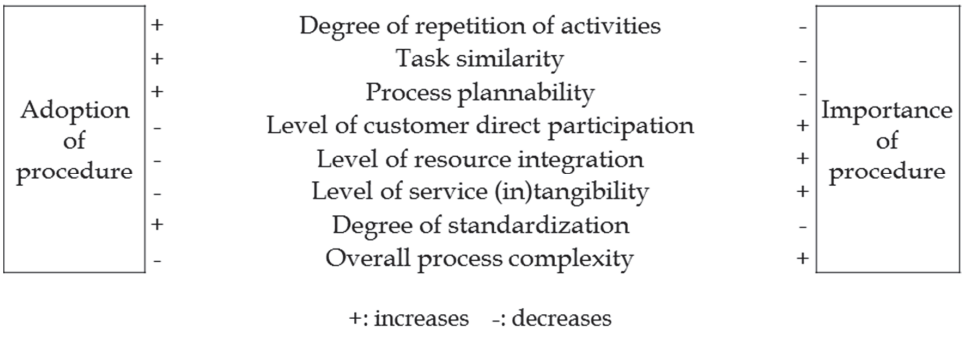

FIGURE 5 Adoption and importance of service procedures (adapted from Eichentopf, Kleinaltenkamp and Stiphout, 2011)

According to Eichentopf et al. (2011), service typology serves the management in that it defines the scripts or procedures for the actions needed for process efficiency and helps to improve interactive value co-creation. The integration of a new system entails the compatibility or fit between the individual work and the way the system is expected to be used within the organization (Venkatesh et al., 2003). With digital healthcare services, the digital service process forces the participants to act in a predefined manner based on scripts or defined procedures (Eichentopf, Kleinaltenkamp and Stiphout, 2011), and the professional's freedom to tailor the treatment process is thus limited. The integration of digital services with existing services follows Orlikowski's structurational model's idea that technologies are designed and used iteratively. Actor engagement is expected to be greater in the development phase, but the ability to change the dig-

ital service procedures in interaction is important for successful implementation. These changes can be physical changes of the service procedure, but even more important is the possibility of altering the social changes meaning interpretations, appropriating and adapting the procedures (Orlikowski, 2000). The technology or digital service mediates the activities of the service network actors, i.e. the professionals and the customer involved. The possibility of changing and influencing how they work with the digital service is important for the professionals who may need to deal with unanticipated events or complex situations (Orlikowski, 2000; Kreps and Neuhauser, 2010). However, the ability to influence how one works with the digital service entails the risk of avoidance behavior related to acceptance and can result in different uses of the service by different individuals, which may cause lower adoption and varying service quality, influencing organizational targets for implementing the digital service. However, the users are influenced or even restricted in their appropriation of technology by the institutionalization of the practices and processes to norms and redesigned processes for performing their work. This situation understandably influences the acceptance and use of new digital services. Organizational support for using a new digital service is required to reduce reluctance and narrow the possible gaps in competencies like computer illiteracy and other skill-related issues in working with the digital service portal. This calls for leadership, encouragement, and support in the implementation of digital services among professionals (Keijser et al., 2016).

The service ecosystem view emphasizes the crucial role of actors and practices in value co-creation (Wieland, Koskela-Huotari and Vargo, 2016). The ability to influence practices with a new digital service is important to professionals; therefore, participative roles in the development and implementation phases are crucial for success (Orlikowski, 2000; Li et al., 2013). Engagement in designing the practices for use supports the participative role (Li et al., 2013). Drawing and adapting from value co-creation practices shaped through institutional work (Wieland, Koskela-Huotari and Vargo, 2016), the practices involved in integrating a new digital service with the existing service process through such institutional work are defined in Figure 6. These practices steer the integration of resources through which value will be co-created. Adapting the model of Wieland, Koskela-Huotari, and Vargo (2016), these practices consist of integrative practices, normalizing practices, and systematization practices (Mair et al., 2012).

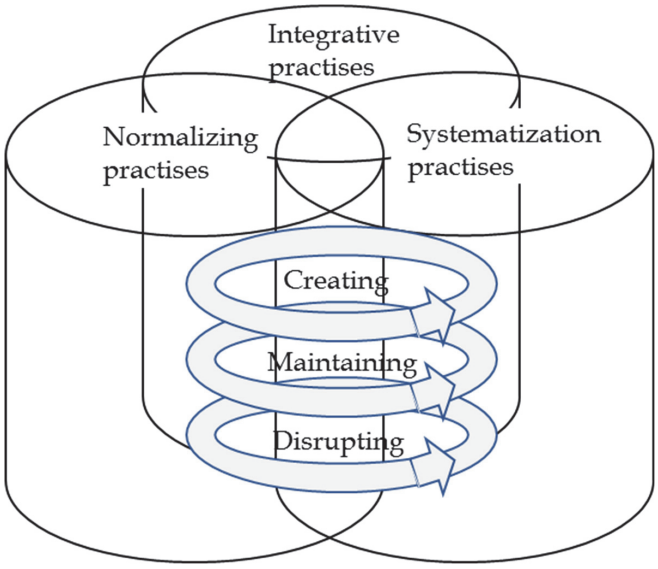

FIGURE 6 Value co-creation practices shaped through institutional work (modified from Wieland, Koskela-Huotari, and Vargo, 2016)

Integrative practices define how new service processes are integrated with the resources available and how these resources are used during the new service process. Through the work of professionals, patterns of interactions with the new digital service become established as standardized practices (Orlikowski, 1992). With standardization, integrating practices introduces established and unified practices, which reduce the diversity of the service online and influence the quality of the service in the long term. Integrating practices and adapting to their use shape the way actors co-create and perceive value (Wieland, Koskela-Huotari and Vargo, 2016). Normalizing practices influence which practices professionals perceive as proper and favorable. By defining practices in relation to which social norms and rules the actors apply using the new digital service in everyday life, the practices become normalized. Within the digital service construction, certain algorithms are the fundamentals of the service and create the basis for acting on the data. These algorithms not only support shared decision-making but also allow the service system to propose certain actions based on the data and information within the system (Newell and Marabelli, 2015). This new element supporting decision-making needs to be included in normalizing practices. Defining the role of algorithmic decision-making diminishes the diversity in decisions, which may lead to resistance as it also reduces the tolerance for diversity, which may be contradicting different views in the decision-making (Newell and Marabelli, 2015; Patel et al., 2009; Loebbecke and Picot, 2015).

Quality issues are crucial concerns in healthcare; therefore, the representational practices referring to how meanings are perceived the original model have been replaced with the more relevant systematization practices (Mair et al.,

2012). Systematization practices define how the identified problems are dealt with during implementation and use (Mair et al., 2012). These practices aim to ensure proper implementation and appropriate use of the new digital service. Concerning each of these practices, new ways of working are being created, some existing service actions are being maintained, and the majority of the ways of working with the digital service are disrupting the existing way of working.

Digitization disrupts existing processes in many ways by causing multiple changes in the ways people work, their respective roles, and the interactions among service network actors. Thus, digitization may cause uncertainty (Dewett and Jones, 2001; Orlikowski and Scott, 2008). Integrating new and existing ways of working involves new ideas and changes due to technology and may incite resistance until the new practices become generally accepted. The process of defining new ways of working occurs both prior to and after the implementation, with the help of normalizing and systematizing practices (FIGURE 6), and is related to the professionals' request to appropriate the new digital service system in the customer interface and to organizational citizenship (Keijser et al., 2016; Orlikowski, 2000; Waseem, Biggeman and Garry, 2017). This approach to defined practices focuses on professionals' crucial role in the antecedents of value co-creation (de Oliveira and Cortimiglia, 2017) in implementing and using the digital service in an iterative way to establish systematic and coherent working processes to ensure value co-creation. The practices should remain agile with iterative and incremental phases to sustain a development lifecycle of a digital service integrated with defined processes (McHugh et al., 2017).

Introducing a digital service process enhances the intangible benefits of unified terminology and language called for in the multi-actor service process, increased transparency and decision-making, and improved planning and monitoring capabilities (Helman et al., 2015; Fink, Yogevand and Eve, 2017; Koch, 2013). Healthcare professionals are quick to recognize such benefits and many more, which enhance the adoption of digital services.

3 RESEARCH METHODOLOGY

This chapter presents the scientific orientation of the dissertation with underlying epistemological and ontological assumptions. The scientific orientation greatly influences the selection of the research methodology, data gathering, and methods of analysis (Dubois and Gibbert, 2010). The research paradigm of this dissertation deploys moderate constructionism as explained by Järvensivu and Törnroos (2010). Moderate constructionism allows the impact of the research context to be considered with the findings. In this dissertation, the context of healthcare is considered relevant and thus affects the choice of research paradigm. The research strategy as well as the research methodology are explained and the research process described, concluding with the description of how the study findings and conclusions were produced.

3.1 Moderate constructionism as a scientific orientation

The scientific orientation or research paradigm considers epistemological and ontological assumptions in relation to the research subject. These assumptions define the choice of research methods and methods of theorizing, the interpretation of the results and conclusions, and how the research can be evaluated (Weber, 2004; Dubois and Gibbert, 2010). The choice of the research paradigm involves the consideration of objectivity or subjectivity in aspects of reality and knowledge (Järvensivu and Törnroos, 2010). Ontology refers to the nature of reality and knowledge about the world and what can be known from it (Metsämuuronen, 2005). In other words, ontology tries to describe what knowledge we have. Further, the choice of the research paradigm involves the consideration of the nature of the knowledge and how the knowledge is obtained (Metsämuuronen, 2005; Weber, 2004). Epistemology refers to the nature of knowledge in describing the relationship between researcher and research subject (Metsämuuronen, 2005).

Although marketing research is dominantly adopting positivism as its research paradigm (Piekkari, Welch and Paavilainen, 2009), increasingly, other approaches are applied due to increased criticism that positivism fails to consider the complexity of the environment in its explanations (Easton, 2010). Positivism views the reality of the social world as consisting of regularities that can be revealed and used for causal statements. Causal explanations in positivism can be adopted in seeking generalizable knowledge to explain reality (Hirschmann, 1986; Johnson and Duberley, 2000; Eisenhardt, 2007). Epistemologically, the empirical reality in positivism is observed or measured, and these findings represent objective reality that can be generalized (Järvensivu and Törnroos, 2010).

Value co-creation in marketing science is by definition an approach in which the focus is on the relationship between the service provider and the customer (Vargo and Lusch, 2008, Grönroos and Voima, 2013). However, recent developments in value co-creation take the service network with its actors into consideration (Vargo and Lusch, 2017; Waseem, Biggeman and Garry, 2017). The service network in a healthcare context is evident, as other actors like multiprofessional teams influence the relationship of the service provider and the customer. Further, digitization also influences the relationship and may even disrupt the relationship by allowing indirect interaction and increased customer involvement in the experimental creation of value, value-in-use. The interactive experiences of professionals and customers enabled by the use of digital service platforms can be observed, but objective generalizations of these subjective experiences based on observations can hardly be formulated. The reality based on experience approaches from ontological and epistemological stance relativism, in which reality is created through social interaction and is subjective and interpreted (Järvensivu and Törnroos, 2010; Easton, 2010). There are as many interpretations as there are researchers involved, and such interpretations are often accused to lack comparison and meaningful evaluation (Easton, 2010), which are both challenging issues in understanding a phenomenon. To conclude regarding the subjective nature of interpretations, it is reasonable to argue that interpretivism seeks to understand a phenomenon rather than explain it (Johnson and Duberley, 2000).

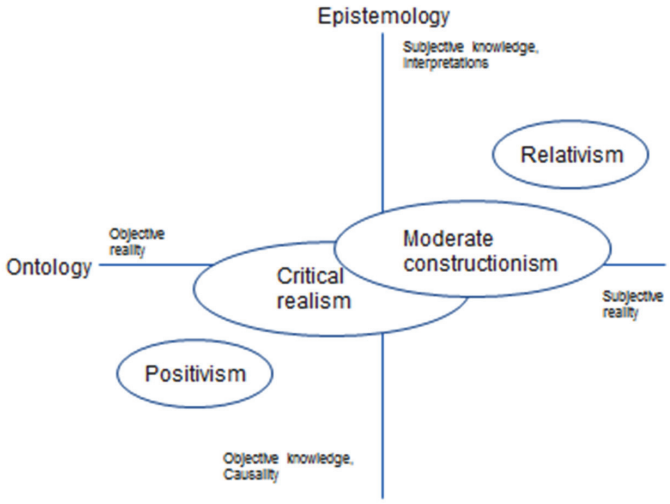

FIGURE 7 Ontological and epistemological dimensions and relative positioning of research paradigms (adapted from Järvensivu and Törnroos, 2010; Järvinen, 2016)

According to Järvensivu and Törnroos (2010), business network case studies do not implicitly apply any specific ontological or epistemological approach and often position themselves with critical realism. However, they further point out that critical realism fails to consider the multiple perspectives of different business communities. Moderate constructionism applies a more relativist approach with interpretivism (FIGURE 7) and allows for the subjectivity of reality and the community-based conception of knowledge (Järvensivu and Törnroos, 2010). With this approach, moderate constructionism is argued to better encompass the multiple constructed, community-bounded realities of a case study. Järvensivu and Törnroos (2010) further argued that moderate constructionism and critical realism are epistemologically rather similar, with some differences in their perceptions of truth and knowledge. Critical realism attributes causality to social relationships and applies triangulation to explain the truth, whereas moderate constructionism sees relationships evolving in a contextual environment referred to as "relevant circumstances," which lead to local and specific realities (Eisenhardt, 1989; Easton, 2010; Lincoln and Guba, 2000). Both critical realism and moderate constructionism apply interpretations of the researcher that cause the observations to be imperfect and subjective, requiring careful analyses of these observations for reasoned interpretations (Järvinen, 2016; Bhaskar, 2015). Aligning moderate constructionism with the interpretation of these relationships is highly dependent on the interaction of human actors and digital services, but the focus is on the processes by which these interpretations

and meanings are created (Schwandt, 2000). Moderate constructionism leaves room for interpretations and thus is more subjective than the constructivist approach, which focuses on making or constructing a phenomenon (Fleetwood, 2004).

Modern constructionism's main approach to reality is that reality is dependent on social relations and their interpretations; thus, truth is socially constructed (Lincoln and Guba, 2000; Schwandt, 2000; Järvensivu and Törnroos, 2010). Further, considering their technological impact, these digital services can be regarded as artifacts (Fleetwood, 2004) influencing the changes for professionals and organizations through interactions between the digital service platform and organizational users. Thus, the interactions of human actors and digital artifacts and the interpretation of these interactions shape and construct reality (Fleetwood, 2004; Markus and Robey, 1988; Orlikowski, 1992; Järvensivu and Törnroos, 2010). As an example of such actor community, the healthcare hospital environment consists of multiple constructs, relationships, and community-bounded or, as here, profession-bounded realities. In organizational research, structurational models have provided insight into technology's influence on organizations and the roles within them (Orlikowski and Barley, 2001; Orlikowski, 1992; Akaka, Wieland and Vargo, 2017). Moderate constructivism shares the approach of viewing human action as a central factor in defining reality during the use of technology (Orlikowski, 2000).

This dissertation finds itself in between positivism and relativism (FIGURE 7) and connects to moderate constructionism (Järvensivu and Törnroos, 2010; Schwandt, 2000), utilizing interpretations of reality in the attempt to increase understanding of the phenomenon of digitization by describing how digitization influences or transforms value co-creation in healthcare. Features of critical realism are applied in that this study utilizes causality to some extent in describing how digitization contributes to the relations of institutions, professionals, and customers in healthcare. However, this is rather a temporal interconnected process (Pettigrew, 1997) and not a direct causality, as the ecosystem's influence on the implications of digitization are complex. This is not to say that emerging antecedents do not have any significant implications but rather to focus on the impact of digitization in the complex healthcare organization with professionals entering the digital customer interface. In the creation and delivery of digital services, multiple actors contribute to the service for the customer. The internal relations of these actors and their agreements on the rules and practices implied greatly affect the success of digitization in healthcare. The relationships in the hospital environment are multi-layered and multiple, and extra-organizational institutions greatly influence them. This dissertation does not aim to specifically identify causal relationships or objectively explain causal relations of the phenomenon of digitization but rather to create understanding through interpreting the phenomenon of digitization of healthcare services and its implications in a complex environment. This inevitably leads to the generation of context-specific and socially constructed knowledge of the phenomenon (Järvensivu, 2007).

3.2 Case study and abductive approach

The emphasis on social interaction in creating reality invites the use of the case study method as a research strategy for this study. The single case study method was chosen mainly because it allows for the utilization of the unique insight the author had while working within the case organization facing the challenges of digitization in the customer interface. Digitization is not only a technological development phenomenon in the phases of implementation and use but strongly related to social interpretations within the organization. With moderate constructionism and the case study method applying a more relativist perspective, the research design needs to consider how the participants' different perspectives can be captured and how they will increase understanding of the research topic (Yin, 2014). This emphasizes the importance of the consideration and choice of the research method.

The case study approach has suffered from being not fully recognized as a proper scientific method, as its findings cannot be scientifically generalized, and it is interpretative and very descriptive in nature (Yin, 2014; Løkke and Sørensen, 2014; Flyvbjerg, 2006; Dubois & Gadde, 2002; Weber, 2004), making it difficult to build a theory. Further, case studies have been argued to be too situation-specific and to have poor theory testing (Yin, 2014; Easton, 2010). However, recently Yin (2014) argued that the case study method not only describes phenomena and creates understanding but also explains phenomena. Currently, case studies are increasingly used due to their ability to create understanding of complex social phenomena or new phenomena in unusual circumstances (Yin, 2014; Eisenhardt and Graebner, 2007; Flyvbjerg, 2006). Weick (1979) pointed out the possibilities of making specific interpretations of situations with a case study method, which contradicts the argument that case studies are too situation-specific (Yin, 2014; Easton, 2010). The case study method has been classified as an interpretive research method (Weber, 2004), and the interpretations are mostly descriptive and apply well to moderate constructionism (Dubois and Gadde, 2002). Yin (2014) categorized case study research into exploratory and descriptive case studies according to the research problem. Descriptive case studies are used mostly in qualitative research methods and typically answer the questions "why" or "how." Yin (2014) described exploratory case studies as those in which a deductive approach is used; the goal is to develop hypotheses and deploy "what" questions.

The typical problem with case studies is that the research lacks an obvious structure. This issue can be avoided with a clear conceptual framework and a strong emphasis on theory, improving the explanatory aspects of case studies (Yin, 2014; Dubois and Gadde, 2002). Traditionally, the qualitative case study method has been used to generalize results into a theoretical concept (Yin, 2014), which is analogous to inductive theory building. The deductive approach to theorizing develops theoretical propositions for testing with empirical data (Järvensivu and Törnroos, 2010). With the moderate constructivist approach's em-

phasizing socially constructed reality, the theorizing becomes more of a process of testing a theory or a research framework. Confirming this, Yin (2014) argued that case studies are increasingly used to test theories when exploring new phenomena in new circumstances.

The aim of moderate constructionism is not to generate a theory presenting a universal reality but rather to understand the research phenomenon. Dubois and Gadde (2002, 2014) supported this view in their abductive approach to case studies. Differing from induction, abduction accepts existing theory; differing from deduction, it allows a less theory-driven research process (Järvensivu and Törnroos, 2010). Further, according to Dubois and Gadde (2002), the abductive approach allows for iteration between the theory and empirical data instead of a linear procedure. This leaves room for the interpretations the researcher can make based on the data and observations, leading to new findings and realizations related to the research question. Lawson (1979) proposed retroduction as an alternative to the inductive or deductive research approach and explained its method of "moving backwards" with the crucial question "What must be true in order to make this event possible?" Easton (2010) described retroduction as being closely related to abduction or the abductive approach Dubois and Gadde (2002) introduced.

The abductive approach strives to uncover new concepts and develop theories rather than simply confirming the existing ones (Dubois and Gadde, 2002). Dubois and Gadde (2002) saw case studies as a unique means of theorizing about insights regarding empirical phenomena and their contexts. They called this combining of the empirical world with theory systematic combining, which can proceed iteratively throughout the research. The systematic combining seeks to match reality and theory and thus can create new insights that may redirect the research (Dubois and Gadde, 2002). Piekkari et al. (2010) concluded that there is no single understanding of the case study method and that the quality of the case study depends on the philosophical assumptions and the understanding of how theory and empirical observation are intertwined. The abductive approach allows new concepts and theories to emerge, which aligns with moderate constructionism's leaving room for interpreting the influence of social context on the emerging concepts and theories (Järvensivu and Törnroos, 2010).

The case study approach enables methodological triangulation, or the use of multiple data gathering techniques, through direct interaction with the actors in the organization and the possibility of understanding the cultural context of the case organization's influence on the digitization process (Yin, 1999; Christensen et al., 2011). This dissertation employs multiple qualitative methods consisting of interviews, focus group interviews, and observations to answer the research questions and to test applicability of the framework of S-D logic to value co-creation in the healthcare context (Vargo and Lusch, 2008a, 2016). Further, with the abductive approach, this study presents new insights into value co-creation in the context of healthcare, outside the traditional marketing sphere.

This study relies on a theoretical framework of value co-creation and especially on the building blocks Prahalad and Ramaswamy (2004b) presented in their DART model. This framework was applied to the interviews in the research. The individual interviews and focus group interviews were carried out according to this framework in close cooperation with the case organization. Both interview types formed the basis for interpretation of the phenomenon in the dissertation, especially in Papers I and II. Observations have been utilized to deepen understanding throughout the papers, but the participative observations (Yin, 2014) are particularly important in Papers III and IV. Participation in in-house seminars and workshops on the digitization of services presented the researcher with a unique opportunity to observe and make notes on the discussions and expressed views and access to the seminar materials for further analysis and interpretations.

3.3 Case study research process

There are several alternative research process models for case study procedures, and most are applicable to linear positivist research. Piekkari et al. (2010) described case study research as a process consisting of phases in which decisions about the study procedures are made. With the abductive approach Dubois and Gadde (2002) presented, the case study process has become iterative and includes the systematic combining of empirical observations and theory, causing the process to be less linear and to utilize the case study phases repetitively as long as they offers new insights for research and theorizing purposes. Table 2 illustrates various case study processes differing from the researcher's ontological and epistemological stance, but it still makes the similarities of the case study research process visible. Yin (2014) presented more positivist research processes, relying on a linear research process, whereas Easton (1020) presented a critical realism approach with causal relations and explanations. Järvensivu and Törnroos (2010) utilized a moderate constructivist approach, and an adapted description of a research process is presented based on their views. The fourth case study process from the literature is based on abductive approach descriptions from Dubois and Gadde (2002). The abductive model Dubois and Gadde (2002) described was utilized in the study process, and its modification is presented in Table 2 with the other examples. The iterative process is perhaps not physically visible in the format here, but it is described: the researcher can revert to earlier stages of research phases, even to the degree of redefining the original research problem with the insights gained at later stages of the study process. Järvensivu and Törnroos (2010) emphasized the role of constructing knowledge through discussions in moderate constructionism, and here, when joined with abductive logic, the iterative nature of the interpretations can be identified as well.

TABLE 2 Examples of the case study research process.

