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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).