This dissertation	Yin, 2014	Easton, 2010	Järvensivu and Törnroos, 2010	Dubois and Gadde, 2002
Research motivation and case selection	Research question Research propositions	Deciding on the study phenomenon Deciding on the nature of the study question	Research purpose	Research problem Redirecting of the original research problem
	Unit of analysis, "the case"	Identifying the entities characterizing the phenomenon	Phenomenon as a case	Case representing the phenomenon Iterative case descriptions
Collecting, analyzing, and interpreting the data with complementary theories and iteration.		Collection of data	Empirical observations	Collection of data Overlapping of data collection and analyses
	Linking of the data with propositions	Making interpretations	Interpreting the data within the case context	Systematic matching of theory and reality Search for complementary theories redirecting the research problem
Presenting the findings		Forming an explanation	Construction of knowledge, validated through dialogue	Activity interdependencies Coordination mechanisms
Evaluation of the research in terms of quality and interpretation acceptability	The criteria for interpreting the findings	Deciding whether the explanation is acceptacle	Understanding knowledge validated through practice	New aspects of the research problem leading to redirection of research, data not in focus

This dissertation applies the abductive approach structure to the case study process and builds mainly on both Dubois and Gadde's (2002) and Järvensivu and Törnroos's (2010) perspectives on the research process. Through the abductive approach, this dissertation approaches theorizing by matching the findings from the healthcare environment with S-D logic from the service provider's perspective, thereby applying the existing theories to a new sector.

The applied multi-disciplinary perspective in this dissertation provides a better perspective on antecedents of value co-creation in the organizational context of this study and the iteration of theory and empirical findings. In this research, the framework of S-D logic with value co-creation was enriched by the perspectives of institutionalism and the organizational concept of professionalism in order to encompass the context of the study more comprehensively. Applying this multidisciplinary approach further helped in utilizing the gathered empirical material in a more enlightening way to create understanding of the research phenomena.

The dissertation discusses the theory and the research findings iteratively, moving between the research phases, utilizing the possibility of reinterpreting the data and interplay with theory, with the interpretations complementing the

original theories or revealing new aspects of them (Dubois and Gadde, 2002). The focus of the dissertation is studied through the selected case, and with the described abductive approach, this study aims to add new insights to the research context by using rich descriptions as a basis for explaining the research findings. Each paper of the dissertation takes a different approach to the research phenomenon, and during the data gathering phase of making observations after interviews, it became obvious that the theoretical framework would require other complementary theoretical aspects. With the complementary theoretical approaches, the study is trying to create understanding of the phenomenon of digitization in the healthcare context and connect the digital service process with the value co-creation concept of S-D logic supported by a multidisciplinary perspective (Vargo and Lusch, 2004). The evaluation of the research findings in terms of the validity and credibility of the interpretations is discussed at the end of the dissertation in Chapter 5.

The first main task in starting a research process is to outline the motivation of the study and the case selection. This dissertation stemmed from observations within a healthcare organization at which the author of this dissertation worked during the time of the intensive data gathering and research. These observations led first into discussions of the organization's efforts to reorganize its services and later into discussions of the efforts to digitize services and service processes. The case organization is one of the largest university hospitals in Finland intensively developing digital healthcare services both with external networks of other university hospitals and primary care organizations and with internal networks of professionals and actors contributing their expertise to the development work. The case organization acts as a driver in the development work, in which it possesses a great national and even an international reference value. The empirical significance of the outcomes in relationships with the customers and among the professionals in the development work both in the digital services, but even more so in the integration of these services with the present service system, motivate the research angle of the service provider within the value co-creation process. The unique opportunity to utilize the available material to create insight into the value co-creation through digitization in a healthcare context and to combine the healthcare environment with perspectives from marketing and service sciences created a strong motivational background and research purpose.

The digitization of the healthcare services offers avenues to changing interaction with the customer and in the roles of the actors. The case organization can allocate substantial resources for the development work and in relation to implications to changing interaction with the customers and the professionals represents high reference value for other healthcare organizations. Based on this dissertation's purposes and the reference value of the case organization, a single case was selected. The single case can be used to determine whether the theoretical propositions are correct or whether there is a more relevant set of explanations. With this definition, the single case can contribute to theory building by confirming, challenging, or even extending the theory (Yin, 2014). In the

negotiations with the case organization's or university hospital's representatives concerning the research, two digital services were pointed out that were both in the implementation or early use phase and at a stage that offered possibilities for gathering empirical data regarding the digitization process of the services with implications to the service provider. These two services offered the possibility of utilizing the embedded unit of analysis in the case study (Yin, 2014). However, as the technique of digitization is not in the focus and the two services were developed in a similar manner by the same organization, the author of this dissertation chose not to differentiate between them in order to avoid drifting into any technical or medical debate on the digitization process itself. Based on this decision, these two services became one embedded unit of analysis (Yin, 2014).

The second main phase of the case research, collecting, analyzing, and interpreting the data, started with choosing and defining the most appropriate sources for data collection. The data collection sources included individual informants, focus group interviews, observations within the organization, and attendance at seminars and workgroups of the organization with provided written material and notes. All the interviews, both individual and focus group interviews, were carried out in late 2015 and early 2016. The workshops of the organization took place in autumn 2015 and the seminars in spring 2016. The case studies employ multiple methods as well as multiple sources of data (Easton, 2010; Eisenhardt, 1989; Eisenhardt and Graebner, 2007). Interviews are commonly used as a data collection source, but the conclusions of a case study cannot be based on interviews alone (Yin, 2014). Moderate constructionists consider multiple sources of data in order to develop a wide understanding of the research case (Dubois and Gadde, 2014). Easton (2010) stressed that the data collection method is defined by what data are needed.

The applied methods for data collection were the same for all the papers in this dissertation. Personal semi-structured interviews, focus group interviews, and observations provided the research material for all the papers. The semi-structured themed interviews were conducted to generate data. For research, interview data should be collected from knowledgeable informants representing different views on the research phenomena (Eisenhardt and Graebner, 2007). The informants with the most knowledge were selected for further interviews by a snowball sampling method after the initial interview on the phenomena. For the semi-structured interviews, the informants were provided with an overview of the theoretical framework, DART (Prahalad and Ramaswamy, 2004a). Although the dissertation tends to follow the abductive approach, traces of the deductive approach were included in the interviews by utilizing the theoretical framework (Easton, 2010) of value co-creation as the starting point of the interviews due to the informants' lack of familiarity with the value co-creation concept of marketing science in the medicine and healthcare environment. The semi-structured interviews began with a short introduction of the theoretical framework followed by the discussion that allowed the informants to express their views on the research phenomenon freely. The interviews were all carried

out by the author, who ensured that all informants expressed their perspectives on the key aspects introduced. Data from the interviews were collected until the point of saturation. The saturation point was when the new interviewee did not add new information regarding or insight into the phenomenon. Each interview was booked for an hour, and the time was well used by the highly motivated respondents. All the interviews were recorded and transcribed. In addition, during the interviews, the author made personal notes to assist in the later analysis of ideas or remarks.

The interviews were complemented by focus group interviews that provided a different perspective on the research phenomenon. The organization preselected the focus group participants from people actively involved in the development of the digital services. The participants had different educational backgrounds and professional fields (medical, nursing, IT), and some represented the voice of the potential user or customer. The focus group interviews were limited to half an hour each. The focus group discussions were facilitated by the author, who also took notes on the discussions. The focus group participants were also briefed on the DART theoretical framework used in the individual interviews. The focus group interviews were video-recorded and transcribed. During the focus group interviews, the themes and comments from the discussions were picked up and written down to notes by the author simultaneously.

Using observations as a data collection method enabled the author to benefit from participation in internal seminars and workshops on digitization. The seminars provided material complementary to the phenomenon, introducing similar cases in other organizations. Also, the discussions and the workshops provided more material, and the author transcribed the workshop presentations. The role of the author was to attend and to observe. The author participated in the workshops, but did not take an active role and allowed the other participants to discuss and express their views on and experiences with the phenomenon. Throughout the discussions, the author took detailed handwritten personal notes to informally support the data analysis.

Analyzing and interpreting the data not only constructs the data but, with the interplay of theory and data in the abductive approach, also influences the previous phases and may affect the theoretical assumptions of the study or even redirect the original research questions (Dubois and Gadde, 2002). In this study, all the collected data were available and utilized for each of the papers of the dissertation, with different emphases and perspectives utilized based on the research questions. The author analyzed the data prior to writing the articles, but using the abductive approach, revisited and complemented the analyses in an iterative fashion (Dubois and Gadde, 2002), influencing the theoretical setting of the research papers and the dissertation. The summary of the data collection sources is presented in Table 3.

TABLE 3 Summary of the data collection sources.

Individual interviews	**Participants**	**Background information**
	6	Phycisians, psychiatrists, nurses
	3	ICT
	3	Managers
Focus group interviews	**Participants**	
Group 1	7	Physicians, psychiatrists, nurses, customer representative
Group 2	8	Physicians, psychiatrists, nurses, ICT, customer representative
Workshop or seminar title	**Participants**	
New opportunities enabled by digitalization and modern ICT	43	Internal workshop series of 3 separate sessions 11 non-medical managers, ICT, development 21 doctors and pscychiatrists, 11 consultants
HUS - Uudet sähköiset palvelut ja uudet tutkimusmahdollisuudet (New digitized services and new research possibilities)	150	Open forum in Biomedicum (estimated 150 participants of doctors, nurses, ICT, managers, medical students and general audience)
Sähköisten palveluiden riskit - Risks of digitized services	25	Internal ICT workshop (estimated 25 participants of doctors, nurses, ICT and managers)

Miles and Hubermann (1994) introduced a process for analyzing qualitative data. The process consists of 1) interpreting and coding the data, 2) categorizing and thematizing, 3) findings patterns and drawing preliminary conclusions, 4) generalizing the conclusions with data, and 5) comparing the generalizations with pre-existing knowledge. However, this approach seems rather linear, whereas with the abductive approach, the data collection and analyses are overlapping and intertwined in the research process, and the data condensation and organization processes are more iterative or cyclical (Dubois and Gadde, 2002; Miles and Hubermann, 1994). Later, Miles et al. (2014) proposed a simpler three-step procedure to create more structure for the analysis of qualitative data: 1) data condensation, 2) data display, and 3) drawing conclusions. In data condensation, the data are "sharpened" to facilitate interpretations. Data display means that the data are organized for drawing and verifying conclusions.

The analyses of the collected data followed the three-step procedure Miles et al. (2014) outlined. The data condensation involved the interpretation and categorization of the data, as did the phases in Miles et al.'s (1994) previous process. The interview and focus group interview material and the material from the observation notes were studied carefully after transcription to gain overall understanding and impressions of the material. The material was then condensed to focus on the most relevant outcomes. The material was analyzed utilizing the Atlas program to identify further themes or categories (Miles and Hubermann, 1994) or to identify findings that created new approaches to the theoretical framework. The first paper utilizes the data by defining the various elements of the theoretical framework in this research context. The second paper widens the perspective of the theoretical framework by applying the findings beyond the original framework and thus displays the data in a new adapted framework for the research context. The third and the fourth papers

are more constructed on the material and data from observations supported by insights and interpretations from the interviews as well as renewed thematized groupings of the data. These papers were further supplemented by additional material from in-house IT seminars related to the research subject that the author attended. The interplay of theory and data invited the iteration of the theory and complementary theories for the third and the fourth papers to proceed to conclusions and interpretations. This widened the perspective to a multidisciplinary approach helping to identify perceptions presented in the interviews and during observations (Miles and Hubermann, 1994).

The third main phase, presenting the findings of a case study, faces challenges with the qualitative data, as the findings may lead to rich descriptions of the phenomenon but not be able to crystallize the contribution (Dubois and Gadde, 2014; Hurmerinta-Peltomäki and Nummela, 2006; Christensen et al., 2011). In his article on case studies in *Health Services Research*, Yin (1999) took a strong stance that case studies should provide evidence clearly separate from the interpretations of the evidence. Case studies are often accused of presenting evidence only supporting the interpretations, and Yin (2014) argued that data should be cited as findings, not interpretations. Despite the long history of case research, there still seems to be no unified or structured way of presenting qualitative case study findings (Yin, 2014; Miles, 1979). The debate regarding whether a more quantitative or more qualitative approach offers more credibility to case studies continues. Dubois and Gadde (2014) noted two issues that should be considered to improve the presentation of the findings. One focuses on the case study's relationship to theory and the other issue on the methodological procedure utilized. With the systematic combing of theory and empirical data, the findings modify the original theoretical framework and enable new concepts and theoretical combinations to be identified (Dubois and Gadde, 2002), which inevitably end up with a descriptive presentation relying on analysis and interpretation.

The findings and conclusions of this dissertation are presented in Chapter 5. This dissertation combines the perspectives of four research papers. The findings of each paper of the dissertation are created by an iterative process and presented in a descriptive fashion. This descriptive way allows to take into consideration the context of the organization or "business" of the organization and the specific challenges that such organizations face as earlier, "less exploited" disciplines enter the traditional territory of healthcare. To connect the findings with the views and thinking of the informants, the papers of this dissertation utilize direct quotes from the interviews.

The fourth phase of the research process consists of evaluating the quality of the study. Case study quality evaluation is difficult is subject to strong opionions. Yin (2014) took a more positivist approach, considering the quality criteria of quantitative data to be construct validity, internal and external validity, and reliability. Lincoln and Guba (1985) also introduced trustworthiness as a criterion for evaluating qualitative research. Trustworthiness involves credibility, transferability, dependability, and confirmability. However, Dubois and Gadde

(2014) claimed that these criteria relate to positivism, as they aim to triangulate data instead of using the data to provide complementary information.

Case study quality will obviously continue to be an issue, but to overcome this, the researcher can take certain actions. Hurmerinta-Peltomäki and Nummela (2006) pointed to a study in which the most severe problem was the poor reporting of the research design and process. With this in mind, the moderate constructionist researcher should introduce the ideas or findings and interpretations for discussion to the organization to which the final ideas of the study are being brought to (Järvensivu and Törnroos, 2010). This discussion and adherence of the organization with the presented proposals ensure the validity of the findings and interpretations. The multiple data sources allow different meanings and interpretations to arise from the research material, which can better validate a case study (Stake, 1995). Easton (2010) noted that findings will always be interpretivist due to ambiguous observations; therefore, no definitive criteria can evaluate the truth or the credibility of the findings. Transparency of interpretations should be essential in evaluating the quality of a case study using moderate constructionism or critical realism. Järvensivu and Törnroos (2010) defended case studies with moderate constructionism as powerful in that they rely on consensus, which rests on transparency and communication. The results of the individual papers were presented to the organization in internal meetings and in an external seminar with thorough discussions with the key respondents for validation of the interpretations. A more detailed evaluation of the study is presented in Chapter 5.

4 SUMMARY OF RESEARCH ARTICLES

This chapter provides summaries of the four papers included in this dissertation. The papers are a mixture of conference papers and book chapters in prominent publications. Each paper was written in conversation with the organization's representatives. Prior to publication, the articles of the dissertation went through review processes. The first two papers were presented at conferences that employ a double-blind review process for the conference papers. The conference papers were accepted with only some minor remarks regarding specific details about the case itself. Presenting the conference proceedings provided excellent forums for engaging with other academics in discussions of the papers. The last two papers were published as book chapters. These papers were accepted for publication immediately and went through a series of minor revisions to meet the requirements for book chapter manuscript format and expressions. While writing the papers, the author also received feedback from discussions with other academics and members of the case organization. By invitation of the case organization, the author also presented the findings of the individual papers at internal and open seminars of the organization, for the development group of digital services, and to the public, which have provided important feedback in addition to the reviewers' contributions. Further, the author has written blog posts on the papers by request of the case organization and for the cooperating primary healthcare organization.

4.1 Paper 1: Value co-creation in healthcare: Insights into the transformation from value creation to value co-creation

The first paper relies on the theoretical framework of value co-creation elements of Prahalad and Ramaswamy (2004b) and includes a review of the literature on the concepts of value co-creation and customer perspective, while understanding the remoteness of these concepts in the healthcare environment. Alone, the concept of the customer in healthcare, especially in the case of public healthcare,

is not generally utilized and is traditionally replaced with the term "patient." The literature aims to create understanding of the changing language, as there is increasing emphasis on customer relationships in healthcare as healthcare consumerism emerges (Fischer, 2014). Understanding the customer is crucial in the digital service, as direct interaction is replaced by communication through the digital portal, which makes service available independent of time and place. Value co-creation in S-D logic (Vargo and Lusch, 2008a) specifies that only the customer defines value. However, through the interviews and insights received, the interplay of theory, and this research material, the notion arose that in healthcare, the boundary remains vague, as the service provider (e.g. the physician) holds a position through which he or she can significantly influence the customer's perception of value. This position is related to special knowledge and authority of the service provider and emphasizes the need to understand the customer and the new interactions via digital service platforms. The paper describes the transformation digitization is creating in this interaction, specifically through the change from traditional face-to-face to indirect interaction via the digital platform.

The paper is based on interpretations of the research material and produced thematizing of the material. With the abductive approach (Dubois and Gadde, 2002), the aim of the paper is not to create a new theory, but based on the research material, the paper contributes to the existing framework of value co-creation by locating its concepts within the healthcare environment and digitization. The paper opens new insights into value co-creation with the digital service processes and enriches the building blocks of value co-creation presented by Prahalad and Ramaswamy (2004b), with a focus on the transformed interactions and role of healthcare customer.

The contributions of the paper are condensed into three managerial implications. First, the paper emphasizes the necessity of deploying the concept of value co-creation in healthcare while the customer is involved as an active participant in the digital interaction. Second, the paper proposes a paradigm shift within value co-creation based on the convergence of the interaction through the digital service portal and the spatial and temporal separation of the service in contrast to the traditional face-to-face service. This service separation has implications for the understanding of when value is being co-created in the interaction between the service provider and the customer. The third contribution of the paper is that it points out the necessity of increased customer orientation with respect to the customer relationship in the method of communication and language employed in the service development itself.

In addition to having presented the paper as a conference proceeding, the author has presented the paper and its findings to the case organization's digital services development team and at an open seminar on the digitization of healthcare. All presentations and forums provided valuable feedback with good discussions.

4.2 Paper 2: Combining digitization with healthcare service processes: Value co-creation opportunities through standard work

The second paper delves deeper into the development and deployment of digital services from the service provider's perspective. The paper is based on the same theoretical framework of value co-creation building blocks (Prahalad and Ramaswamy, 2004b) as the first paper, but through the analysis and thematizing of the research material, the original framework was adapted and extended after an iterative process of matching the theory and evident findings and interpretations drawn from the material. The former value co-creation building blocks were extended by opening up the abstract element of transparency to transparency of information and transparency of operations (FIGURE 8).

FIGURE 8 DARIO model of value co-creation in digitized services (adapted from Prahalad and Ramaswamy, 2004b)

This paper confirms the findings of the first paper in which transparency was enriched by the aspects of information and processes However, the interviewees pointed out several times that transparency does not necessarily enable value co-creation unless the service processes are properly defined and integrated. The case organization is actively deploying the Lean philosophy (see, for example, Barnas, 2014; Kenney, 2012) in its development of digital services. The challenge that the digitalization of service processes introduces is the integration of the digital process with the overall service process. In defining the new processes, it was important to reflect the customer's path in the service process and to reduce quality variations by standardizing the work. Standard work refers to

the unified and similar ways in which professionals perform operations, which increases the transparency for the customer.

The approach to the theoretical framework of the value co-creation elements interplayed the theoretical framework with research material and interpretations, concluding in the author's redefining the deployed DART model and adapting it to the purpose of the paper in the digital service context (Dubois and Gadde, 2014). The DARIO constellation contributes to the concept of value co-creation with a focus on digital service processes and standard work. The interplay of theory provided new insights into the cross-disciplinary possibilities of industrial management deploying a Lean philosophy.

The second paper is also a conference paper and was also presented to the case organization's representatives and affiliates. A synopsis in a blog post was produced for the case organization's purposes.

4.3 Paper 3: Value co-creation through digitization in the healthcare sector: A managerial perspective

The third paper is built upon the same data gathered from the case organization as the first two papers and investigates the implications of digitized services from a managerial perspective. The handling of the data was iterative and involved the processing of observational data and redirection of the theoretical framework. The paper was published as a book chapter and its findings presented at a seminar of an affiliate organization.

The interplay of theory and data made it obvious that a multidisciplinary approach would best encompass the findings of this paper. This study was constructed with both the value co-creation framework of Prahalad and Ramaswamy (2004b) and approaches from institutionalism and professionalism from the organizational sciences (see, for example, Orlikowski, 1992; Orlikowski and Scott, 2008). In the iterative process of evaluating the theoretical framework, the value co-creation perspective on technology (Saarijärvi, Kannan and Kuusela, 2013) was found to be connected with the institutional aspect of technology (Orlikowski, 1992). This aspect sheds lights on the impact of technology on the professionals' work and on the relationships within an organization with institutional affiliations. The paper discusses the dissertation's research question in a concrete way, as the way of working is changing and influencing the roles and skills required of the professional. With this discussion, the paper combines the understanding of value co-creation with shared decision-making in healthcare, which have the common features of dialoguing and sharing knowledge with the participative customer (Vargo and Lusch, 2008a; Carman and Workman, 2017).

Governments strive to increase healthcare availability and transparency and deploy digitization strategies to accomplish this (OECD, 2013). However, the institutional influence of professional unions plays a significant role in how

these strategies and targets are interpreted concerning the healthcare professionals, specifically physicians and therapists. The interpretations again influence the organization's ability to implement digital healthcare services and the organization's adaptation to these services and their requirements. Thus, value co-creation through digitization becomes a phenomenon in which a complex network of actors has an impact on the outcome of the digital service implementation. The traditional professional autonomy of certain professionals like doctors is under scrutiny due to the transparency that digitization and increasing customer requests impose.

The findings of this study focus on the implications for professionals and have been grouped into new roles, new skills, and new ways of working. New roles encompass the changing dialogue and more consultative approach to the customer. New skills refer to computer literacy skills, which differ greatly from the spoken dialogue in traditional meetings. The written communication requires training of professionals for the new behavior and skills. The new way of working with a digital service platform requires a shift in mindset, as the defined service processes and algorithm steer the service process. The standardized process may cause a strong feeling of loss of professional autonomy even though it reduces quality variations and so strongly supports value co-creation. Because digital services introduce a form of organizational control, they challenge traditional professional autonomy (Noordegraaf, 2007; Evetts, 2009). The findings confirm that the implementation and adoption of digital services cannot be established on voluntarism but require clear guidelines, defined work procedures from the organization, and managerial support.

4.4 Paper 4: Value co-creation opportunities: Managerial transformation of digitization risks into success factors

The fourth paper focuses on the risks and benefits of healthcare service digitization from a managerial perspective. The paper has been published as a book chapter and its findings presented at a seminar of an affiliate organization. The chapter was strongly influenced by the abductive approach, enabling the author to include rich observational insights and information from participation in the case organization's internal seminars and workshops. This paper is also built on the same case organization data as the previous three papers. The material was complemented by additional interviews and an in-house workshop on technology and digitization risks.

The handling of the data involved an interplay of the theoretical framework of the value co-creation opportunities model presented in paper 2 and the complementary interpretations and findings for this paper. The value co-creation building blocks of Prahalad and Ramaswamy (2004a) present the idea of analyzing risks and benefits in value co-creation but do not specify the analyses and meaning of the risks in detail. Therefore, the building blocks of the

DART model (Prahalad and Ramaswamy, 2004b) were adapted for the context of digitization from the risk perspective. The paper tries to map out the risks from earlier studies on the healthcare field and discusses the handling and identification of the risks in order to transform them into opportunities or even benefits when dealt with in an appropriately structured manner as a precedent for value co-creation. A categorization framework from previous studies on risks related to the implementation of electronic medical records divides the risks into micro, meso, and macro levels (McGinn et al., 2011). The paper discusses the micro- and meso-level risks of the case organization's situation and, based on this interplay of risk levels, proposes ways to ensure better success with the implementation of digital healthcare services.

The findings show that managerial involvement in the development process is required to ensure a positive outcome. According to the principles of value co-creation, the service provider plays the role of resource integrator for people and technology resources (Ostrom et al., 2015; Vargo and Lusch, 2016), and this role is perhaps not adhered to in the development work to its full potential. The enthusiasm that exists in developing digital healthcare services seems to be missing a holistic strategy that includes careful target-setting for implementation. The development team of the case organization is working with great commitment on the digital services, but neither the rest of the organization nor the affiliate organizations are closely involved enough to generate integrated services. According to the findings, an obvious, jointly understood commitment to division of the development work among various actors and participants does not exist; therefore, many issues remain unsolved and are becoming problematic in the implementation phase or with the actual use of the application. Further, the lack of long-term commitment from the managers in the organization or external stakeholders is causing problems in the implementation and adaption of these new services and the associated new work roles and processes. With the approach of categorizing the risks on the micro and meso levels and the close involvement of the management from the strategic perspective, the organization can identify and act on the emerging and existing risks in implementing digital services.

5 DISCUSSION

This dissertation aims to shed light on the implications of digitization in healthcare services for value co-creation and for the service ecosystem with the changing roles of the professionals. This section discusses the study findings in relation to the research questions, summarizes the contributions of this dissertation, and offers a critical view of the study and its limitations. Based on the findings and evaluation, proposals for future research are outlined.

5.1 Answering the research questions

This dissertation discussed the implications of digital services in healthcare value co-creation. The concept of value co-creation has not been widely studied in healthcare nor from the service provider's perspective (Hardyman, Daunt and Kitchener, 2015; Grönroos and Voima, 2013; Vargo and Lusch, 2016), so a research gap was identified. The digitization of services was adjoined with value co-creation, extending the theoretical approach outside marketing and service science and deploying a multidisciplinary approach when describing the phenomenon. This multidisciplinary approach and collaboration have also been called for and referred to by scholars developing S-D logic and value co-creation. With this approach, the study aimed to answer the main research question: "How can the digitization of healthcare services enable value co-creation?" To answer the main research question, this section aims to answer four questions.

1) How does digitization influence the value co-creation process with the customer?

This study confirms the general target of increasing the availability of healthcare services through digitization set by governments and institutions like the OECD (OECD, 2013; WHO, 2014). The findings on the first research

question report that increased availability is realized through interrelated changes in interaction and access to information. As S-D logic states, services are the foundation of exchange, and in services, intangible resources like knowledge are exchanged rather than direct compensation (Vargo and Lusch, 2016; Allee, 2009; Kowalkowski, 2011). In connection to value co-creation, the digital service supports the exchange of information in the interactions. The exchange of information is thus confirmed as a central element in the value co-creation process. Within the digital service portal, the customer becomes an active participant in the service or value co-creation process. The interaction between the customer and the service provider changes as the portal supports the customer's active role and the service provider needs to respond to this changing role. The traditional face-to-face interaction is complemented or replaced by communication through the digital service portal. The interaction within the portal can occur online or indirectly, meaning offline or not simultaneously. Between the direct interactions with the service provider or therapist, the system provides all the relevant data of the customer stored in the system, and the customer or the therapist can access the data whenever needed. In addition to the customer's own data, the customer is provided with real, expert information for support at any time during the service process. The findings confirm that information asymmetry, often related to the interaction between a healthcare professional and a customer (Barile, Saviano and Polese, 2014; Edvardsson, Tronvoll and Gruber, 2011), can be balanced with the help of a digital service's providing information. Value co-creation prevails as the service provider provides information and support during the process and can contact the customer even without direct online connection. Digitization enables indirect interaction, resulting in spatial and temporal separation, and extends the value co-creation idea of the interaction locus. The possibility for temporal separation increases the availability of the service in terms of access to knowledge and the customer's own data between direct interactions. Through digitally provided knowledge and supported interaction, even the indirect interactions of the service process become part of the value co-creation process.

Another feature of the transformative role of digitization becomes realized with the scalability of the online service. The interaction with the customer changes, as the time consumed within a single interaction in the digital portal is much less than in a traditional face-to-face encounter. This enables more customers to utilize the digital service for care or treatment, as the possibilities of indirect interaction allow for flexible interactions not bound by time or location. Further, the cost-effectiveness of digital service supports increased availability in terms of affordability, making it possible for a wider population to use the service. With respect to the general target of increasing the availability of healthcare services, digital service processes meet the targets set for increased digitization of healthcare services though changes in interaction and scalability of the services.

As confirmed by some earlier studies on the professional's role or professionalism (Nugus et al., 2013; Keijser et al., 2016; Orlikowski, 1992; Evetts, 2009),

professionals have doubts and uncertainty concerning changes in their territory. In the early phases of developing the digital services, there were substantial resistance and skepticism concerning the digital treatment process. The developers were accused of abandoning the customer due to the lack of face-to-face encounters. Further, the professionals were concerned about the interpretations of the information the customer could obtain, as reported in other studies (Kreps and Neuhauser, 2016; Keijser et al., 2016). False information or false interpretations of information are seen as a risk, and real expert information is needed. The findings introduce the necessity of involving professionals and customer representatives in the development phases of digital services to reduce the professionals' uncertainty. The information asymmetry is balanced by the customer's access to information. Customers today are actively looking for information regarding everyday problems, and these digital services from healthcare organizations provide expert-approved knowledge. Thus, the risk or doubt involved in providing information to customer that can be falsely interpreted can be diminished. Overall, the digital service process supports the need for increased customer orientation (Chandler and Lusch, 2015; Newell and Marabelli, 2015).

The findings of the study confirm the transformative role of digital healthcare services in value co-creation. This study specifically addressed three value co-creation elements: 1) interactions often accomplished through dialogue, 2) availability, and 3) transparency. As the theoretical definitions of the value co-creation concept claim, interaction is a crucial element of value co-creation (Prahalad and Ramaswamy, 2004a) but now extends to a process of interaction through direct and indirect involvement with the digital service portal. The study findings report that the scalability and affordability support the increasing availability of service through digital service solutions and by meeting the identified customer request for support throughout the therapy process. Diminishing the information asymmetry by offering access to expert information improves the transparency of information. From the service provider's perspective, increasing customer orientation requires a more systematic approach to using the digital service. The value co-creation element of transparency includes the service process; therefore, the following research question arose and must be answered:

2) How does the digitization of service influence development work and value co-creation opportunities?

According to the value co-creation literature and the value co-creation elements in Prahalad and Ramaswamy's (2004a) DART model, transparency involves two elements: transparency of information and transparency of operations. The first research question dealt with the transparency of information through sharing information and diminishing information asymmetry (Barile, Saviano and Polese, 2014; Edvardsson, Tronvoll and Gruber, 2011). The second research question led to the study of the implications of the digitization of healthcare service through increased transparency of operations in the planning of the ser-

vice process and of the professionals' work. Further, the transparency of operations is linked with the definition of the service process in that all the actors involved should understand the process. The study findings report issues in the development work regarding a lack of experience in defining digital service processes and related roles and work descriptions for the use phase of the digital service. Further, developing digital services introduces a certain algorithm-based way of operating with the digital services and makes the service process structured. The interviews indicate that to tackle these issues, the organization is utilizing the Lean philosophy and value-stream mapping in its digital service process planning (Barnas, 2014).

The findings indicate the need for the close cooperation of customers and professionals in developing digital services. Viewing the customer as a starting point is fundamental to the Lean philosophy of tracking the customer path in the service process through value-stream mapping (Kenney, 2011; Barnas, 2014). The theoretical framework of value co-creation stresses the central role of the customer in the value co-creation process (Vargo and Lusch, 2008a; Holbrook, 1996), and in the healthcare environment, applying Lean methods is a practical way to operationalize value co-creation. This cooperation ensures the customer will be a starting point in the planning of the service process. The study findings report that the use of customer experience experts in defining the service process makes the planning and the new digital service process transparent for the customer. The planned phases of the service can be described and constructed based on the customer's perspective. The findings related to the standard work emphasize ensuring service quality and reducing waste due to missing information. Further, the findings conclude that digitization influences the standardization of work and of the work environment.

The findings of the study also offer dissenting views. The lack of managerial commitment slows the development work and adoption of the digital service. A lack of managerial support causes professionals to claim uncertainty regarding the workload related to implementing or using the digital service and difficulties in setting targets for the implementation or use of the service. In line with these findings, other research confirms the concerns regarding workload within the teams and the need for managerial engagement to support integrating the service systems (Mair et al., 2012). Managerial commitment is displayed by showing leadership in terms of target setting and commitment to encouraging the staff (Keijser et al., 2016).

A lack of managerial commitment reflects the model of development work based on voluntary participation. Although voluntary participation ensures motivation, it causes sporadic progress in the development work and worse, a lack of sufficient expert participation, resulting in poor planning of the services. Other studies on the roles of actors involved in development and implementation report varying views regarding whether the roles and responsibilities should be clear or whether the focus should be on training the staff (Mair et al., 2012; Keijser et al., 2016). The findings of this study confirm the need for managerial commitment in the form of support and organized training for the staff in

the new digital service processes. However, the study findings also report that training is secondary to the planning of digital services, despite the recognition of the importance of training to successful implementation and value co-creation in the customer interface.

The findings of this study suggest that digitization introduces a standardized way of developing and working with digital services. The findings confirm the need for careful planning for these service processes and integration of the digital service process with the service system. To ensure value co-creation with the use of standardized and therefore transparent service processes, voluntary participation in the development work requires strong managerial commitment in the form of leadership and support. Further, the study findings suggest a systematic standard work is needed in organizing the training for digital services prior to implementation for successful implementation of defined digital services.

As the focus of the dissertation is on the service provider's role in the value co-creation interaction, research questions 3 and 4 deal more closely with the study of digitization's implications for the service provider. Drawing more deeply from the second research question, the third research question continues to study the work-related implications of digitization:

3) What kind of changes does digitization imply for professionals as a precedent of value co-creation?

In healthcare, there is a strong commitment to and cultural agreement regarding collaboration and valuing different roles and their contributions (Nugus et al., 2010). However, when the changes imposed enter the territory of professional self-regulation and autonomy, there is reluctance to adapt and conform, even to degree of resisting the changes (Noordegraaf, 2007; Lawrence, Zhang and Heineke, 2016). This study reflects on these notions from other studies and points out the various difficulties the case organization is struggling with in the attempt to implement digital services for the professionals. The findings of the study report that the professionals are not volunteering to integrate the digital services into their existing services for various reasons. First, this study found that fear of losing the professional autonomy to make individual choices regarding treatment due to standardized digital processes exists. Second, there is fear that digital services are a threat to the whole therapy profession, and many professionals lack insight regarding how digitization could meaningfully enhance their work. The third fear is related to this changing way of working, as digital communication requires new skills.

The study found that the professionals are facing three major changes related to these fears: 1) new roles, 2) new skills, and 3) new ways of working. Emerging new roles encompass the changing dialogue and the more consultative approach to the customer. According to the literature, the new consultative approach emphasizes building trust with the customer, and trust is related to how the professional supports the customer during the service process and involves him or her in shared decision-making (Ouschan et al., 2006; Fitzpatrik et

al., 2015; Barile, Saviano and Polese, 2014). According to the study findings, there needs to be a shift of mindset among the professionals; they have not fully internalized the changing role of the customer in the digital service to that of an active participant. From the organizational perspective, the professional service network is changing from a closed system of university hospital experts to a collaborative network of multiple actors. The study findings on the integration of the digital services confirm such collaboration. When the digital service is integrated with the primary care service processes, the roles of the professionals in the service process are altered. The traditional form of responsible physician taking care of the customer is supported by an external expert's providing support directly to the customer on a consulting basis. The customer becomes not only a target for treatment or therapy but also a contributor in this network by sharing information with these other actors. In this constellation, the service network extends beyond organizational boundaries, and multiple actors contribute to value co-creation (Vargo and Lusch, 2016). Still, the study reports the multi-professional teamwork can be problematic in terms of information exchange, as the digital service portal is not open to the team, and collaboration during the therapy process needs to be addressed.

The study findings regarding new skills refer to changes in the interaction through the digital service portal and new competency requirements. The study reveals difficulties in adopting the digital service due to the new skills required. The individual perception of one's skills is outweighed by the organizational targets for levels of competency defined by digital service process requirements. In the literature of institutional scholars, this kind of interference regarding competencies is a form of organizational control, which professionals can see as limiting their autonomy (Evetts, 2009; Anteby, Chan and Dibenigno, 2016). However, the study findings suggest that the organizational control through digitization and new defined competency requirements offer the ability to improve service quality by diminishing variance in quality due to the varying capabilities of the professionals. These findings are supported by other studies and scholars studying eHealth who refer to trade-offs between targeted benefits and actual service outcomes (Newell and Marabelli, 2015; van Gemert-Pijnen et al., 2011). Further, according to the study findings, the deploying of the digital service is based on voluntarism, which causes the digital service not to provide the benefits aimed for.

The third finding of the study is the emergence of new ways of working. The study findings report a new role of net-therapists, which typically are newer or younger therapists adapting to new digital services. They are able to enter the new processes directly without the transition from old to new ways of working and typically possess advanced computer literacy skills. However, as there is a need for clinical work in connection with therapy, there are no pure net-therapists, emphasizing the need to define the new service processes as new ways of working. Further, the nature of the digital service process, starting from the joint target-setting with the customer, increases transparency for the customer and enhances value co-creation. For the professional, this transparency

may be challenging, and support for new ways of working is required. In addition to concerns regarding the skills required, the fear of losing professional autonomy with the perceived reduction of ability adapt and adjust the service in the customer interface slows the adoption of digital services. The organizational sciences literature and other studies identify this need of professionals to appropriate or adjust the service, especially in relation to dealing with unexpected and complex situations (Orlikowski, 2000; Kreps and Neuhauser, 2010). Appropriating means normalizing the service practices for everyday use with jointly agreed-upon norms. Related to the identified difficulty with systematic or standardized ways of working is the idea that such standards will not allow professionals to appropriate the service to include empathy in the therapy process and will be limiting to the professional. The literature also confirms the need to appropriate or normalize practices with the digital service.

Professional competency has traditionally defined the healthcare management culture (Noordegraaf, 2007; Currie, et al., 2012). Digital service may extend outside the traditional competencies, and the study confirms the need for management support in the form of training and determining the appropriate use of the digital service. In addition, managerial support is requested in redefining the work processes and integrating the new digital service into the existing services and clinical work. The study findings further propose that the role of the management needs to be a conscious and deliberate choice of the organization to reach the target of successfully implementing digital services. As the role of management is recognized to be crucial in ensuring value co-creation with digital services, the fourth research question takes a closer look at managerial actions in developing and implementing digital services:

4) How can management support value co-creation from professionals?

Healthcare organizations are a complex setting of people, systems, and organizational structures forming a service ecosystem with interdependencies and social dynamics. These service ecosystems necessitate a participatory approach to the development and implementation processes for digital services. (Newell and Marabelli, 2015; van Gemert-Pijnen et al., 2011). The findings support this claim from the literature, as the development work of digital services for the customer interface involves multiple actors, both inside and outside the organization, collaborating and contributing to value co-creation (Vargo and Lusch, 2016). The resources of this multi-actor network are integrated based on the strengths or expertise of each actor. However, the idea of a self-adjusting service network introduced in recent literature (Akaka, Vargo and Wieland, 2017) has not been realized, and based on the study findings, there is a strong need for the case organization's management to commit to taking agency in both internal and external networks to ensure the strategic development and implementation of digital services.

The study findings report that in connection with external service networks, a clear joint strategy for the development of digital services needs to be established to steer the integration of resources from various participating or-

ganizations and to clarify the roles of each. This requires increased collaboration among the participating organizations and actors. In connection to the internal service networks of the case organization, the study findings reveal a discrepancy in coordinating the overall design of the service architecture and the new digital service processes due to the dominance of IT development of the services and IT-related risk analyses. This discrepancy results in information gaps that cause difficulties in the implementation phase. The study findings confirm that typically, the risk analysis for implementation focuses on IT-related issues of continuity and technical availability of the service. A risk assessment mapping potential pitfalls in implementing the digital service process from the professionals' point of view is missing or at least not reported in the study findings. According to the study findings, the goal in the development work is to involve healthcare personnel and professionals in developing the service processes and defining the benefits, and input from professionals is crucial for adjusting the service process in the customer interface. If such input is not solicited, the operational management may be unprepared to impose changes in the professionals' roles and, at worst, may face issues with non-integrated services.

According to the study findings, the connection between the existing practical processes of the professionals and the development work is not well-established, and the views of the professionals may not be fully transmitted, slowing the development work. Participation in the development work is voluntary, and therefore, engagement levels may vary. The organizational units that are engaged with the development work allocate sufficient competent resources for the development work, whereas others may allocate only the minimum for "compulsory trouble." The findings confirm the necessity of change management in communicating the changes with the organization to ensure engagement and collaboration. Further, as the literature and study findings suggest, joint understandings of integrating and normalizing practices (Wieland, Koskela-Huotari and Vargo, 2016) need to be established for clear target-setting for service processes.

The study findings can be summarized as five main concerns management should address when developing and implementing a digital healthcare service: 1) strategic collaboration with the external network; 2) coordinating internal resources; 3) closer involvement of the professionals in defining the practices of the digital service process, with the possibility of adjusting such practices according to the professionals' input; 4) enhancing organizational culture to encourage supportive attitudes regarding the changes in service culture through good communication; and 5) adjusting the speed of change to the organization's ability to adopt the changes. The study findings confirm that the careful planning and integration of the digital services support successful implementation and adoption of the changes.

5.2 Contributions

5.2.1 Theoretical contributions

The theoretical contributions of this dissertation can be evaluated with the framework of Corley and Gioia (2011) consisting of two dimensions of originality and utility for this evaluation. The dimension of originality with revelatory or incremental aspects distinguishes whether the dissertation advances the current understanding or whether it opens new academic conversation with revelatory insights. The dimension of utility evaluates the contribution whether it is practically useful or scientifically useful (Corley and Gioia, 2011). From the originality perspective, this dissertation contributes incrementally to the ongoing discussion on developing the theory of value co-creation (Vargo and Lusch, 2016; Grönroos, 2011a; Storbacka et al., 2016; Akaka, Vargo and Wieland, 2017). The theoretical contributions are to the new perspectives on value co-creation in the context of healthcare and digital healthcare services. The dissertation increases understanding of value co-creation antecedents within the healthcare environment and its complex networks and strong tradition of professionalism (Evetts, 2009; Keijser et al., 2016). From the utility perspective, the dissertation extends this understanding of value co-creation to a transformative process by describing how the digitization of healthcare services changes the dynamics of the healthcare environment and the roles of professionals in the digital service process with practical elements. The answer to the main research question of "How does the digitization of healthcare services enable value co-creation?" can be summarized in the main theoretical contributions.

Digitization is increasingly affecting new areas of services, including healthcare. This challenges healthcare organizations to review their activities involving customers and the concept of customer orientation. The findings of this dissertation confirm the proposed applicability of value co-creation to the healthcare environment and its network of actors in the request for increased customer orientation. This increased need for customer orientation emerges from the digitization of services, which, by transforming the existing ways of interacting with the customer and with the service network, also necessitates changes in the roles of the professionals. To clarify value co-creation through the digital service, the antecedents of value co-creation from the service provider's perspective are illustrated in Figure 4. These actions of various levels and of multiple actors illustrate the complexity of the environment and the interdependencies influencing the professionals working and interacting in the customer interface to co-create value.

First, linked with the multidisciplinary approach, this dissertation contributes incrementally to the discussion and development of the value co-creation concept by increasing the understanding and providing insight into the role of the service provider, which has not been widely studied in the value co-creation context (Grönroos and Voima, 2013). The dimension of originality re-

lating the theoretical concepts with healthcare contribute to the discussion even with some transformative thinking (Corley and Gioia, 2011) on the interaction in the healthcare context. Further, the study complements the discussion on digitization in healthcare regarding how the actions of the service provider ensure value co-creation (Beirão, Patricio and Fisk, 2017). These actions concern the organizational setting and changing roles in the service process, enhancing the development and implementation of sound digital services and the importance of the role of the management in the transformation. The digital service process necessitates changes in the professionals' roles as the customer becomes more active and empowered. The empirical evidence of the dissertation confirms this need to redefine the roles within the service process (Abbott, 1988; Nugus et al., 2010; Keijser et al., 2016). The dissertation confirms the development and implementation of the digital service as an interactive process consisting of iterative practices to ensure value co-creation (Wieland, Koskela-Huotari and Vargo, 2016). Finally, the dissertation confirms the strategic management literature's findings (Peppard and Ward, 2016) that upper-level management plays an essential, strategic role in the successful digitization of services.

Second, this dissertation contributes from the utility perspective with practical implications (Corley and Gioia, 2011) to the discussion on value co-creation elements as defined by Prahalad and Ramaswamy (2004) in connection with the digitization of healthcare services. The empirical evidence of the dissertation introduces the idea of spatial and temporal service separation in value co-creation in the interaction through the digital service portal. The dispute regarding whether the interaction is direct or indirect and whether value is then created or co-created (Vargo and Lusch, 2004; Grönroos 2011a) shifts to the digital sphere, which enables the continuous interaction process irrespective of time and place or simultaneous interaction. Further, the study divides the value co-creation element of transparency into transparency of information and transparency of operation (FIGURE 7). Information, or knowledge is regarded as an operant resource in value co-creation and a crucial element in the interaction for value co-creation (Vargo and Lusch, 2008b; Vargo, Lusch and O'Brien, 2007). The dissertation findings also confirm that the asymmetry related to information in the healthcare context, as identified in the literature (Barile, Saviano and Polese, 2014; Edvardsson, Tronvoll and Gruber, 2011), can be diminished with the help of a digital service portal offering professional, expert knowledge to the customer to enhance value co-creation. The transparency of operation refers to service processes and the request to increase the transparency of such processes for the customer. The empirical evidence of the dissertation supports the role of the digital service process in increasing transparency, as the customer is an active participant in planning the service process with the professional.

Third, the dissertation answers the call for multidisciplinary research on S-D logic, value co-creation, and healthcare (Vargo and Lusch, 2016; Akaka and Vargo, 2014; Keijser et al., 2016; Helman et al., 2015). With the complexity of the healthcare environment, the aim to create understanding of the interdependencies of the service network with various professions benefits from a wider ap-

proach that includes a variety of disciplines. The digitization of healthcare services influences the existing roles and power dynamics within the service network and calls for input from IT and organizational, social, and institutional sciences, to name a few (Peppard and Ward, 2016; Sullivan, 2000; Evetts, 2009; Orlikowski, 1992). Thus, the theoretical contribution influences the discussion of the theories on many frontiers by introducing the unique environment of the healthcare network with its concepts of professionalism, professional autonomy, and multi-professional teams.

5.2.2 Managerial implications

According to Flyvbjerg (2006), the most profound misconception regarding case-study research is that general or theoretical (context-independent) knowledge is more valuable than concrete, practical (context-dependent) knowledge. This dissertation is strongly motivated by managerial implications and practical knowledge and adheres to Flyvbjerg's argument. The benefit of case studies is their ability to offer rich insights into managerial practices (Johnston, Leach and Liu, 1999). The findings of this dissertation are context-dependent and, as such, hopefully of concrete and practical value as they provide insights into the research problem. Tremendous enthusiasm exists among the managers involved in the development of digital services, and they intend to "meet the unmet needs of healthcare customers" through digital services. This enthusiasm is easily shared. The managerial contributions of interest to healthcare managers and people involved in the development of digital healthcare services are transformed into implications.

Healthcare organizations recognize the importance of increased customer orientation in terms of increasing the availability of healthcare services, especially with the help of digitized services. The organization management should implement a clear strategy for the digitization of healthcare service and set clear targets for successful implementation of the service process and the speed and spread of use. Without a clear strategy, the organization will not respond to the resource request, and the target-setting for the development work will not be effective. There is great enthusiasm for digitizing healthcare services, but the enthusiasm and the voluntarism are causing the development work to be unstructured. The findings identify the need for a strategic perspective prioritizing which services should be digitized first and which services remain in need of resources. The more focused the digitization sequence, the better the resource allocation and the adaptation capability of the organization in the implementation phase. This prioritization, according to the Lean principle of using the customer as the starting point (Barnas, 2014), ensures that digitization reflects customer needs and priorities and thus supports value co-creation.

With a clear strategy and targets for the development and implementation of digital services, the management should strive for a systematic definition of the new digital service processes while recognizing changes in the dynamics of the service network relationships. The practices for integrating and normalizing the new digital service processes as part of everyday work need to be clear and

practical, and measures of success in practice need to be established. For the iterative process of implementing and developing the service, systematization practices need to be established to ensure proper resources are available for both the primary development and the iterative, corrective, or improving development work. Allowing participation in the development work to be voluntary necessitates strong managerial support with target-setting on an organizational level to engage operational management in allocating necessary resources.

Change management is required; the upper management must promote the digital services through extensive communication and training. The communication and constant presentation of digital services and their benefits to customers and professionals minimize the fears or concerns related to the implementation of digital services. The concerns regarding workload, loss of autonomy, and increased complexity, among others, hinder the implementation and thus the value co-creation with the customer and other actors in the service network. The management needs to identify and act upon these concerns. Through change management, continuous communication, and involving the organization in the discussion, development work and design of new digital service processes with the ability to widely adapt the service will change the attitudes of the professionals and eventually the organization's culture.

Central concerns at the individual professional level were related to the abilities and skills required to use a digital portal. The insecurity regarding how to transform the present methods of showing empathy in therapy to new ways of communicating through a digital service and uncertainty regarding operating the digital service portal due to the literacy required may hinder the adoption of the digital service. Management needs to create a systematic implementation plan that includes strategically training the personnel in these new service processes to ensure successful implementation. Systematic training involves the professionals with the new digital services on a wider basis and reduces the resistance to adoption stemming from uncertainty related to skills. Further, training contributes to reaching the target of increased service availability as multiple professionals are systematically included, not only on a voluntary basis. The training should include a description or presentation of the new roles or expectations for behavior in the service process with the customer and in relation to the multi-professional team setting.

Concerning the network of related organizations in the development work, management should act on the basis of agency in the network. This agency involves the responsibility to properly engage other actors in the development network and integrate their respective resources in the service development. Representatives of the many external organizations involved in the actual development work called for a clear joint strategy and targets. Management responsible for the development work should focus on collaboration and participative actions to benefit the whole network and thereby gain the benefit of integrated resources and through joint targets, ensure wide implementation and adoption of digital services, particularly when governmental funding has been provided for the development work. Finally, general interest is growing regard-

ing digital services, and as one of the interviewees proposed, there has to be well-planned, visible marketing related to the implementation strategy to increase awareness of these implemented digital services.

5.3 Evaluation of the study

This dissertation connects to moderate constructionism by using interpretations and descriptions of reality. Interpretivism aims to understand a phenomenon rather than explain it (Johnson and Duberley, 2000). According to moderate constructionism, reality depends on social relations and interpretations that jointly construct reality as "truth" (Lincoln and Guba, 2000; Schwandt, 2000; Järvensivu and Törnroos, 2010). The benefit of a case study is that it provides rich descriptions of the research phenomenon (Johnston, Leach and Liu, 1999). Evaluating the quality of a case study and its interpretations depends on the applied research approach. In the abductive approach of the dissertation, the transparency of the interplay among theory, methods, and the empirical phenomenon is a key factor in the evaluation (Dubois and Gadde, 2014; Dubois and Gibbert, 2010; Piekkari et al., 2010). The qualitative study interpretations are typically evaluated by trustworthiness and credibility (Schwandt, Lincoln and Guba, 2007). The following evaluation of the study focuses on these three factors of transparency, trustworthiness, and credibility.

1) ***Transparency*** is essential in collecting the empirical data, analyzing or interpreting the data, and reporting, as it enables replication of the research and evaluation of the interpretations (Dubois and Gibbert, 2010). Transparency is thus linked to the reliability and validity of the research (Yin, 2014). Reliability focuses on the consistency of the study across methods and researchers (Miles and Huberman, 1994). To ensure consistency, the data collection method has to be described. The data collection method is commonly selected according to what kind of data are needed and available (Easton, 2010). This dissertation utilized multiple methods of semi-structured interviews, focus group interviews, and observation. The informants represent key actors in the development of digital healthcare services. Herein lies a risk for bias in the interpretations, as the informants for the interviews were selected by a snowball method, and the organization preselected the participants in the focus group interviews. However, as the digital services were in their early phases of implementation, there were not many other options for collecting the interview data. The possible interpretation bias is diminished by the utilization of rich observational data collected on multiple occasions. The author tried to be as transparent as possible regarding the descriptions of the process of collecting and analyzing the data for this dissertation. The dissertation includes several references to the interplay of the findings with the theory and their further implications for the final research questions. All the research papers were published and went through a review process, receiving minor remarks or requiring only minor corrections,

which confirms the validity of the findings in the scientific community (Järvensivu and Törnroos, 2010).

2) ***Trustworthiness*** includes many aspects, such as reliability (dependability), external validity (transferability), internal validity (credibility), and objectivity (neutrality) (Schwandt, Lincoln and Guba, 2007). As transparency, reliability, and credibility are discussed elsewhere, this section focuses on the remaining criteria of external validity and objectivity. Trustworthiness, as defined by the external validity of transformability, refers to the generalizability of the study findings. Traditionally, case studies have been accused of a lack of generalizability (Flyvbjerg, 2006), but this issue is not necessarily a feature of case studies as such but rather is due to complex relationships such studies present (Lincoln and Guba, 2000). The healthcare environment is complex and thus limits generalizability. Still, the justification of the case selection and the context of the case organization that this dissertation provides confirm the transformability of the study.

Trustworthiness defined by objectivity or neutrality is obviously of concern as the author of the dissertation was working within the organization. Case studies are often criticized for having a tendency to confirm the researcher's presuppositions (Flyvbjerg, 2006). In this study, the author was not connected to the clinical operations or to the development of digital services. Further, the majority of the informants were not familiar with the author. Thus, the author had few prejudices toward or presuppositions regarding the research problem. To ensure objectivity of the findings, Miles and Huberman (1994) proposed considering rival conclusions. The findings of three of the papers of this dissertation have been presented to wide audiences with no questioning of the validity of the findings or the author's objectivity.

3) ***Credibility***, the third criteria for evaluating the study, is typically more related to quantitative studies, but with qualitative methods, the flexible and responsive data collection methods allow cross-checking of the data and the opinions and understandings of the informants (Meyer, 2001). The relationship of the theoretical concepts to the research problem is one way to assess credibility. The author studied the related theoretical concepts in order to update and extend her prior knowledge as well as to become familiar with more distant theories. A theoretical framework was used to collect the research data, and the empirical findings led to adjustment of the theoretical framework and the final research questions. The chosen abductive research process supported the multidisciplinary work well. With the abductive approach, researchers often report changing their original ideas when they gain additional insights in the iterative process of conducting a case study (Flyvbjerg, 2006; Dubois and Gadde, 2014).

5.4 Limitations and further research avenues

Although the study quality was evaluated in the previous section, there are still limitations to the research to consider. The first limitation is the selection of the

case in relation to the research phenomenon. The findings and interpretations of the study are based on one case organization. According to the service ecosystem idea (Vargo and Lusch, 2016), involving other related organizations in the research would influence the interpretations and provide a wider perspective on the research phenomenon. Second, the author collected the data through interviews and observations as well as conducted the analyses and interpretations. As the author was working within the case organization, there is an issue with objectivity regarding the interpretations. The possibility that the unique access to information may have compromised the objectivity is worth considering.

The findings of the dissertation provide several intriguing avenues for future research. First, this dissertation consciously focused on the service provider and thus ignored the customer. The customer's perception of these digital healthcare services in the service interaction offers a rich area of study. Multiple perspectives related to the role of the customer, the experience of using the service, and the value co-created could be investigated. The research on value co-creation in healthcare is scarce. Many marketing scholars developing the theoretical concept of value co-creation gladly refer to healthcare, but there are very few comprehensive studies (see, for example, Beirão, Patrício and Fisk, 2017). The utilization of marketing or service science with Service-dominance logic within a healthcare context offers plenty of fruitful possibilities for increasing the customer orientation of healthcare and would benefit healthcare managers through multidisciplinary collaboration. For marketing science originating from social sciences, promoting good, quality case studies in different environments may strengthen the research tradition (Flyvbjerg, 2006).

Second, the study was carried out in the early phases of implementing the first digital services. The development and implementation of the digital services are rapid, and to increase the possibilities of successful implementation and value co-creation with the customer, further studies on the implementation practices and influences on the multi-professional team interactions presented in this study are recommended. The customer perspective regarding the integration of digital services with new practices is also of interest.

Third, implementing digital services influences the service network and roles within it. Professionals are experiencing unforeseen pressure and turmoil due to requests from customers, management, and technology. In connection with multi-professional teams, the roles and capabilities of the professionals as they relate to digital services call for multiple future studies from different perspectives, including value co-creation, as the changes in the roles have immediate implications for the customer interface.

Fourth, the new technology utilizing artificial intelligence offers rich research possibilities from the organizational and value co-creation perspectives that can influence the social relationships and work of the professionals. Increasing experience and evidence provide better possibilities for studying the implications of new technology through innovations. The changes underway in the Finnish healthcare system that allow for certain freedoms in choosing a ser-

vice provider, be it public or private, will change the dynamics in the healthcare sector as public financing follows the customer's choice of provider. The digitization of healthcare services opens interesting future research possibilities on new business models within the changing network and dynamics in the Finnish healthcare sector.

Fifth, value co-creation in the digital service is challenging the interaction traditions and the roles in the interactive value formation. The outcomes of this interaction are not only linked to positive connotations. Problems and failures in the practices following the new service processes influence the engagement and understanding of the actors leading to the possibility to value co-destruction. The concept of value co-destruction (Echeverri and Skålen, 2011) with failures in interaction offer an interesting research path and is closely related to the worries raised in healthcare towards the digitization of services.

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ORIGINAL PAPERS

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VALUE COCREATION IN HEALTH-CARE: INSIGHTS INTO THE TRANSFORMATION FROM VALUE CREATION TO VALUE COCREATION THROUGH DIGITIZATION

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Value Co-creation in Health Care: Insights into the Transformation from Value Creation to Value Co-creation through Digitization

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ABSTRACT
This study explores the transformation of value creation into value co-creation and how the digitization of services plays a key role in this transformation within the health-care sector, which faces new challenges with the increasingly active role of the customer. Customers are becoming active participants in value co-creation and now have expectations based on their needs from the service. The objective of this study is to provide a more holistic view of the customer's role and value co-creation within digital health-care services. This study emphasizes the necessity of the co-creation of value within the health-care sector and introduces a paradigm shift through the digitization of value co-creation This study illustrates a new mode of interaction in value co-creation in which both parties are independent in their own spheres, but the service (via digital platform) is available to both and has a timewise continuum that differs dramatically from traditional episode-based meetings between the service provider and the customer. This study points out the necessity of increasing the customer orientation of health-care services development.

CCS Concepts
Information systems → Information systems applications → Human-centered computing → Human computer interaction (HCI) → Social and professional topics → Computing/technology policy

Keywords
Service logic; Service dominance logic; Value creation; Value co-creation; Digitization; Health-care

1. INTRODUCTION
The idea of value creation is currently the subject of active discussion in the health-care sector. This study explores the transformation of value creation into value co-creation and the way in which the digitization of services plays a key role in this transformation. Value creation is the central phenomenon in both service logic and service-dominance logic [1, 2]. Value creation itself is generally seen as a process in which both the service provider and the customer interact with each other. Value co-creation is a profound approach in which the customer is involved in creating the value. In value co-creation, both parties create mutual value via cooperation [1, 2]. The basic idea in service-dominance logic is that the customer, through his or her active participation, ultimately defines the perceived value [1, 3]. Perceived value is a construct in which a variety of determinants and factors (such as price, quality, etc.) have an influence.

Within the health-care sector, the definition of value and the value offering are based on the betterment of the patient's condition, meaning that the services are produced for the patient. This can easily create the illusion that the patient or the customer is the focus. The planning of a service is often based on possibilities of production, cost containment, advancement of the science of medicine, or skills within the medical organization; whether or not customer requirements are met is seldom consciously considered [4]. The traditional focus of health-care service development has been on medicine or cost and not on the customer having personal expectations. Logically, service production and its related processes have been defined primarily from the producer's perspective [5, 6].

The empowerment of customers within the health-care sector is starting to gain a stronger foothold, however—one that digitization strongly supports. Two interesting questions we might ask include who defines the value of health-care services and when can value be defined within the service process. Value creation is an experiential process in which the customer creates the value "in-use" [2]. The transaction or the service content as such are not the focal point but are the process of the experience that the customer or patient is going through. The customer experiences value by being better or worse off after the experience; according to the idea of service logic, the target is the wellbeing of the customer or society in broad terms.

Within the health-care sector, starting with the terminology, the idea of customers and consumers is not well established [6]. The traditional terminology discusses customers using the term "patient," which places the customer in an inferior position: that of an object that is subject to various actions and decisions and is not in the position of an active customer [6, 7]. In health care, the patient as a customer segment differs greatly from consumer market customers, but still we may find many similarities in the customer's expectation of the service. Recent discussions on hospital positioning and hospital marketing have established the term "health-care consumer" [8].

The recent development of digitization in consumer markets has created higher expectations of value for digital services, including health-care applications that use such services. Research on consumer adaptability and the use of new information technology is wide-ranging, and one could say that

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the field already has an established tradition. Several studies on the consumer acceptance of digital solutions have proposed theories on the ways in which consumers adapt and use new digital technology [9]. Studies on the use of information technology and the ways in which digital services in the health-care sector can improve customer involvement have not been pursued as comprehensively as they have within other consumer markets. The research that has been done on consumer behavior can be applied to the health-care sector, however, related to certain special features of the customer segment (i.e., patients).

The service-logic idea that value can be created only in direct interaction [2] and the idea that value can only be estimated by the output are now being challenged by the digitization of services, which has also transformed the traditional value-creation or service-process thinking in the health-care sector. Digital services are common in the travel industry, for example, where consumers are accustomed to shifting their buying behavior between the traditional methods of purchasing and the new digital services that are available. One could argue that the benefits that the digitization offers in providing the service can be restricted by the strict legislation and stipulation of health-care services. However, we may see analogies to many professional service sectors (such as banking) or to tax authorities who are very advanced in their digital-service offerings and have high standards of reliability and regulations. Likewise, the transformation of health-care services into digital formats or platforms must entail procedures to ensure that the services follow the legislation and are both credible and secure.

The transformation of services into digital format has been accelerated by the scarcity of resources in the wider economy. Although health care as an industry sector absorbs a majority of public expenditures in many countries [10], very few actual studies have been conducted on the ways in which digitization enables the transformation of value creation to value co-creation via customer interaction in health care. Common availability problems within health-care services are currently contributing to new ways of offering health-care services. One may see these availability issues in long lines for treatment; even calls from customers for acute help are often almost impossible to get through. Demands such as these challenge health-care service providers since resources cannot be increased to keep up with demand. Further, the cost development and the economic situation both enforce the requirement for patient self-care. These scarce resources for meeting increasing demand have forced health-care service providers to reach for new and different solutions to make health-care services both available and cost effective. In this area, the digitization of services will provide new solutions and possibilities to meet the currently unmet service demand.

The objective of this study is to provide a more holistic view of the customer's role and of value co-creation within digital health-care services. For this purpose, this study uses the four building blocks of interactions for value co-creation [11, 12] as a tool in identifying and categorizing the main factors that enable the transformation to value co-creation; these building blocks consist of dialogue, access, risks-benefits, and transparency.

This study discusses three approaches to the value co-creation of health-care services. First, it increases our knowledge and understanding of the transformative role of digitization in improving the availability of health-care services by making these services available in a completely new service format. Second, the study describes the changes in the interactions between customers and service providers through a shift in the timewise continuum of the available service. Third, the study contributes to the discussion of the digitization of health-care services from the value co-creation perspective.

2. LITERATURE REVIEW

This study builds on the theories of service logic and service-dominance logic and their respective definitions of value creation; the study also makes use of ideas from the digital marketing field in the discussion, since the digitization of services (or "digital services") is the transformative factor of value creation into value co-creation [13].

2.1 Value Creation

Value creation, value co-creation, and value production have distinct differences in the literature, but in practice they are used in mixed versions that describe the idea of producing additional value. All of this discussion within health care is understandably confusing, since the health-care industry has not been a leader in marketing science. Although value creation is often confused with value production, there is a difference: value production does not include the customer as an active participant in the process, and thus the producer can only make value propositions or value promises to the customer [1, 4]. Value co-production, in contrast, includes direct or indirect co-working with the customer; but still the focus is on the producer's processes, to which the customer makes an input through cooperation in information sharing and dialogue [15–18]. Value co-creation involves the customer as an active actor and participant in the process, where mutual interests exist and joint efforts create mutual value. Scholars have been engaged in an ongoing dispute over whether or not value can be co-created only in direct contact with customers or only with interactions with customers—or even without the direct involvement of the producer [1, 2]. In this dispute, digitization enables us to transfer the discussion to another sphere; we can actually create a new approach to the discussion of what "interaction" actually refers to.

2.2 Conceptualizing Value

The definition of "value" is a multifaceted issue, since one must first understand whose value is in question and who can define value. Value can be the customer's or provider's value or even their mutual value. Still, the term "value" is often unclear or is not understood in a unified way. Value is defined, for example, as consumers' assessment of their perceptions of what they receive and what they give [19]. Perceived value is an assessment, and thus quite a subjectively defined phenomenon [1]. Further, value has traditionally been related to utility traded against price, where value delivery is based on the exchange process [20].

Value has many multidimensional aspects to it that define if value is more utilitarian or "hedonic" in nature and describe how value is categorized based on the customer-value hierarchy [20, 21]. Value can also be seen as a very abstract phenomenon, as in "value-in-exchange" and "value-in-use" [2, 22]. Value-in-exchange refers to a utility as an output of a production process that can be exchanged for another utility (i.e., money); the process of the supplier is involved in the concept of value-in-exchange [2]. The value-in-use concept describes value creation as a process in which the customer feels better or worse off after its completion; as such, the value cannot be defined nor assessed before usage [2]. Value-in-use is the customer's experience-based definition of the value. Value creation is an experiential process in which the customer creates the value-in-use. The transaction per se is not the focal point, but rather the *process* of the experience the customer is going through is what is important. The customer experiences value by being better or worse off after the experience and, according to the idea of service logic, the target is the wellbeing of the customer or

society in general in broad terms. [2]. During the service process, not only the actual actions of the service provider matter but also 1) the holistic experience of the service situations, 2) the result in actual terms of being better off after the service (as in the case of health care), and 3) the result as an experience that turns into a sense of security or a feeling of happiness, both of which are significant phenomena that affect healthcare processes and their outcomes [2, 22, 23]. The customer experience during usage can easily be adapted to the service process and to the use of digital services.

These two schools (service logic and service-dominance logic) have different opinions about how customers are involved in the value-creation process. The main differences in these two paradigms is the locus point of value creation. Service-dominance logic defines value as always being co-created, whereas service logic holds that value is co-created only in direct or face-to-face interactions [1, 2]. To bring these two schools' conclusions closer to the realm of organizational impact, this study uses Prahalad and Ramaswamy's "DART" model (dialog, access, risk-benefits, and transparency) in value co-creation through interaction [11, 12]; the model presents several specific aspects in determining the factors of interaction through which value is co-created and emphasizes the idea that value is co-created. It interprets the co-creation process through the above-mentioned four factors or building blocks.

2.3 Digitization in Health Care

The digitization of services (and the increasing access to these services through digitization) has transformed traditional service-process thinking [24]. The service-logic idea that value can be created only in direct interactions and the idea that value can only be estimated by the output defined by the producer have also been the traditional means of understanding the service in the health-care sector. The direct interactions during appointments with patients is the traditional and dominant way to deliver the service, but it is a very resource-bound service method—a method that again is limited by scarce resources. Value creation in health care should be closely linked to the idea of service as a process and thus a series of interactions. The involvement of both parties in value creation occurs in a series of interactions instead of in single episodes, and the interaction process has a timewise continuum. The process may not be linear, however, since customers' activities do not necessarily follow producers' activities. This brings to mind the potential benefits of digitization, as the technology enables both parties to act independently and not simultaneously. This aspect shows one of the main differences in how Grönroos and Voima [2] view value co-creation. According to these authors, value can only be co-created in direct interactions (in contrast to Vargo and Lusch [1], who do not see the necessity of direct interaction); Grönroos and Voima argue that value can only be created by the customer.

Digitization provides a refreshing point of view to the arguments that the service and service-dominance logics present. In the health-care services sector, for example, digitization is starting to be oriented more toward social-marketing aspects and the digitization of services. Saarijärvi et al. [21] introduced technology as an enabler in value co-creation in their work. Technology offers a platform in which the customer and the service provider can interact in the best interests of both parties. Technology allows for value co-creation to be a process that takes place within and between service systems. Saarijärvi et al. [21] introduced three elements to address the conceptual complexity and to develop the analytical framework for this idea. There first must be an understanding of what kind of value is being created, and for whom. At this point we must define value, which, as discussed, is not always easy to do. Value has been defined in several ways, but generally speaking, value is very much context dependent; in other words, the actors, situations, and resources involved affect the way in which value is understood. Second, value is also linked to a certain dynamic and is not static, since value is created by experiences [2, 14, 22, 23, 25, 26]. Then again, we may bypass the service-dominant-logic and service-logic discussions about who exactly is defining the value by simply taking both parties' views on value co-creation into account. The service provider should recognize the value that is being co-created for both parties, since the service provider is in a position to have a significant impact on both parties by also enabling and supporting the creation of customer value. In addition, Saarijärvi et al. [21] discussed the actors and their resources involved in creating the value; their third element is thus the mechanism of value creation in which technology plays a role.

The impact of digital marketing is not just a matter of moving the service platform to a digital model or adding a digital element; it creates dramatic changes in interactions, value co-creation mechanisms, and the way in which value is defined or perceived. The dispute between service-dominant logic and service logic over whether value is created or co-created can be taken to another discussion level through the digitization of services. Digitization transfers the need for immediate contact to another forum in which simultaneous interaction is unnecessary, since the platform changes the communication independently of location and time; in other words, the timewise continuum is extended.

This development of technology vis-à-vis digital customer solutions in health care is booming and has created completely new ways of interacting within the service process. The customer's role is changing from that of passive patient or treatment recipient to a responsible party and partner in the value co-creation process via the digital platform. Online behavior certainly differs from the actors' behavior in the traditional form of service. Consumer behavior and digital marketing now share a joint sphere.

3. METHODOLOGY

This study is based on a single case-study method. A single case evaluation was selected because the introduction of digital services in the health-care sector is a strongly growing phenomenon in a very complex environment, and the use of the case-study approach allows the researcher to observe the processes that form these services. Further, because no clear and identifiable strategies related to the implementation of digital services in the health-care sector are to be found, the study of a theoretical framework using a case study is the most feasible approach. A single case study serves in this paper as an example of the industry entering a new method of value creation and service provision. Single-case studies are also said to be feasible when exploring new phenomena under unusual circumstances [27]. For this study, the organization that we studied provided the case study, since very few references are to be found on the topic. The case that we have investigated is an interesting one, because researchers have scarcely studied the concept of value creation and the role of digitization in the transformation to a value co-creation model in relation to health-care services. This particular case study also provides us with a better understanding of the underlying drivers of the digitization of health-care services, as well as the consequences of this phenomenon in a complex environment.

The case was selected by the organization based on the company's experience and commitment in developing digital services in a completely new, systematic, and comprehensive way. The case is a high-level operator in its field of expertise that has invested years of effort and expertise into developing

viable digital-service offerings for the health-care sector in the extremely challenging areas of psychiatry and weight control. The first algorithms had already been defined for these services in digital format some seven years ago; despite strong resistance to the new way of offering the company's services and availability, the experts were persistent and continued to strive for a breakthrough. They can at last be said to have accomplished this.

The empirical material for the study was gathered based on various qualitative methods, including theme interviews, focus group interviews, and observations. The interviews were recorded for later reflection and further analysis. Qualitative research is generally thought to be subjective in nature and difficult to replicate [28], but because the development of value creation through digitization is a new phenomenon within the organization, there were few other ways to gather the experiences from the interviewees, and experiences are subjective by their very nature. The interviews were conducted using a snowball-sampling method [29] in which each interviewee suggested the next contact for interview. This resulted in seven interviews with different individuals, all of whom were active in designing, planning, creating, and establishing digital services in a defined manner in this particular health-care organization. Two more interviews were also conducted with people who have a strategic approach within the service design and architecture of these digital services in the health-care environment. The gathering of empirical material via the nine interviews continued until the information that the interviewees provided to us had started to become repetitive. All of these interviews were conducted as thematic interviews in which each interview focused on predetermined themes of the value co-creation DART building blocks of dialogue, access, risk assessment, and transparency [11, 12].

The interviewees provided additional insights into the topic of digital services as well as the challenges involved in establishing these services in the strictly stipulated environment of the health-care sector. We also conducted focus-group interviews in which fifteen people altogether (both from inside and outside the organization) participated; the thematic background for these was the same as with the individual interviews. The focus groups were comprised of people who had participated in the planning of digital services either directly or through commenting and providing feedback. One of the authors of the study also completed the empirical material by observing and gathering information from internal workgroups and digital-service workshops within the organization. All of this material provides a comprehensive understanding of the organization's actions and ideas about the process of value co-creation and service digitization.

All of the interviews were recorded and transcribed. Notes from the interviews were used to support the interview material and analysis. All of the interview materials, along with the notes, were reviewed and analyzed using the qualitative research program Atlas to secure better reliability and validity of the analyses. Using the Atlas processing, the research material was organized into the guiding themes of the interviews that had resulted in ideas about value co-creation factors through the digitization of health care.

4. FINDINGS

To meet its demand for health-care services, the case organization has chosen to take on an active role in developing digital health-care services. The target is to increase the availability of its services: in other words, to enable access to health-care services and aid for people in need. The case organization's strategy is to provide digital services with high-standard professional expertise. The fundamental difference between this service and free health applications that can be downloaded anywhere is that the latter offer numerous instructions or opinions on health issues; instead, the organization offers only evidence-based, high-standard, professional services with correspondingly knowledgeable and suitably reliable and secure applications.

The case organization is a public health-care service provider that aims to offer maximum value to its customers without pursuing financial profit or otherwise maximizing economic results from its digital health-care service. As the medical director put it:

> *Our target is simply to maximize the welfare and quality of the medical service* [and to combine it] *with excellent services.* [Medical director]

(Note that interview quotes in this paper have been edited very slightly for clarify and grammar; the editing has not affected the meaning in any way. The original transcripts are available upon request.) The development work at the case organization for high-standard, evidence-based digital health-care services started almost ten years ago and was focused on one specific area of medicine. The early stages of this process provoked strong resistance among professionals and practicing physicians; the pioneers in the development work were accused of leaving patients untreated and drifting between treatment options. This meant that the company faced enormous resistance to change (or to adapting new ways of treatment via digitization) and skepticism about the treatment process via a digital platform.

After years of persistent development work, however, the results are now starting to emerge. During 2015, the number of users of the digital health-care service tripled from the 2014 figure. By late 2015, the numbers were still low—only 7 percent (or 1,500) of the patients were customers who used the digital service—but the growth of this sector is accelerating. The benefits of the digital therapy service are that it is scalable, and the number of customers the service can accommodate is essentially limitless compared with the traditional face-to-face service. The service baseline is public and is openly available through the Finnish public health-care system, as well as through private clinics.

4.1 Value Co-creation through Digitization

Value creation in health care is often taken to be self-evident, but it is not taken for granted that a customer focus is the primary steering factor. The participants in the workgroup discussions recognized that a change in focus needs to occur:

> *We need to focus on the customer instead of our internal processes.* [Physician, workgroup participant]

The question of who defines what value means to the customer remains open. In addition, value creation is often referred to as "creating additional value," but if the value is unclear, then the meaning of "additional value" is irrelevant. The health-care sector is strictly regulated, and the related professions are licensed. This has created a culture in which professionals use their medical expertise to define and produce value within the internal processes. According to service-dominance logic, this means that for customers, value proposals and the whole chain of value creation are not fully utilized. The culture is changing with increasing speed, however, and empowerment of the patient is now on the agenda of every service producer. But more than simply empowering the patient, one must view patients as customers who have knowledge of their individual conditions and ideas about their personal aims in the health-care process. With digitization, the empowerment is transferred

to value creation shifting toward value co-creation, where both parties work together in the process to create mutual value and value to each other. This is already the work process within the development work of digitalized health-care services. Successful development work for digital health-care services for professional use now utilizes the service providers' knowledge and processes and combines them with the results of working together with customer representatives, who provide their experience and knowledge of customer expectations.

The development work within the case organization has thus far been organized between the medical units and the IT department so that dedicated resources are available for the development work. The first evaluations started by identifying which services could be offered digitally (or would benefit the customer when offered digitally). Evaluations of the possibilities for providing and developing the service in a digital format then followed. After these two phases, the management decided whether or not to start the development work; it evaluated the service against the case organization's current (at the time) service architecture and created a clear definition process for the service design to follow. When the development work started, the patients and patient organizations also participated in the actual development work together with the health-care professionals. The possibility to influence and actively participate in the development work on the digital service has increased the organization's transparency and has made the customer the focal point in planning the processes.

The service was designed based on high-level medical professionalism and evidence-based research work. The service for the customer has followed defined research-based algorithms so that customers cannot create medical diagnoses for themselves, as that is the fundamental responsibility of doctors. But based on this algorithm, a "symptom navigator" directs the customers to the correct service point within the digital-service platform. Based on the algorithm behind the symptom navigator, customers are segmented and are offered the proper contacts to proceed in the service process. While the service algorithm requires the work of experts, the service was tested during the development work within a group of "experience-users" and patient-organization representatives in order to acquire their feedback on the development work.

4.2 Dialogue and Interaction

The digital-service platform enables both parties—the service provider and the customer—to engage in new kinds of interaction. Support is offered via the digital-service platform, but contact with the therapist is based on dialogue via the service platform and is not necessarily "online" in the traditional sense. Customers may operate independently (whether or not a therapist is available) using their own forums of information and self-care tasks; they may also leave questions for the therapist to answer later on that will be visible in the system. In addition, when customers use the service independently, the system recognizes (via the parameters of the algorithm) if they have experienced a change in their condition and thus require immediate medical assistance. An example would be the symptoms of suicidal behavior; in this case, the system would cancel the customer self-care and would urge the customer to seek immediate medical help instead.

The normal therapy process takes around one year, after which the therapist evaluates the process and the customer's state during and after the process for the physician who will be doing further medical decision making or treatment. The therapy process starts with a referral from the physician; the digital service includes online therapy at agreed-upon intervals and durations. The challenge with online sessions is to find the best way to offer the personal touch that is often so important in the treatment process:

> *What* [the] *digitization of a health-care service mostly requires for value creation is a sufficient combining of the systematic way of treating* [patients] *with a sufficient amount of empathy*. [Director, ICT Psychiatry]

The benefit of online psychiatric therapy is the independence of the therapist; in face-to-face sessions, in contrast, customers may become attached to a particular therapist. The more impersonalized online service supports the customer's self-care; it keeps the focus on the treatment and the acquisition of the correct information while avoiding attachment or dependency building. Digitization of the service does not eliminate the organization's medical responsibilities. The physicians are still responsible for the patients or customers, and the digital therapy is done only on a consulting basis in medical terms. If there is no response from the customer for a defined period of time, or if the symptoms that are received through the system refer to a severe condition, the customer is contacted directly; the service is then transferred to a traditional service with an identifiable therapist.

4.3 Availability and Affordability

The system navigator segments the customers and directs them to the correct service point. The customers can then access the open forum, where information is freely available and can be used for self-care. When the navigator points someone toward professional therapy, the customer is instructed to contact the physician to obtain a referral for the therapy service; the therapy process is then offered in digital format.

In the usage phase of the service, value co-creation is enabled from the beginning through interactions and dialogue during the service process. With the established digital service, the customer plays an active role in defining the diagnosis and planning the treatment with the therapist. Customers can choose which therapy format to utilize and how much face-to-face time will be required. Digitization enables access to the service even without direct interactions with the therapist, since the information is available online. The online service offers self-help tasks and information so that customers may proceed with the therapy even without the active online portion that is conducted with the therapist. Based on the algorithms behind the service, certain processes have been put in place to identify whether the customer should directly contact the therapist or physician in charge or should go directly to the emergency department for acute conditions. This has been the most criticized feature to date, since opponents claim that customers are left without help. But because the service is available around the clock, customers are supported all the time; in addition, help is available much more often than is the case with traditional treatment, where therapists or physicians are available only during working hours. (In-person visits generally also require long waiting times.)

Customers want a quick and easy service process that will be available whenever they need service; they want to be able to access the service whenever they want and wherever they happen to be located. Customers also want to control their service process, which is made transparent via digital platforms.

> *Accessibility and affordability are the key defining features steering the development of digital health-care services in public health care.* [Medical director]

The traditional direct interactions within health-care services creates a hindrance to service by limiting availability through

time and resource constraints. Digitalized service is now revolutionizing the availability of health-care services. In the case organization's service, the digital service for mental therapy is openly available, as is the professional section for therapy with a referral from any physician (private or public); all is done at very low cost. The digital-therapy format is a process with set dates for the beginning and end of the therapy process. The normal duration for a digital therapy service is one year at a cost of €670 for the entire process. Therapists' availability is also extended, since one therapist can consult thirty customers daily instead of only five or six cases as is the case with traditional face-to-face consulting. If one compares this cost with the traditional therapy costs of face-to-face appointments—where one appointment can easily cost over €200, and the appointments are both resource-bound and scarce due to limited therapist availability—the advantages of digitalized service become clear.

> *We are casting our expertise into a black hole of unmet needs. We have the expert resources and therapists of the special health care, and through the digital service we can offer expert service* [for] *basic health care and handle the unmet needs. This level of expert service of special health care has not been available for the basic health care* [when using] *the traditional way*. [Director, operating area of psychiatry]

Customers have access to the service at any hour from anywhere and are not bound to wait for the next meeting with the therapist. The information for the customers is stored and available for reviewing, instead of the customer having to try to remember what the therapist or physician told him or her; this prevents difficulties in understanding and receiving the information flow. In relation to value co-creation, this shifts the time aspect of the service and creates a time-continuum that is vastly different from the traditional way of meeting with the therapist. Access for support through self-care is available when needed, and the service offers access to the correct information. The digital service supports or "carries" the customer through times of need by attaining help between the online therapy sessions. (See Figure 1.)

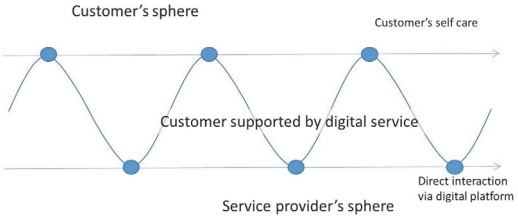

Figure 1. Customer support by the digitalized service

The empowerment of the customer in the value-creation process is currently taking the customer onboard in planning the service; what is even more crucial in the health-care sector is the self-care feature, which is supported by digital service solutions. The customer is given responsibility in supporting the treatment by actively participating and carrying out certain processes independently.

> *People want to engage themselves, and digitization enables us to transfer part of the work in the service process to the customer. This is what we mean by "self-care." Earlier, in traditional therapy, most unsuccessful therapies resulted because there were no requirements for the patients, who confused care with treatment. The digital service contains coaching features that allow the customer to act as an expert on his or her own life; the therapist is changed from having a "know-it-all" status to being a mentor or coach who is enabled to empower the customer.* [Director, ICT Psychiatry]

These self-care features further support the therapists' availability, since the scarce health-care resources can be used more effectively in areas where professional expertise is required in the service process.

4.4. Risk-Benefits

Digitalized health-care services are increasing at an ever-growing speed. But because health-care services are strictly regulated, it is essential that the digital services should be carefully analyzed before entering the digitization process so that their role (in this case) in the case organization's service architecture can be evaluated. The digital services are connected to an enormous network of systems and connections in the health-care environment, and they encounter various regulations on the reliability and safety of handling patients' information. Regulations serve as a form of risk in the development work, in the sense that not every service feature can be established. For example, restrictions exist on how openly customers may be followed by monitoring their everyday lives with remote identifiers.

Legal and other authority regulations also enable the systematic development of high-quality standards. This makes the case organization's efforts valuable, as the service it offers reflects high professional standards and is based on medical evidence and research. Companies that offer various health applications are currently offering their services widely; providing such services through the Internet is a major field today, with varying levels of information quality and connectivity to other health-related services. The case organization's target is to offer high-quality medical services, and not applications for entertainment or fitness purposes. The development work for digitizing health-care services requires a careful understanding of the service architecture and regulations, followed by a high level of medical expertise. For the patient, this means reliability of the information that is provided, high service quality, and a high level of transparency of the process.

4.5.Transparency

The treatment program for the customer before and after a therapy or surgery session can be personalized using a digital service, since it is then possible to enter tasks and instructions that are directly relevant to the situation and condition of the customer. Such a system advances the transparency of the service process; in addition, the customer becomes an interactive actor in the service process, thus strongly contributing to value co-creation and the success of the treatment.

The main transparency-related achievement may be found in the increase in service quality. The care and treatment processes must be described in detail for the digitized service to proceed; the process is steered by algorithms and parameters. This means that every therapist follows the same procedures that are based on medical evidence and research. Variations in quality due to the person-related quality dependency are therefore diminished.

Because the customer is already involved in the planning phases of the treatment and is given responsibility through self-care, all of the information related to the customer and his or her condition is available all the time for reviewing within the service platform. It is possible for the customer to enter that information whenever needed and to reflect on the process and the treatment that they were provided with. This dispels the traditional "black box" between the specialist and the customer

by offering open and transparent information for both parties who are involved in the process.

5. DISCUSSION

The task of this study is to provide an overview of the marketing paradigms of service logic and service-dominance logic. This overview presents the similarities and differences between the approaches to value creation and value co-creation. The distinction between service logic and service dominance-logic appears to be the subject of much debate, and the role of the customer accordingly differs from different viewpoints [1, 2]. In terms of value co-creation, whether the customer is the only actor who can define value or whether value can be mutually defined is a matter of some debate. The second dispute relates to whether or not the value can be co-created by indirect interaction. Digitization offers several mechanisms for value co-creation that differ from previous discussions of interaction [21]. Just as a thesis needs an antithesis in order for the synthesis to emerge, this, too, is the case with service and service-dominance logic. These paradigms enable a paradigm shift through digitization; a new construct of value co-creation can be created through this shift as a synthesis of the two paradigms that are up for debate.

Service logic uses the point of view that value creation involves the customer in defining the value. The idea that the producer could only make value proposals and that the customer defines value are sources of some confusion. Service-dominance logic takes the approach that only the customer can define value. Again, in co-creation it would be impossible to think of a situation in which the service provider (along with its expertise and knowledge) would not play a significant role in defining value. The border between service logic and service-dominance logic is thus quite vague.

5.1 Managerial Implications

This study has a number of managerial implications. First, this research emphasizes the necessity of value co-creation in the health-care sector. The idea that the service provider makes value proposals has dominated the health-care sector's traditional way of operating within the producer's sphere. Such providers offer very expert-oriented services, the focus is on treatment or medicine, and the customer is involved no earlier than during the testing phases of the developmental work. Further, the customer plays the role of patient (which is traditionally a very passive role), and the value the service provider offers cannot be questioned or discussed, since the patient lacks the relevant information to engage in any meaningful discussion. Health-care services require medical expertise, but a successful treatment requires interaction and cooperation between the service provider and the customer in order to meet the general target of improved services. Value co-creation is thus imminent in digital-service format, since both parties' actions contribute to the advancement of the treatment processes and their outcomes.

Second, this study introduces a paradigm shift via digitization within value co-creation. Service logic and service-dominance logic have different definitions for issues that essentially cannot be viewed in black and white, since the complexity of these definitions is self-evident. For example, service logic and service-dominant logic provide different insights into when, exactly, the value is created. Service logic holds that value can be created only "in-use" or through experience, and only during direct interactions; the interaction between the service provider and the customer is the relevant building block for value co-creation. Interaction enables dialogue and the exchange of relevant information. Within the health-care sector, interactions and dialogue are traditionally limited to face-to-face appointments or episode-based customer/patient treatment. This study illustrates a new way of interaction in value co-creation in which both parties are independent in their own spheres, but the service (via digital platform) is available and has a timewise continuum that differs dramatically from traditional episode-based meetings between the service provider and the customer. In this system, the customer is supported until both parties meet during the session via the digitized service. This timewise continuum through digitization enables the paradigm shift, while the definition of "interaction" changes from direct-indirect to time-independent interactions.

Third, this study points out the necessity of increasing the customer orientation of health-care services development. Communication and the language that is used should be adapted to this increasing customer focus. As long as customers in the health-care sector are only categorized as patients, the patient/customer will remain in an inferior and passive position and will remain a target for care or treatment. Health-care consumers bring to the discussion the idea that customers can choose and provide feedback, ultimately by changing their service provider. In public health care, the customer as patient is traditionally taken for granted; the customer is not an active consumer with different options. Communications with the customer should respect the customer relationship and should reflect the changing relationship through value co-creation.

5.2 Limitations and Future Research Directions

This study has several limitations related to the research context and the theory-building process. First, we have studied value creation in the health-care sector based on a case organization's newly established digital health-care services. While this study illustrates the transformation of value creation to value co-creation through digitization, it is limited in terms of which kinds of services can be established in digital format. Future research could illuminate the process of how services are currently selected for digitization. Second, the paradigm shift of service logic and service-dominance logic is a complex development process that has been enabled by digitization. While this study may open the discussion and bring new aspects to value co-creation through digitization, as a new approach it leaves numerous possibilities for investigating the paradigm's internal changes and development in the context of digitization. Third, this study refers to customers in the health-care sector as active players, without segmenting them. Future research on health-care customers' roles and changing expectations through digitization and empowerment will have enormous and interesting opportunities in opening up the health-care environment to the customer relationship (or even to health-care consumer) thinking. Fourth, a further expansion of the theory of value co-creation into service ecosystems would be relevant. The health-care sector is a vast ecosystem unto itself that consists of smaller ecosystems that are critically connected. This means that future research has numerous possibilities, especially given the emerging reforms of the public health-care and social-care systems in many countries. Fifth, this study has the approach of the service provide, which was a practical and conscious decision. A deeper understanding of the customer expectations for digital health care services can be obtained by focusing on the customer through customer i.e. patient involvement by interviewing or by other means of data gathering.

This research introduces several valuable insights into the increasing popularity of developing digitized health-care services. These findings and insights will have important implications for health-care service providers and for players in the field who are now developing these digital solutions.

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II

COMBINING DIGITIZATION WITH HEALTHCARE SERVICE PROCESSES: VALUE CO-CREATION OPPORTUNITIES THROUGH STANDARD WORK

by

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Combining digitization with healthcare service processes: *Value co-creation opportunities through standard work*

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Abstract

The study explores some implications of digitized healthcare services for value co-creation opportunities and work standardization and introduces DARIO, a value co-creation model of digitized services. The key development is the model's focus on service processes that emerge through standardized work, providing opportunities for value co-creation. The DARIO model seeks to combine the theory of value co-creation and operations through lean standard work. The digitization of healthcare services is typically discussed from technological, medical science or customer perspectives, but opportunities for professionals to participate or to perform in the value co-creation process are less widely studied. The digitization of healthcare services changes service processes and the professional's work. As professionals may not automatically adopt new digital services and uncertainty surrounds the related work processes and workloads, managerial support is needed in defining standard work and for training and target setting in implementing digital healthcare services.

Keywords: Healthcare, Digitization, eHealth, Value Co-creation, Lean, Standard Work

Introduction

Governments and healthcare organizations in many countries are looking for ways to transform traditional healthcare services and to develop new services within a digital format. There is strong impetus for this development from legislation and government target setting to increase service availability and to deliver those services cost effectively (Moen et al., 2012; Christensen, 2010; OECD, 2013; Martin, 2009).

For healthcare organizations with limited resources, the ever-increasing demand for healthcare services and the complexity of customer situations present huge challenges (Hickie et al., 2007; Christensen et al., 2010). Digitization offers new possibilities in meeting these

challenges, as more active, empowered customers interact with healthcare professionals (Lerch et al., 2015), requiring the redesign of service processes.

Digitization of health care services is typically discussed from a technological, medical science or customer perspective, and the role of the service provider is less widely studied. The present study aims to enhance understanding of how service providers can address issues of service process change through digitization. For value co-creation, the service provider must consider certain risks and seek to enhance identified benefits, which are dynamic rather than static, making the development of digital services more complex. Risks in the health care service process are often linked to issues of quality, which in this sector relates to the fundamental need for security and high standards of care (Black et al., 2011; Dahlgaard et al., 2011). In digital format, risks of quality failure or variation can be said to diminish as the service is standardized and variation can be controlled (Kenney, 2011; Barnas, 2014; Grunden, 2012).

Digitization entails a technological approach to customer and service issues, but the managerial dimension must also be considered. The present study contributes to the discussion on digitized healthcare services by highlighting the need for standardization of work processes. The DARIO value co-creation model of digitized services described here is derived from Prahalad and Ramaswamy's (2004a) value co-creation building blocks. The key development is the model's focus on service processes implemented through standardized work, providing opportunities for value co-creation.

Literature review

Healthcare service systems are transforming rapidly to become more customer-focused, shifting from value proposals to systems of value co-creation (Vargo et al., 2008a). This shift is strongly supported by the changing role of the customer and significant technological developments, offering opportunities for secure and collaborative value co-creation. For health care professionals, the challenge is to integrate digital healthcare services with the overall service process and operations, which inevitably become standardized through digitization.

Value co-creation

According to service-dominant logic, both customer and service provider become resource integrators in value co-creation (Vargo et al., 2008a; McColl-Kennedy et al., 2012; Ostrom et al., 2015; Moeller 2008; Vargo et al., 2016). Service-dominant logic further designates the customer as the focal actor in defining value (Vargo et al., 2008a). The customer's perception of value relates not only to value as service outcome but also as experience or value-in-use (Grönroos et al., 2013; Payne et al., 2008; Vargo et al., 2008a). In a healthcare context, value is generally understood as the outcome of the service process, but the customer experience during the treatment process and the value co-created during the process is seen to be of even greater relevance, irrespective of the final outcome.

The changing role of the customer also changes expectations about how healthcare services are delivered, requiring a shift of mindset in service development. Digitization brings the customer into focus, and the digital service process offers mechanisms supporting value co-

creation (Saarijärvi et al., 2013; Vargo et al., 2014). In a knowledge-intensive sector such as healthcare, the service provider is especially well positioned to influence the process of co-creating value with the customer through professional expertise and knowledge.

As well as interaction, value co-creation involves processes in which the service provider and the customer operate independently in their respective domains (Payne et al., 2008; Grönroos et al., 2013). The nature and existence of these independent processes is of course arguable, as according to Grönroos et al. (2013), value is always co-created only in direct interaction—in other words, there has to be simultaneous interaction between the stakeholders in value co-creation. However, as well as value related to the service provider-customer interaction, there is also value derived from or related to the service process that is actually co-created among stakeholders other than service provider and customer. These independent domains include processes that for the service provider involve co-creation opportunities (Payne et al., 2008), planning and implementation and metrics connected to implementation. For this reason, the service provider can exert significant influence on the creation of customer value by providing opportunities for value co-creation (Payne et al., 2008).

Digitized services provide opportunities for mutual benefits, with joint targets set for the entire process according to the principles of value co-creation (Vargo et al., 2008a; Payne et al., 2008). The dialogue between customer and service provider itself becomes an ongoing element of the digitized service process (Prahalad et al., 2004b; Vargo et al., 2008b). Further, digitization increases potential availability of the service as well as better customer access by departing from the traditional direct appointments approach. In addition, risk-benefit evaluation is considered a further building block of value co-creation (Prahalad et al., 2004a) and can be utilized to analyse the impact of digitization on the service.

Shared information is one element that enhances the service system by creating opportunities for value co-creation. Digitization creates these opportunities by establishing a platform for sharing information, so introducing transparency to the service process (Maglio et al., 2008; Vargo et al., 2008b; Akaka et al., 2014). In healthcare settings, transparency is closely linked to shared information and to the related concept of shared-decision making (Carman et al., 2017; Gulbrandsen et al., 2016; Hoffman et al., 2014). Based on shared information that the service provider contributes to and facilitates, the customer is empowered to participate actively in shared-decision making. However, transparency does not necessarily deliver value for the customer unless the digital service process is properly integrated into the practical operations through which concrete value co-creation opportunities emerge (Hickie et al., 2007; Martin, 2009). The digital service process requires a new way of operating and a different approach on the part of the service provider. It is therefore necessary to properly define the new processes and to integrate the digital service portal into the service process and operations to ensure that professionals do not act sporadically on the basis that “it is just a gadget or a tool” (Lapão, 2016; Hickie et al., 2007).

Given that transparency can be seen to relate to information and to operations, which differ in certain respects, the present study proposes a modification of the DART model (Prahalad et al., 2004a) in the form of DARIO, a new value co-creation model. As described in Figure 1 below, DARIO operationalizes the concept of transparency into information and operations as two distinct features introduced by digitization for value co-creation and the development of

digitized services. The model's key contribution is the focus on service operations through customer activities within the portal and the professional's standard work as opportunities for value co-creation (Payne et al., 2008).

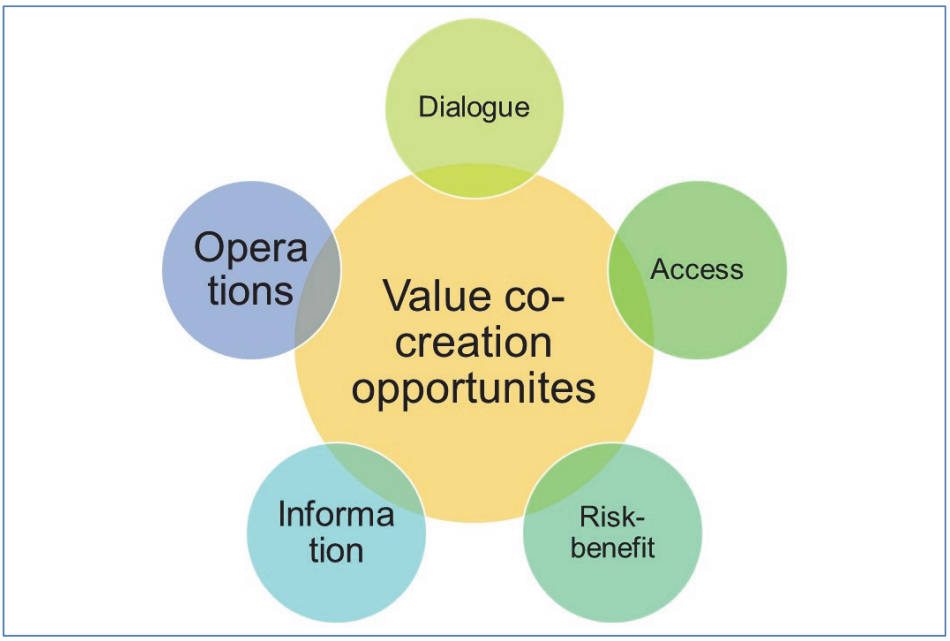

Figure 1: DARIO model of value co-creation in digitized services

As indicated, operations are an essential contributor to value co-creation, as both customer and service provider use the digital service portal, offering opportunities for value co-creation. For the service provider, operations represent an organizational aspect of value co-creation, as processes and practices need to be integrated with digital processes to operationalize the service. Many eHealth services fail because insufficient attention is paid to actual implementation of the service (van Limburg et al., 2011; Lapão, 2016; Hickie et al., 2007). Based on the value co-creation definition of the customer as the focal value-defining actor, operations must be value-driven—in other words, digital service processes must be developed in close cooperation with the customer, enabling work processes to be successfully integrated. However, developing digital solutions customer needs and changing capabilities require that development is a continuous process, including re-evaluation of processes following actual implementation.

Operations as standardized service processes

The present study views the service provider's operations as an opportunity for value co-creation and as an element of that value co-creation. Digitization of healthcare services requires effective implementation so that the service provider or the professional can integrate the digital service portal with operations, enabling value to be co-created. If implementation of the digital service portal is not given due consideration but is instead seen

as something that "just happens," implementation may fail or fall short of its full potential for service delivery due to a lack of proper planning (Lerch et al., 2015; Hickie et al., 2007; Christensen et al., 2010). Here, implementation means successful integration of the digital service with the overall service process to ensure seamless care. Professionals who must learn new ways of interacting with the customer do not always receive sufficient support to ensure successful implementation, and the consequences for professionals' work must be carefully considered and planned in the development phase of the digital service portal.

Many healthcare organizations have made huge advances in their operations through standardized procedures and defined targets based on the lean method (Kenney, 2011, Barnas, 2014). Lean is based on continuous improvement and a focus on people, both customers and personnel (Womack, 1996; Grunden et al., 2012). Lean essentially means following the customer's path through the service process and monitoring that process through the customer's eyes to become a customer-centered service organization (Rasche 2017). Following the customer path through the service process and developing and planning the new process contribute to more successful implementation of the digital service.

Lean philosophy takes the customer as the starting point for the organization's operations and processes. Understanding the customer's actions and path through the service process are the key objectives for lean value stream mapping (Womack, 1996; Kenney, 2011; Barnas, 2014). Value stream mapping as a lean tool starts from the customer at the threshold of the service process and follows on through operations, multiple interaction points and sub-processes that the customer encounters. Taking the customer as starting point in the planning of the digital service process is closely analogous to the founding premises of value co-creation. For the service provider, this means keeping the customer in view when developing service processes and operations or work processes. It follows that planning for implementation of the digital service should consider the professional work processes with which use of the digital service portal must be integrated.

Risks in the health care service process are often associated with issues of quality. The requirement for quality reflects the requirement for security and high standards of care and treatment (Black et al., 2011, Dahlgaard et al., 2011). In the digital service format, the risks of quality variation or failure arguably diminish as the service is standardized, enabling variation to be controlled (Kenney, 2011; Barnas, 2014; Grunde et al., 2012). By the very nature of the technology, digitization necessitates definition of work processes and operations. Further, according to lean philosophy, the operations defined in the digital service format help to reduce the risks of quality failure or variation, as the service process becomes standardized and variations can be controlled.

The concept of standard work refers to how professionals perform operations in a unified and similar way. Standard work looks to create a consensus in the practice of procedures and operations to reduce any variation among practicing professionals. Reduced variation of treatment increases the consistency of quality of operations and outcomes (Kenney, 2011; Barnas, 2014). Standard work is very often misunderstood as excluding the possibility of interpretation and the use of professional expertise. However, this is not the objective; on the contrary, standard work reduces wasted time and effort in the service process and so releases the professional's time and expertise to make a more meaningful contribution to the service

process. Digitization of processes can too easily be regarded as a threat to professionals' work, and more emphasis should be placed on how a standardized work process facilitates non-routine work requiring advanced expertise and knowledge (Gregorio et al., 2008; Lapão, 2016).

Methodology

The study is based on single case data gathered from a large healthcare organization, using the qualitative methods of thematic and focus group interviews. The single case study facilitates exploration of an industry embarking on a new approach to value creation and implementing processes for value co-creation opportunities through digitization. It is also appropriate when studying a new phenomenon under unusual or (as here) complex circumstances (Eisenhardt et al., 2007). The material obtained through the interviews was further enriched by observations within the organization while participating in two seminars and workshops on digitizing healthcare and its services. The organization in question identified mental health and weight control digital services development groups, from which the interviewees were drawn. Participants in the thematic interviews were selected by means of snowball sampling (Salganik et al., 2004), with each interviewee identifying the next. Interviews continued until the information gathered became repetitive and no longer added to the information from previous interviewees. There were two focus group interviews, involving people who were active participants in the development of digital healthcare services.

In total, 26 people participated in the individual or group interviews. The observations in seminars and workshops consisted of several discussions and workshop tasks with multiple health care professionals who were interested in or participating in digitization of healthcare services. The personal thematic interviews were tape-recorded, and the group interviews were video-recorded with participants' permission. The recorded material was typed, grouped and organized, utilizing the guiding thematic issues for the purposes of analysis. The material casts light on the attitudes of the organization and its professionals toward digitization, and on understandings and measures concerning the need to define internal processes to meet the challenge at the customer interface for value co-creation.

Findings

The case organization has several ongoing projects developing digitized healthcare service portals. Very often, implementation of these services would not progress or even seem to fade away because of deficits in service process integration planning, poor understanding of the implications for work procedures and low managerial commitment to implementation. This lack of managerial commitment owed to uncertainty about the new workload and the inability to set clear targets for implementation. While the organization has made significant efforts and there has been substantial development work, the implementation process is slow.

> *"We don't know if this service is useful or not. We cannot proceed, as we don't know whether it will overstretch us."* (Physician, workshop participant)

The development groups comprised voluntary participants, ensuring their motivation and commitment to developing the services. However, voluntary participation also means that management commitment may be low. While some development groups proceed well and

people are committed, there are others whose work lack management commitment, and the lack of sufficient organizational participation resulting in poor planning and potential failure of implementation.

> *"This is a journey toward understanding what this could mean for us."* (Project director, ICT digital services)

Based on the interview findings, it seems obvious that careful planning of digital service processes is fundamental for successful implementation enabling value co-creation.

> *"You have to plan changes in the way of working before implementation."* (Project Manager, Administration, Development activities)

There are now ongoing efforts to formalize the development work based on a strategic approach to which services to digitize, how to proceed with planning and whom to involve in development. However, there is an evident lack of experience within the organization in defining services, service processes, roles and work descriptions, which is rather resource bound for ICT supporting this development work with less support from the management or from the human resources organization.

> *"We proceed with the lean plan-do-check-act of continuous improvement, with small steps in the development work."* (Project director, ICT digital services)

The organization utilizes lean methods for digital service development, involving both personnel and customers. Services are planned and developed on the basis of a customer forum of customer experience experts—that is, real customers for the services to be digitized. For the professionals, defining the service process for digitization introduces the concept of standard work, which assures quality and reduces waste in the process such as missing or lost information, which are also essential features of digitization.

> *"Standard work is also standardization of the work environment."* (Project director, LEAN projects)

The planning of digital treatment paths is an iterative process, and courage is required in order to learn through an iterative process.

> *"We learn from our experiences and utilize that in subsequent services."* (Quality manager, ICT project office)

Results improve each time and enhance the functioning of the digital service process. However, training for new work processes remains secondary in terms of planning, although its importance for the successful implementation of the services has been recognized.

Discussion

Theoretical and managerial contributions

The study findings can be discussed in terms of the DARIO model, which links transparency to information and operations as indicated in Figure 1. This more precisely captures what the service provider must consider for successful value co-creation in digital services. The DARIO

model contributes to the discussion of digitization of healthcare services, which requires new cross-disciplinary inputs.

The findings have several managerial implications. The service provider, who has a huge impact on value co-creation opportunities, must also be a resource integrator—that is, they must be able to integrate the digital service into the overall service along with defined work processes and standard work. This highlights the importance of developing digital services through close interaction between customers and professionals. The development of digital services is based on voluntary involvement by the participants in the development groups. However, from a managerial perspective, this voluntary participation fails to deliver the necessary understanding of the digitized service process to the organization and of the related workload to management. The findings suggest that a lack of clear targets for implementation, including voluntary participation in the development work, hinders integration of resources, which further slows the implementation process and increases the risk of low adaptation. Both of these effects undermine achievement of the ultimate targets of increasing service availability and cost effectiveness in the delivery of healthcare services. Based on these findings, there is an imminent need for systematic involvement of management in the development processes and in defining targets for implementation in terms of number of users and timespan for integrating the digital service within the overall service.

The mental therapy service offers a huge range of possibilities to proceed with the customer. There seems to exist uncertainty of and lack of a common description for the proceedings how to combine the digital mental therapy service with sufficient amount of empathy and presence. With the weight control house these are services for various combinations of conditions like anorexia or severe obesity with linkages to mental therapy services as often there is a connection with these issues. During the interviews or in the focus group interviews there was less remarks on the implications to work processes or operations in general concerning the mental therapy services or weight control house services. However, as digitization changes these work processes and service operations tremendously, there emerges a need to redefine work processes or the work. Algorithms behind the service process guide how the service proceeds, but these do not define operations or how the professional integrates the digital service portal into the service process. Lean's standard work introduces a coercive formula to follow a defined work process in the digital service portal.

These findings suggest that the organization still lacks the necessary systematic planning for implementation of the service portal with defined standardized work processes and training for the professionals for integration with the overall service. This suggests a need for systematic involvement of management in defining implementation, training and standardized work in order to gain commitment and ensure successful implementation and value co-creation opportunities within the service process.

Limitations and directions for future research

The study has several limitations. The first of these relates to the theory-building process. An approach combining value co-creation and lean standard work through operations may seem risky, as there is no readily available theoretical precedent, and the model can therefore be considered limited in this regard. Nevertheless, the idea of combining value co-creation and

lean offers multiple possibilities for future research. Second, the focus here is on single professionals and their standard work; multiprofessional teams were not considered because of practical constraints. This limitation invites more thorough and separate research on standard work in multiprofessional teams in the context of digital healthcare services. Third, there was no possibility of studying customer operations within the digital service portal for practical reasons of permissions and the need to focus on the professionals. However, customer use of the digital service portal represents an interesting and fruitful area for further research.

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III

VALUE CO-CREATION THROUGH DIGITIZATION IN THE HEALTHCARE SECTOR: A MANAGERIAL PERSPECTIVE

by

Rantala, K. & Karjaluoto, H. 2017

Navigating Through Changing Times, 113-129

Value Co-creation through Digitization in the Healthcare Sector: A Managerial Perspective

Katja Rantala and Heikki Karjaluoto

Digitization is changing the work of professionals

This chapter investigates the implications of digitized services for value co-creation and for professionals from a managerial perspective. The aim is to create further understanding of the change requirements imposed on professionals by digitization in a healthcare context, to examine the changing roles in the value co-creation process, and to investigate how the pervasiveness of digitization enforces dialogue and service transparency. In particular, these requirements challenge the professional autonomy of decision taking as the black box of the service process is rendered transparent by information sharing and customer participation.

As a subject of intense discussion in the healthcare sector, digitization has become something of a buzzword. However, the discussion has centred mainly on technical digital solutions and customer service expectations, and it remains unclear what the term might actually mean in this context. In particular, there has been little discussion of the implications of digitization from a managerial perspective on new requirements for professionals in terms of their role and practice (Orlikowski and Scott 2008, 435; Lawrence, Zhang and Heineke 2016, 34). New ways of working and interacting create multiple requirements on the professionals' as the customer becomes an active participant in value co-creation. This has significant implications for the professional's working culture, as traditional expert authority gives way to a more open and consultative role (Gummesson, Lusch and Vargo 2010; Saarijarvi, Kannan and Kuusela 2013). As well as giving the customer responsibility for the service process through carrying out for self-care tasks supported by the digital service portal, this transformation brings the customer into dialogue with the professional during the service process. The information available within a digital service portal increases service transparency, as the requirements

of openness and customer empowerment are realized through information sharing and customer participation in decision taking (Carman and Workman 2017).

As the autonomy of healthcare professionals like physicians and medical therapists has traditionally been unarguable, this can become a very sensitive issue when service processes are standardized (Noordegraaf 2007). Based on the defined work processes in the digitized service portal, skills and capabilities of professionals become more transparent. This standardization of work is a consequence of the digital service algorithm, which allows for fewer exceptions in the treatment process than in the traditional format where the service provider could act independently on the best available understanding and knowledge. In this way, the digitization of healthcare services can be said to transform the role of practitioners to such an extent as to generate resistance. Despite mutual benefits, this transparency can be seen as diminishing professional autonomy, giving rise to scepticism and possible resistance. The more standardized processes and the more transparent information changes the way of working and increases the organization's role in defining of these service processes. This transfers the professional autonomy towards organizational professionalism and reduces the level of individual autonomy of the professional. The transfer of professional autonomy and the managerial implications of digitization are discussed here in terms of value co-creation building blocks (Prahalad and Ramaswamy 2004a, 9; 2004b, 8) as a frame or tool for operationalizing the somewhat cumbersome concept of value co-creation.

Digitization through the lens of institutionalism

The chapter builds on theories of institutionalism and value co-creation. These are combined in a multidisciplinary approach to explore the managerial implications of digitization for healthcare professionals. The digital marketing dimension is also explored in terms of the changing customer role and digitization as a transformative factor in value co-creation (Hennig-Thurau et al. 2010, 313).

In a healthcare context, the insistence on democracy and openness in contemporary society creates increasing demand for openness of information and access and availability of services (Flyverbom et al. 2016, 102). In many countries, the demand for digitized healthcare services is driven by government strategies and legislative regulations that seek to reduce overall healthcare costs while increasing access to these services (OECD 2013; Martin, Currie and Finn 2009, 1191). Despite this obvious demand (OECD 2013), some healthcare professionals have questioned the need for digitization of healthcare services and whether this may be no more than a felt need. Due to these doubts, there arises concerns about how independently a service provider should define the service delivery system and whether the question should rather be how to respond to these requirements of openness and availability. One approach is to review digitization through the lens of institutionalism.

Technological development and the digitization of services reflect change processes in organizational environments. Technology and digitization can be regarded as tools of organizational reform in creating structures and constraints for interaction through digital solutions. This includes the healthcare sector, where management seeks increasingly to redevelop structures for managing processes of service provision (Scott 2013, 199-200; Evans 2016, 25; Exworthy and Halford 1999, 10). Requirements for change through digitization as imposed by external actors and internal organizational actions can be better understood in terms of formal and informal institutional forms (Peng et al. 2009, 67).

In general, institutionalization can be described as the process by which an organization's formal structure comes to be accepted by its members, so legitimizing the organization and its structures (Tolbert and Zucker 1983). Formal institutions represent the regulative or coercive form, defining prerequisites through legislation or other regulations for informal institutions to establish norms and cultures intentionally or unintentionally (Peng et al. 2009, 68). In informal institutions, professionals act on their individual and collective professional autonomy. This informal institutional power through autonomy resides within the formal organization of healthcare, which is not a passive recipient of rules

or regulations from outside as it has the power to interpret and to choose how to act in relation to external forces (Zucker 1987, 451; Meyer and Zucker 1989, 56-83; Orlikowski 1992). At the same time, the regulative actions of external institutions like government influence internal organizational interpretation and implementation of these regulations as formal rules and informal organizational norms and cultures.

Although technology is an inseparable element of modern working life, knowledge of how it influences organizational practices or service processes remains limited. From a managerial perspective, the impact of digitization on the role of service professionals has until recently been little studied or discussed (Lawrence, Zhang and Heineke 2016, 26). The need for research on the implications of technology in organizational contexts, including healthcare organizations, is widely acknowledged (Orlikowski and Scott 2008, 435; Dewett and Gareth 2001, 328; Zammuto et al. 2007, 750; Eriksson-Lundstrom and Edenius 2014). According to Orlikowski and Scott (2008), more than 95% of the articles in leading management journals take no account of the influence of technology in organizations. Based on Orlikowski's findings, this absence of research can be seen to relate to a lack of familiarity with technological matters among scholars in the organizational sciences.

Digitization can be defined by taking comparisons from the approach to define technology. In tracing the impact of digitization, technology can be seen either as an independent variable (that is, equipment or program) or as a moderating variable in interaction (that is, specific functions or targets and the means of attaining these) (Orlikowski and Scott 2008, 439). In relation to healthcare services, technology can be viewed as an independent variable in the form of a program or as a moderating variable through which openness and access to services can be realized. In the context of value co-creation, technology or digitization can be regarded as a moderating variable that enables value co-creation by providing a joint platform where customer and service provider can interact in the interests of both parties (Saarijarvi, Kannan and Kuusela 2013).

Typically, healthcare organizations (especially in the field of special healthcare) strive to innovate. However, despite the legitimacy this affords, digitization and associated changes are not automatically accepted, and adaptation may therefore be slow (Tolbert and Zucker 1983). Traditional technology acceptance models focus on the organization's employees (Venkatesh and Davis 2000), but the model has been updated to address the impact of peer support in the technology acceptance process (Sykes, Venkatesh and Gosain 2009, 374), introducing a social network perspective. Despite existing research that includes, for example, evidence of significant changes in radiologists' service processes through digitization, there has been little interest in the organizational implications of technology acceptance. Changes in work processes have not been accepted automatically and follow-up and consistency has been required (Lawrence, Zhang and Heineke 2016, 34; Koivikko, Kauppinen and Ahovuo 2008; Kauppinen, Kaipio and Koivikko 2013, 1020; Hu et al. 1999, 105).

It can be argued that digitization and new professional methods create a new approach to controlling work and managerial control of services. Digital and technological solutions also restructure and create new service systems (Lawrence, Zhang and Heineke 2016, 27). This structural approach to controlling work can be seen as a threat to professional autonomy or even as weakening professionalism (Noordegraaf 2007; Exworthy and Halford 1999, 10; Evans 2016, 16; Lawrence, Zhang and Heineke 2016, 34). Organizational adaptation to innovations like newly digitized services can be evaluated rationally as a necessary change (Zucker 1987, 453). However, despite obvious government targets in this regard, doubts persist among healthcare professionals about the need for change, and organizational support is needed if new digitized services are to be successfully adapted and accepted by professionals (Lawrence, Zhang and Heineke 2016, 34).

There exists substantial element of trust on self-initiated interest to maintain sufficient professional capabilities (Sullivan 2000) while complying with the requirements of digitized healthcare services. Adoption of these digital services in care processes is not necessarily systematically supported and

implemented, and there is evidence of a gap in self-initiated implementation between offered and recommended evidence-based healthcare services (Kristensen, Nyman and Konradsen 2016, 1). On that basis, there is an obvious need for managerial structures and targets if digital reformulation of working practices is to be effectively integrated into the service process (Rintala and Suolanen, 2005, 62; Lawrence, Zhang and Heineke 2016).

Transformation of professional autonomy through digitization

Professionalism is traditionally linked to disciplines that apply specialized knowledge, have the autonomy of self-regulation, enjoy authority and defend their autonomy in the face of competition from other professions (Noordegraaf 2007; Lawrence, Zhang and Heineke 2016, 26; Freidson 1988, 3-10). Traditionally, in these professions, which include law, education and medicine, there has been a tendency to protect the core work to maintain professional autonomy or even a monopoly of techniques and competencies and justification of self-regulation (Martin, Currie and Finn 2009, 1193; Light 2000; Freidson 1988, 3-10; Noordegraaf 2007).

Medical professionals have traditionally enjoyed support from professional associations outside their own place of work, contributing to a strong collegial culture among practitioners in healthcare organizations. In addition to organizational procedures, their work has been governed by this collegial understanding and agreement on procedures, and a strong culture of professional autonomy has prevailed. New managerial controls arguably weaken traditional professional groups, creating scope for a new professionalism (Noordegraaf 2007) — specifically, occupational professionalism becomes a more organizational professionalism (Evetts 2009, 255), defined by measures that include digitized service processes, target setting and measurement. In this environment, technology is strongly linked to social structures and institutions, and most organizations deploy digital solutions in their work processes (Orlikowski and Scott 2008, 434; Dewett and Gareth 2001, 328). This process of digitization

is challenging current healthcare service processes, introducing new requirements for professionals in terms of interaction, transparency, capabilities and operating procedures. This new professionalism does not happen automatically, and professionals' capacity to adapt is crucial in determining how this unfolds.

Digitization may be seen to threaten professional autonomy, as information and knowledge is embedded in the digital service portal and the algorithm standardizes ways of working. The embedded information is transparent to all who enter the service portal. The standardized way of working can be seen as limiting professional autonomy, although it can also free up the professional's time for questions that require their specific skill and knowledge while the customer can play a more active role in self-care or routine tasks supported by the digital service platform (Lawrence, Zhang and Heineke 2016, 27; Donnelly, Shaw and van den Akker 2008, 9).

Digitization enhances value co-creation

As a form of technology, digitization can be said to play a pervasive role in interaction with the customer (Dewett and Gareth 2001, 334; Orlikowski and Scott 2008, 444) by supporting interaction and dialogue and making the service black box transparent (Dawson 2012, 3-7). As ICT enables access to information and reduces the monopoly on knowledge, customers turn increasingly to actors other than professionals for information (Donnelly, Shaw and van den Akker 2008, 9; Dedding et al. 2011, 51). Digitization supports this trend, enforcing greater transparency and more open dialogue with customers (Lawrence, Zhang and Heineke 2016, 27; Noordegraaf 2007). Technology expands interaction roles (Dewett and Gareth 2001, 328; Orlikowski and Scott 2008, 444), challenging existing ways of interacting and altering the roles of customer and professional service provider as customers become able and willing to interact and participate in shared decision-making of healthcare and professionals must adopt a more consultative approach with the customer (Carman and Workman

2017; Gulbrandsen et al. 2016; Hoffman, Montori and Del Mar 2014). This transparency of information and interaction challenges professionals' current ways of working, as well as their professional autonomy and monopoly of knowledge (Lawrence, Zhang and Heineke 2016, 34).

Value co-creation proceeds from the customer's participatory role in their interaction with the service provider (Vargo and Lusch 2008, 8; Prahalad and Ramaswamy 2004a, 9; 2004b, 8). Value co-creation stems from the service dominance logic, according to which value is always co-created among stakeholders. As joint targets or mutual interests of the interaction play a crucial role in value co-creation, there is arguably a natural analogy with shared decision-making in healthcare (Vargo and Lusch 2008, 8; Vargo, Maglio and Akaka 2008, 149; Vargo 2011; Carman and Workman 2017). Value co-creation removes the producer-consumer dualism of the producer or service provider "producing" and the customer "consuming" value and shifts the focus to co-creation (Vargo, Maglio and Akaka 2008, 149; Akaka and Vargo 2014, 371). Saarijarvi et al. (2013) discussed the impact of technology in the value creation process by adding the influence of the technical solution to the interaction between service provider and customer. The process of value co-creation is supported by the organization's systems and processes, including technology — that is, the digital service platform influences the interaction (Zainuddin, Russell-Bennet and Previte 2013, 1509; Saarijarvi, Kannan and Kuusela 2013), enabling the value co-creation process and supporting the changing, expanding roles of stakeholders (Orlikowski and Scott 2008, 444; Dewett and Gareth 2011, 339). However, digitization of services is not just about transfer to a digital format but entails significant changes in the service interaction and value co-creation mechanisms. While Orlikowski's (1992) structurational model of technology emphasizes how technology is socially constructed or defined within an organization, Akaka and Vargo (2014) argued that the model does not take into account the complexity and dynamic systems in which value co-creation emerges. Value co-creation is a process in which the customer and service provider interact at multiple stages to co-create the value (Akaka and Vargo 2014, 371; Prahalad and

Ramaswamy 2004a, 9; 2004b, 8). Akaka and Vargo's (2014) approach emphasizes how technology is embedded in the service ecosystem, defining technology as a combination of practices, processes and symbols for a purpose to be fulfilled. They further define technology as a medium that influences how value is created. The technology's purpose therefore becomes central, influencing motivation to adapt (Lawrence, Zhang and Heineke 2016, 26), which in a healthcare context involves a commitment to help and so create value.

A look into developing digital services of health care

This chapter describes a research carried out in Finland. The target of the research is to develop a health care organization and provide digital services in a health care organization undergoing strategic change in moving toward digitized services at the customer interface. The empirical data referred to here are drawn from multiple interviews with representatives of the case organization.

The case organization commenced development of digital healthcare services for direct customer interface some years ago and has continued to make more services available in this form to increase availability and address unmet needs for the service as determined both by external actors and internally by healthcare professionals. The case organization pointed out two of these digital services to be studied closer: the mental house and the house of weight control. Both offer evidence-based services at three levels: open service, therapy service (referral only) and a forum for professionals. From the professionals' perspective, these digital services are seen as outreach from special healthcare to primary care practitioners to obtain a high standard information that is evidence-based and professional and is not possible or easy to provide through traditional service processes. The majority of psychotherapists working in Finland operate in the private sector, and the case organization sources a number of short therapy services from outside. The digital service is developed among special healthcare professionals of the organization and made available also for the sourced professionals. The information in these

service portals is of special healthcare standard and based on evidence, and it is continuously updated by a network of professionals.

The findings are based on the views of professionals within the case organization, including some of those directly involved in developing the digital services, also acting as practitioners and managing other practitioners. Data collection involved semi-structured qualitative thematic personal interviews and group interviews. The personal interviews were constructed using snowball sampling, in which each interviewee identified the next contact, resulting in nine individual interviews all consisting of healthcare professionals within the organization. The group interviews were organized as two focus groups, comprising professionals involved in developing and using the digital service portals, as well as people involved in planning the portals. The thematic frame for the interviews was based on pre-selected themes, using the DART-model of value co-creation building blocks (dialogue, access, risk assessment, and transparency) (Prahalad and Ramaswamy 2004a, 9; 2004b, 8). Personal interviews were tape-recorded, and group interviews were video-recorded with the participants' permission. The accumulated interview material was grouped and organized, using the DART-model guiding themes of the interviews for the purposes of analysis. Within these building blocks of DART-model, certain point of views were guiding the regrouping of the themes for interpreting the findings more on managerial basis.

The interviews were further enriched and supplemented by observations and active participation in the discussions and in eHealth workgroups within the organization. The observations were conducted at in-house seminars on the digitization of healthcare services, including discussions and material provided by the seminar representatives. All of this material was treated anonymously and provides a comprehensive understanding of the organization's actions in respect of value co-creation through digitization of services.

The findings of the research are presented under three headings. *New roles* identifies the new kind of dialogue with the customer and the changing roles of the parties to value co-creation. *New skills* introduces the requirement for different interaction skills in changing roles to enhance value co-creation. Additionally, this section addresses the transparency of information and of the service process as new phenomena introduced by digitization, emphasizing the need for managerial support for the required capabilities. *New way of working* considers the implications of digitization for the service process and how the form of organizational measures influences the work of the professional in the value co-creation process and how professional autonomy is perceived in this context.

Digitized services alter interaction with the customer to an ongoing process of dialogue through the service portal, where the professional can act proactively beyond only responding to a question. The customer can pose questions at any time, and the professional can respond when available. Discussion is ongoing, and the customer receives the necessary support. Digitization transforms the need for immediate contact to an ongoing process of dialogue, as the platform renders communication independent of location and time. The information and dialogue available within the digital service portal enables the customer to become an active participant and contributor to the service process and enables the professional to act proactively as the customer's condition-related information becomes available.

In the service portal, specific customer-related information is shared between customer and therapist, but the customer decides what information is passed on to the physician responsible for that customer. This sharing of professional information benefits the whole treatment process, including the therapist as well as the primary care practitioner. The dialogue among these actors is based on transparent, evidence-based, high quality special healthcare information.

The digital service referral grants access to the portal, and the customer is assigned to a therapist. Their relationship is built and supported by the digital service portal. In the case of weight control house, the

connection is built with an identifiable therapist, but in the case of mental house services, the therapist or psychiatrist is not identifiable and remains anonymous to the customer. This anonymity is one means of empowering the customer to be active and to participate in their treatment through self-care tasks. In the weight control house, it is considered more effective to provide an identifiable therapist, as customers often have a history of neglected issues with obesity, and there may be a need for coaching and support with an identifiable therapist. Through empowering the customer "is given role of expert in his or her own life, and the professional becomes more a mentor or coach. The patient is made responsible, and targets are jointly set, all of which is designed to enable the patient to feel a sense of agency."

The service process begins with joint target setting for the different phases of the process and for the overall outcome. Target setting is a form of shared decision-making with the customer, in which self-care tasks and training customer contributes actively to successful treatment. This new customer role as a responsible and active participant in the treatment process calls for a new approach with coaching abilities from the professional. One of the interviewees described the change: "The earlier malfunctioning of the psychiatric treatment owed largely to the fact that there were no requirements for the patient. Treatment was mixed with care. Now, we offer training components in the net therapy portal."

As a new tool that integrates the therapy service in the primary care service process, the digital service platform alters the roles of the special and primary healthcare professionals. Through the service portal, primary care practitioners can make referrals, allowing customers to access the digital service. While the therapist works on a consultative basis, responsibility for the customer remains with the primary care practitioner, supporting meaningful and cost effective allocation of professional resources. The change in resource allocation with positive consequences is illustrated with the excerpt: "The number of patients directed to special healthcare is diminishing as digital psychotherapy services cure

customers before their condition requires special healthcare." For the referring physician, the process is not transparent within the service portal itself. However, as the therapist provides a consulting report following treatment, with symptom measures and further instructions, the service outcome is also transparent to the physician.

The digital service transforms the traditional face-to-face dialogue to online interaction, requiring new behaviours and skills from the professionals. Among these, the dialogue takes the form of a written conversation, requiring an ability to express issues in writing, which may prove challenging for many professionals as this is not necessarily something that comes naturally. Similarly, working with a net portal is not automatic and the communication through the portal requires planning and training. The sceptics make comments of the work with the digital portal such as "Do I really have to respond to the customer via the tool?" This kind of comment strongly calls for management involvement in defining and supporting the development of new behaviour and skills.

Online sessions with the customer requires communication skills that differ from the traditional face-to-face appointment. Because the customer actively participates in the treatment process as a responsible actor, the professional must develop a coaching approach. The digital service portal makes information transparent for the customer that only the professional could previously access. Again, this consultative approach is not automatic for professionals; as one interviewee said, this requires a significant shift of mind-set.

Within the organization, there is substantial trust in the professional's self-initiated willingness to maintain the required professional capabilities. However, use of the net therapy portal requires a specific range and level of expertise, which according to managers of the therapy services can present a challenge to the autonomy of professional knowledge. The digital service process makes the knowledge of the practicing therapist visible and requests timely knowledge. From the managerial perspective, this creates a requirement for standards in relation to the requisite level of skills and capabilities followed

by management that is more systematic as more technologically skilful and process-oriented professionals enter working life.

The digital service portal offers a huge range of psychiatric therapy possibilities that must be integrated with new tools, medical training and measurements, and the professionals developing the service understand the pressing need for systematic practical training for new psychiatrists or therapists. More generally, there is a need for systematic familiarization with the digital service portals.

The problem of professional autonomy becomes clear in open-ended psychiatric therapy, where the case organization sources a number of short therapy services from outside, making control of service quality extremely difficult. The digital service offers a possibility to improve the service quality as illustrated by the following excerpt: “The therapy portal secures the quality of services bought outside the organization.”

Through defined processes and algorithm, the therapy portal harmonizes and so improves service quality. While the professionals using the mental net therapy portal still show signs of indecisiveness or a semi-voluntary approach, the weight control portal is well accepted and used. The optional or semi-voluntary use of the digitized service by some professionals is considered problematic, as it does not deliver the benefits that could be achieved through use that is more systematic. This may also lead to situations where managers are unable to evaluate the level or timeliness of the knowledge of the practicing therapist.

In psychiatry, the organization struggles to be systematic in this way, as some of the therapists and psychiatrists providing the service find it hard to follow any systematic process and favour a more unsystematic and empathetic approach. According to the interviewed specialists, some service providers and participants tend to work in an unsystematic way involving a high level of empathy. Clearly, then, value creation in digitized healthcare services requires an adequate combination of the systematic and the empathetic within the treatment process.

By defining procedures to follow, the service process offered by the digital portal creates new standardized ways of working. This allows for fewer exceptions in the treatment process than in the traditional format, where the service provider could independently decide on treatment and duration based on their best understanding and knowledge. The challenge, then, is how to integrate the defined service process into the work so that use of the service portal no longer depends on the personal preferences of the individual practitioner. Within the case organization, there is an understanding that this will have significant implications for the working culture as the traditional "authoritarian artisan" approach is transformed into a more systematic way of working, with defined processes and targets and the operating culture will transform to more process way of working.

By empowering the customer, the portal frees professionals to focus more on tasks and questions demanding their specific knowledge and expertise. However, acceptance of the new digital services among professionals is not automatic, and there remains plenty of doubt and scepticism concerning implementation, which is expressed in the next excerpt: "The sceptics see the risk of jeopardizing the profession of psychiatry, but on the other side there is the help for the customer." Further, there needs to emerge new, systematic measures to enhance the acceptance of the digital service, which is expresses in the following excerpt: "Systematic marketing of digital services to professionals is needed."

Professionals are concerned whether use of the net therapy service portal will add to workloads. The target is to around 50% of working time using the net therapy portal while the rest of the time is allocated to clinical work. At present, therapists in both the mental health and weight control services allocate one day a week to customers using the digital service portal, which accounts for some 20% of working time. Since net therapy is still quite new and perhaps more tiring as a way of working, the ratio of net therapy time to total working time remains limited.

As the digital therapy service always involves some clinical work, there is no such work as a pure net therapist. As expresses by one of the interviewees: “The advancement and implementation of digital services will depend on how well they can be integrated into the daily working actions as new tools of the artisan.” The integration of the digital service into the daily practices is a complex issue and the allocated working time is one possibility to maintain the attractiveness of working through the digital service portal and so increase its share in the service offering. Typically, net therapists are newer and younger and are more eager to adapt and use the digital service portal in their work.

For professionals, a further concern about the digital portal relates to multiprofessional collaboration in the service process. Traditionally, the treatment process involves a team of professionals, but the digital service portal is not open to the team. Because team members do not have access to the information in digital format, there is no transparency, and this is seen as problematic in terms of quality and multiprofessional collaboration during the treatment process.

Managerial commitment required

While the multidisciplinary approach has some challenging aspects, these seem worthwhile in pursuing an understanding of how digitization transforms value co-creation in a complex environment such as healthcare and helpful in clarifying the challenges for the professionals and their work from a managerial perspective. Understanding the complex issues posed by healthcare organizations and their processes in combination with issues of professionalism seems to require this broader view.

The management culture in healthcare has generally been defined by professional competency and the autonomy legitimated through that competency (Noordegraaf 2007; Martin, Currie and Finn 2009, 1192; Lawrence, Zhang and Heineke 2016, 26; Freidson 1988, 3-10). Digitization inevitably affects professional autonomy by shifting the emphasis toward organizational professionalism (Noordegraaf

2007; Evetts 2009, 255). In other words, in defining digital service processes and the capabilities required by digitization, the organization is perceived as reducing individual professional autonomy.

At its core, value co-creation is about open communication and interaction with the customer for mutual benefits (Vargo and Lusch 2008, 8; Prahalad and Ramaswamy 2004a, 9; 2004b, 8). In the digital service portal, the dialogue becomes a more ongoing process, involving the professional in an online interaction that differs from the traditional appointment-based consultation. The communication skills required in this online environment are also different, as online communication can also be anonymous, as in the case of mental house services. While this approach to service provision can appear quite radical to many, it is a well-reasoned means of supporting the treatment process. It is also important to remember that the customer is supported on a continuous basis rather than having to wait for the traditional fixed and perhaps rare appointment. Although the anonymity of the therapist differs from the traditional service, the interviewed professionals did not raise this as an issue. However, perceptions of this anonymity among healthcare professionals and customers clearly warrant further research.

The information available in the service portal and jointly agreed targets for the treatment or service process increases transparency to a level that may be perceived as challenging for the professional, who is required to act in a more systematic way. However, through dialogue with the empowered customer, this increased transparency supports mutual target setting for the service process and so enhances value co-creation (Prahalad and Ramaswamy 2004a, 9; 2004b, 8).

The interviewees realized that this would have implications for the working culture, as the role of expert is transformed into a more coaching and consultative role and professional autonomy may be challenged (Donnelly, Shaw and van den Akker 2008, 9; Noordegraaf 2007; Lawrence, Zhang and Heineke 2016, 27). There is a clear analogy here with the shared decision-making concept in healthcare, where the patient as customer participates in decision making on the basis of mutual

information sharing (Carman and Workman 2017; Gulbrandsen et al. 2016; Vargo and Lusch 2008, 8; Prahalad and Ramaswamy 2004 a, 9; 2004b, 8). This finding opens the door to further research in the healthcare sector from a customer or consumer perspective and suggests that the development of the service portal can be enhanced by the customer's more active role.

The use of the digital service portal requires different skills, as more of the dialogue is an ongoing process, mainly in written form, in which both parties play an active role. This also means that the professional is enabled to act proactively with the dialogue. The computer literate skills to engage proactively with the dialogue and readiness to communicate through the digital service portal may require stronger managerial support. There is an obvious need for systematic training and support for appropriate use of the digital service portal for professionals, and there is already evidence that new therapists or younger professionals are more eager to adapt.

Digital service processes introduce a more systematic or standardized way of working. This more standardized process enables the organization to control and enhance overall service quality by reducing person-related variation. However, the standardized way of working is not automatically accepted (Tolbert and Zucker 1983; Venkatesh and Davis 2000; Sykes, Venkatesh and Gosain 2009, 377), and if use of the digital service portal is based on voluntarism, managerial targets for the service are unlikely to be met. Sceptics tend to perceive the possibilities of net therapy negatively because digitization will eliminate the need for therapists. In addressing this concern, management should emphasize the help offered to people who would probably otherwise go untreated. In the case organization there is still a lack of systematic implementation of targets for the new digitized services, and there is an urgent need for managerial commitment to targets for implementation. This is why digital service portal treatment processes must be properly integrated with clinical work to address issues like multiprofessional team working. Based on the research the level of successful implementation among the professionals is seen to depend on how well digital service process can be

integrated with therapy practices, requiring redefinition of work processes and training in the relevant skills.

To conclude, as service digitization introduces a new mechanism of organizational control, professional autonomy is challenged and transformed into organizational professionalism (Noordegraaf 2007; Evetts 2009, 255), and acceptance and implementation of digital service portals by the professionals cannot be based on self-initiated and voluntary use. The interview findings highlight the need for managerial action to support acceptance, implementation and adoption of the digital service portal. Adoption of digital services and the associated changes in working processes largely determine the success of value co-creation in healthcare through digitization, based on open dialogue and increased service availability (Prahalad and Ramaswamy 2004a, 9; 2004b, 8; Hennig-Thurau et al. 2010, 319).

This chapter has described organizational implications of digitization, changes in the work and role of professionals less often studied in this context, customer relationship management and value co-creation in healthcare and the importance of evaluating digitized service processes and their implications for value co-creation from the professional's point of view. The evident similarities with shared decision-making offers a new and perhaps wider definition of the healthcare customer's role.

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IV

VALUE CO-CREATION OPPORTUNITIES: MANAGERIAL TRANSFORMTAION OF DIGITISATION RISKS INTO SUCCESS FACTORS

by

Rantala, K. & Karjaluoto, H. 2018

Management and Technological Challenges in the Digital Age (*minor revisions*)

Risks influencing value co-creation: Management challenged by risks of digitization

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x.1 Introduction: Rethinking Healthcare Services

This chapter introduces the development work of digitized healthcare services through a case organization through value co-creation in networks. Further, as in healthcare the issue of quality is central in terms of risks, this study discusses through value co-creation elements the risks the management is facing in the digitization of services.

Transforming service into digital format has been ongoing in consumer service industries already for some time especially in areas of travelling, banking and even some governmental services like tax bureau. Logically healthcare sector is following this development as there seems to be a general expectation value for better availability, self-service and independency from the service provider (OECD, 2013; Martin et al., 2009). Digital solutions in healthcare are effectively utilized in medical and treatment processes through various equipment, but in terms of service and empowering and activating the customer, the development of digital services confronts totally new arena and even challenges of healthcare consumerism meaning the customer making active independent choices for the service or treatment (Fischer, 2014).

Healthcare services are traditionally developed based on the development of science of medicine. This kind of development work is enhanced within the healthcare organization with some inputs by the patient through inquiries and the participation of any other organization in the development work is based mainly on the expertise in the area of medicine. For the development of services digitization opens up possibilities to increase the customer focus by involving the customer in the actual development work of the digital services and utilizing a network of actors in the development work each contributing with

their respective expertise to the development work. These kinds of networks consist of organizations and actors that are oriented toward a mutual target with joint efforts. These organizational networks can be described as value networks creating social and economic good or value supported by exchange of information (Allee 2009, Vargo and Lusch, 2016)). With the public funding these networks of organizations consist of several interest parties all focused on collaborating with the development work of digital services. These networks are dynamic value co-creation configurations integrating resources of people and technology and are not only sharing, but accumulating information and knowledge to meet the joint target (Ostrom et al., 2015; Spohrer and Maglio, 2010; Vargo and Lusch, 2016).

Healthcare environment consists of complex interrelations and networks within an organization and between these organizational units. The complexity of the healthcare environment is challenging both for the operators within this environment, and for the citizens seeking their way to obtain care or professional help. The governmental actions to increase transparency of the healthcare services are part of the aim for open government (OECD, 2013; Greve, 2013). The open government further strives for accessibility and responsiveness of the public actions. These ideas of open government are applicable to public healthcare and carry with them similar dimensions as the idea of value co-creation.

x.2 From Value Creation to Value Co-Creation

Healthcare is a complex service system that implicitly strives for enhancing the public good and for this purpose integrates various resources of the service system. Healthcare is traditionally viewed as producing value. According to Vargo and Lusch (2916) value cannot be produced as the value is defined only by the beneficiary, and followingly the service provider can only offer value propositions. Value co-production carries the idea of exchange and a possession of a service and is hence derived from the service provider's context. Value co-creation is differing from co-production as value co-creation includes the elements of

customer as an active actor and participant in the value co-creation process (Vargo and Lusch, 2008).

Moore (2000) presented the idea of public value creation. In public value creation the customers are the citizens that determine value. From the very nature value is something that cannot be defined or produced by the service provider (Siltaloppi & Vargo, 2014). Along with service dominance logic value is created in-use differing from the idea of exchange based value, which refers to a utility against compensation (Grönroos and Voima, 2013). Value- in-use is the experiential value or perceived value based on the consumption of the service (or goods), which emphasizes the process nature of value creation. The perceived or experienced value is not static and can change during the process or differ from the expectation in the end of the process. In healthcare the customer perceived or experienced value follows the same logic and cannot be defined before usage of the service (Grönroos and Voima, 2013; Ranjan and Read, 2016; Vargo, Maglio and Akaka, 2008).

Value co-creation is defined to occur during interaction between the service provider and the customer. These two actors meet in a joint sphere for mutual interests (Grönroos and Voima, 2013). In healthcare the joint sphere of interaction is corresponding with the appointment of the doctor with the customer or the patient. This interaction traditionally is based on a face-to-face meeting, which is utilizing the scarce resources and has the element of informing the customer or patient of the condition with relevant, but limited information. As healthcare professions are highly specialized, regulated and legitimized for diagnosis, the customer is not in the position to acquire or possess information related to the medical or other health condition in a way that would make both parties equal and the interaction balanced. Logically then, the service provider or the doctor is in a strong position to contribute to the value co-creation process greatly with the knowledge, information and resources at hand and support the value creation of the customer. The imbalance of the relationship in terms of knowledge

may cause difficulties for value co-creation as customers are lacking the information and their value perceptions may be influenced by the way the service provider presents the service offering (Edvardsson & al., 2011). In practice this would require the professional to meet the customer more than half the way in interaction and hence support the customer in the value co-creation process.

x.3 Digitization Creating Value Co-Creation Opportunities

Value co-creation between the service provider and the customer takes place in the joint sphere of interaction through dialogue with the use of digital solutions acting as platforms or mechanism for this dialogue and value co-creation (Grönroos and Voima, 2013; Saarijärvi, Kannan and Kuusela, 2013). Both the service provider and the customer can utilize their networks or independent spheres for value co-creation and this value co-creation can also be independent of the service provider's intervention or facilities like in case of customer's sphere (Grönroos and Voima, 2013; Ranjan and Read, 2013; Ordanini and Pasini, 2008; Grönroos and Ravald 2011).

Digitalization of the service creates possibilities for temporal and spatial service separation and hence, a completely new arena for the value co-creation process with engaged and empowered customer with independent networks in customer's sphere. The service separation is enabled with the digital service platform that can be accessed from anywhere at anytime, differing completely from the traditional appointment with the doctor at the doctor's facilities. The temporal separation means that the dialogue can have a timewise continuum where both the customer and the service provider utilize the possibilities of the services portal regardless whether the other party is on-line or not. In other words, instead of the traditional way of dialogue during the direct appointments, dialogue becomes a process supported by the digital portal with messaging, chat or independent service actions within the portal. Further the spatial separation of the service interaction is enabled through the digital platform. The

digital service can be accessed at anytime from anywhere and is not bound to any specific location or facilities of the service provider. Through this separation of service digitalization transforms the interaction of the acting parties and emphasizes the process nature of the service supported by the service portal. Through the service separation the digitization of the service increases the availability and access to the service, which ultimately means that the unmet needs can be better met as the service is scalable in a magnitude not possible with the traditional appointments.

The concept of value co-creation is complex and still is calls for a consistent theory or evolution (Ranjan and Read, 2014; Grönroos and Helle, 2012; Vargo and Lusch, 2016). Therefore the operationalization of the concept is more meaningful for the purpose of this chapter. This chapter focuses on discussing the operationalization of the value co-creation through digitization with DARIO model further developed on the work of Prahalad and Ramaswamy (2004) of building blocks of value co-creation, the so called DART model. The letters of DART stand for dialogue, access, risk-benefits and transparency.

DARIO model (see Figure 1) combines the four building blocks with digitization and opens further the concept of transparency into transparency of information and operations in form of standard work introduced by defined digital work processes. With these elements of dialogue, access, risks, information transparency and operations DARIO model introduces the idea of value co-creation opportunities through digitization of services.

Figure 1: DARIO model of value co-creation in digitized services

Offering value co-creation opportunities or enabling them is applicable in healthcare as the service provider has the access to knowledge and has the legitimized position meaning that the responsibility of the service provider is emphasized in relation to the customer as these two cannot meet on equal terms (Edvardsson and al., 2011). This means that the service provider enables and greatly contributes to the value co-creation and hence offers

opportunities for value co-creation. The shared information and jointly set targets for the care or treatment and the active participation of the customer in decision making and treatment are contributing to the process and end result. The customer becomes an active participant in shared decision making with shared information and targets for the treatment or service (Gionfriddo & al., 2013; Hoffmann, 2014; Carman and Workman, 2017), which consist of dialogue and mutual interests, crucial elements of value co-creation.

Digitization from its very nature is a disruptive factor for a service process and this disruption carries the element of uncertainty or risk within. Prahalad and Ramaswamy (2004) have considered the risks of the value co-creation process from the customer point of view. The customer may be puzzled with for example questions of medication and its risks and is looking for answers through dialogue (Prahalad and Ramaswamy, 2004). In the DARIO model the risks-benefit is discussed from the service provider's perspective with the concept of risks related to the integration of the digital service with the overall service process. The risks in healthcare are of great concern and very much connected to the quality of the service. The medical service quality is undoubtedly of major concern and here the involvement of the professionals contributing to the development work of digital service content is of great importance. However, the risks related to digitalization are much more complex as they not only concern the medical service quality, but also the risks of the development work, integration, utilization and acceptance of the digital services. The internal risks related to the utilization or integration of the digital service within the service process and acceptance to use the digital service portal in the customer interface present risks where the internal actions of the organization contribute greatly to the outcome (Sykes, Venkatesh and Gosain, 2009). There is less extensive research on the digitization of health care services from the implementation perspective, but there are studies on implementing electronic medical records. These studies have been analyzed in a study by Øvretveit & al. (2007) and the study

identifies differences in how the work processes as redesigned, either as part of implementation or as a benefit. According to this study repeated factors can be found for successful implementation. Other than technical system related features, these factors encompass features of the implementation process, leadership, resources and the organization's culture. The impact of the organizational culture and collaboration is realized either in improved or reduced cooperation. The successful integration of the digital service with the overall service process creates value co-creation opportunities. The integration is enhanced through defined working processes of operations in the implementation. If the integration of digital services with the overall service process fails in the implementation, there is less possibility to reach proper acceptance for a digital service by the professionals and effective utilization may fail due to complex working processes. Logically, the technology acceptance process and the impact of peer support are of significant relevance when integrating the service and exploiting the possibilities engaged (Sykes, Venkatesh and Gosain, 2009).

x.4 Developing Digital Services for Healthcare

This chapter describes development and its challenges of digital healthcare services of a public healthcare organization. The organization is developing new digital services as well as transforming services on digital platform. The development work has started years ago within the organization. The development work is on-going on several medical fronts, but the starting point has been the development of digital services and service platforms of mental therapy and weight control services. The development work has been carried out by the organization's professionals of these respective areas with the help of ICT department. The path has been long and the current success and acceptance of these digital services has required great enthusiasm and commitment. Further, currently as other similar services are being developed, the work is involving a network of other organizations and actors

contributing to the development work.

This chapter is based on findings of the two pioneering applications of mental therapy and weight control services in digital format. The data is gathered by multiple interviews, focus group interviews and through observations within the organization as one of the authors working within the organization. The observations are based on seminars and workshops of the organization dealing with digitization and digital services. The interviews, both individual and focus group interviews, were thematic interviews based on DART model of Prahalad and Ramaswamy (2004). The individual interviews were carried out with snowball sampling (Salganik & al., 2004) where each interviewee identified the next participant. The focus group interviews were mix of people of the organization keenly involved with the development work and digitization of healthcare services, not specific on the mental therapy or weight control services. For this specific chapter the interviews were further replenished to focus more closely on the risks of digitization based on the DARIO model of value co-creation opportunities. The purpose was to enlarge the comprehension of the prevailing risks for the service provider and for the management responsible for implementing these services. Further the observations were replenished with an additional workshop on risks related to technology and digitization organized by the ICT department of the organization.

Both these case services of mental therapy and weight control are well advanced and of special healthcare quality. Both consist of three separate sections first being the general section of information on the topic of mental conditions and issues of weight control and obesity for anyone to access. This service portal also offers the possibility for self-navigating and assessing the options for service. The second section of these service portals is aimed for the actual therapy, which requires a referral to be entered. The actual therapy part is then opened when the referral is sent and accepted. The therapy planning is done jointly with the customer and the information during the therapy is stored within the portal and is accessible

at anytime by participants. Participants for the therapy are the therapist and the customer. The therapy is working on consulting basis and the responsible physician will receive the report after the therapy is finalized. Further, the customer can choose how much of the therapy process the customer will share with the responsible physician. The therapy is steered by algorithms and the process is normally planned for one year having a starting, mid-process, and finalizing reviews with the therapist. If the customer wishes additional virtual appointments can be agreed upon. The third section of the service platform of these therapies is for the professionals, who can enter for information and further contribute to the development of the service and content. The information offered in all these sections is of special healthcare professional quality, evidence-based and is constantly updated with the latest research available.

The digital service portal supports the interaction through-out the service process duration with available, stored and shared information. The transparency of the information is brought to a completely new level through the digital service portal. The customer related information is stored in the service portal during the service process and is accessible at anytime by both parties, the customer and the service provider. Further, the service provider with the help of the network of professionals contributing to the service development and maintenance is providing evidence based high level professional information for the customer. The information is freely accessible within the service for supporting self-care tasks, providing correct, evidence based information for the customer condition or need for support through correct information.

The customer empowerment is enabled by the service provider's actions in the service provider's sphere. The digital service format enforces the service provider to follow a predefined, more standardized way of working with the service portal. This standardized way of working appears for the customer in the joint-sphere as transparency of the service

process. The customer is involved from the beginning in the design of the service process that has jointly agreed targets and a predefined duration. This is dramatically different form the traditional appointment based service, where there is missing and loss of information between the appointments and the customer learns only step by step the next phase of the service. The digital therapy service is based on agreed targets and transparent process that is supported by the digital portal with self-care tasks for the customer in various phases of the service.

The possibility to access the service is multiplied in the digital service format when compared to the traditional appointments. A therapist for example in case of the mental therapies can take five to six patients or customers through a scheduled appointment. With the digital service one therapist can have over twenty customers a day. This increase in availability of appointment times due to the efficient service structure increases the access to the service tremendously. This can have dramatically different influences for the population as the unmet needs for therapy can increasingly be met. The service structure engages the customer with tasks that traditionally would consume the therapist time in the appointment session. Now the customer can contribute independently to the care process with tasks of providing information and self-care tasks.

Healthcare industry is strictly regulated with licensed professions and legislation for the patient security and safety. This emphasis the role of the service provider in assessing and taking the risks of digitalization into account.

x.5. Collaboration in Value Co-Creation on Digital Services

The development of value co-creation theory is moving from dyadic perspective towards a network orientation. The idea of integrating micro-specializations is changed to a more generic description of multiple, economic and social, actors as resource integrations (Vargo and Lusch, 2016). Technical or digital solutions can act as mechanisms through which additional resources are integrated for value co-creation processes (Saarijärvi, Kannan and

Kuusela, 2013). These additional resources consist of network of organizations and other actors that contribute to the development work of these digital services and enable the construction of value co-creation opportunities. The network of professionals makes a major contribution to the development work providing and sharing the special healthcare level of information that is widely opened through these services to primary care physicians, therapists and customers. Hence, in this network of actors the service provider is integrating various resources like knowledge to support the customer in value creation process (Edvardsson et al, 2011).

In the development teams of the case organization there are multiple organizational actors participating and giving their input and expertise of the actual medical science in use. There seems to be a lot of willingness to contribute to the digitization of the services, but there is an evident need for clear strategy as there are comments from the participating parties that their input is of minor value and hence, the network is not comprehensively included in the development work, or there is no clear target for implementation of the services, and even worse there seems to be unawareness of the actual implemented services available.

There are plenty of start-up entrepreneurs that are willing to offer different kind of solutions and gadgets for healthcare services during this ongoing booming transformation of services. For the management the challenge is to find right partners that have commitment to the development work required. The development work of digital healthcare services encompasses enormous efforts to ensure quality, security and safety aspects. This proceeds high level of commitment in the development work, which requires continuous resourcing in terms of capabilities, financing and time. Further, as the connectivity issue among various ICT systems is critical for the service process, the various applications and software offered causes multiple problems with the connectivity issue and hence due to resources the possibilities to engage perhaps attractive software may be limited. Therefore, the case

organization has chosen the way to take a lead itself and start developing digitized healthcare services that are of high quality from the content point of view as well as from the connectivity point of view.

There is a call for marketing these digitized services among participating actors in the networks. The participation into the development work reaches only a small fraction of the organizations and the general knowledge of opportunities is not reaching the final users from the professionals as well as from the customer side. Perhaps a more effective solution would be the closer involvement of the network participants in the strategy development of digitization and target setting for the implementation of these digital services. The network actors are not closely connected or discussing actively shared view of the strategy although the exists government level of commitment to the development work in terms of financing. This would require stronger management level involvement of the participating network organizations in defining the strategic targets with service architecture, work processes and procedures in order to draw full benefits of a wide digital service offering for various medical expert areas under development.

Digitalization increases availability and enables sharing of information, as components of value co-creation, in such a magnitude that it is said to revolutionize healthcare as it fulfils the unmet needs of the public for healthcare. But because health-care services are strictly regulated, it is essential that the digital services should be carefully analyzed before entering the digitization process so that their role in the service architecture can be evaluated. The case organization is proceeding simultaneously with service architecture design, service design and developing digitalized services at a very wide front with various actors and networks. There seems to be intra-organizational challenges between actors involved with the service architecture design and the actual digital service development work. The part of organization that is working to design a holistic service architecture for the organization is separate from

the part of organization that is actively developing the digital services and not connected to the network of actors consisting of multiple organizations in the development work. The challenge seems to be on the interaction of the architecture design and designing new emerging work processes generated by the digital service platforms.

x.6. Management Coping with the Risks of Digitization

The development of the digital services comes from two approaches; transferring present services into digital format and describing the new processes accordingly and developing services that are actually quite new and possible through digitization. The service design is based on the work in these development working groups, but the connection to the practical processes of the professionals is not tightly linked into the development work due to voluntary participation and missing jointly agreed and set targets for implementation. The overall service architecture, service design and the development of the actual digital services proceed parallel, but the coordination is very much on responsibility of ICT dedicated for this service development work and the management is not systematically adhered to it.

ICT security procedures and legislation are the directing guidelines in the development work for the organization. The legislation and EU directives define the digital healthcare service platform as a medical device, which sets the foundation for the testing and acceptance procedure of the service. The organization utilizes risk analysis in evaluating the service platform from the ICT security perspective and from the managerial usability perspective. The content of the risk analysis is defined based on the purpose of the analysis. For example the usability has different risk evaluation than when analyzing the software application data security.

The ICT development work is based on life-cycle thinking of the digital service software and ICT platform and ICT services. The planning, actual development work and implementation phases are considered from the risk perspective to secure continuity and availability of the

service and a proper handling of disturbances. This is covered by having generic elements in the digital services and then separate features of the service content.

The technical risk related to the service application or networks is connected with the ICT, but there seems to be a division of responsibility concerning these new digital services of the organization. The ICT department takes the responsibility of the basic infrastructure, but the functioning of the digital services and their applications and networks are pointed to the development team of ICT, which from a holistic perspective of risk management is perhaps not a sustainable risk management practice. Not only the practical implementation related risks emerge, but the risks for the information security and risks for the usability of the service arise. It is on the responsibility of the service provider to secure the service platform in a way that the information and usability are not endangered. The service provider in the customer interface is the physician or the therapist and in this interface there needs to be clear responsibility and security action plan for cases when the service is not available and the customer is suffering for lacking the therapy or contact possibility with the therapist through the digital service platform. This traditional responsibility of the service by the physician in the customer surface causes the attitude within professionals that the fear for errors or mistakes becomes a hinder for the digitization of services and innovations. The fear for shift of responsibility creates unnecessary blockages as the digitization does not outsource the responsibility of the physician nor does it delude the process, on the contrary the digitized service process is transparent also for the physician. “The professionals need to change and review processes from another perspective” (Project director, ICT).

The identified features for successful implementation (Øvretveit & al., 2007) are identifiable risk areas in the implementation of these digital healthcare services. For a successful value co-creation these risks involved with the implementation process, leadership, resources and organizational culture are covered in the risk analysis idea, but there seems to be a gap in

operationalizing the measures to prevent the realization of the risks.

Based on the risk analysis findings of resources already in the developing phase of the services, there is an imminent risk of inadequate capabilities of required respources concerning digital solutions. Further the attitude of the management of the organization allocating these resources may not be supportive and that the digitization is regarded by the organization something like “a compulsory trouble”. These risks of lacking capabilities and adverse attitudes slow the starting process of the development work when resources are being acquired. Hence, the project organization strives for to create an understanding of the magnitude of the transformation required and that with the current traditional ways of working, equipment, resources and knowledge of digitization, the progress in the development work requires time and allocated resources from the organization accordingly. “This is a journey to understanding and realizing of what could be” (Project director, ICT). Further managerial risk is there that the personnel cannot keep up with the speed of change and resistance hinders the successful implementation. This requires the adaptation of the development speed with the engagement of the personnel. The target is to involve the personnel to develop their daily work processes with the digital service by defining the benefits the digitalization can bring to the work and for the customer. The capabilities of the organization to support the implementation are mapped and supported with targeted measures one being the standardization of the service. Despite the target of standardization, there is no fixed development formula for this and the development work is done tailoring each service separately. This has evident challenges and is not always successful as the management culture is not necessarily adapting with the use of the digital services. It is crucial how the management understands the change and the imposed requirements of digitization for the work processes and managing of the work and personnel. “The digitized service brings the customer more involved with the service process and the role of the customer is increasing.

For the service organization unit this means a tremendous change in the service culture, which should be apparent and visible in each customer interaction and in the entire service process". (Project Director, ICT)

The transformation of the services into digital format requires a wide understanding and knowledge of the work processes related. This introduces the need for new definitions of work processes and a service architecture that combines the various ways of offering the service to the customer. Finally in the customer interface it is the physician who has to be able to support the customer in the choice of a proper service method and its content. This capability of the physician requires training for the new digital services and for the new service architecture and the linkages between the service elements of the digital and traditional format of the service. Digitization of the services resulting in changing work processes and habits evidently will change the working culture and the company culture. Logically, this brings in the challenge that the management is facing with the practical implementation of these digital services with applicable, defined and integrated, but missing work processes.

Further, digitization causes a dilemma with networks of multiprofessional teams and collaboration. The digital processes with the customer are based on dual interaction and the shared information cannot be distributed to any third party unless the customer so wishes. Still for the overall service process there is the need for multiprofessional teams engagement and expertise like in case of weight control processes. The customer may start the process to treat obesity with tasks and acquiring information targeted to prepare the customer for an obesity surgery. After the surgery the customer and the health condition requires other professionals to support the recovery process, nutrition change necessities and perhaps even related mental issues. Combining this need multiprofessional work with a digital service requires a change in working culture and also in the work processes. This is not still closely

planned and defined with the development work and requires a lot of managerial input with the development teams for a successful end result. The definition responsibility of the new working processes easily remains on individual managers of operations that struggle with the professionals' acceptance of new ways of working and the combining the need for multiprofessional teams work with new processes.

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Figure Legend

Figure 1: DARIO model of value co-creation in digitized services. (Based on Prahalad and Ramaswamy 2004)


Dialogue
Opera tions
Value co-creation opportunites
Access
Informa tion
Risk-benefit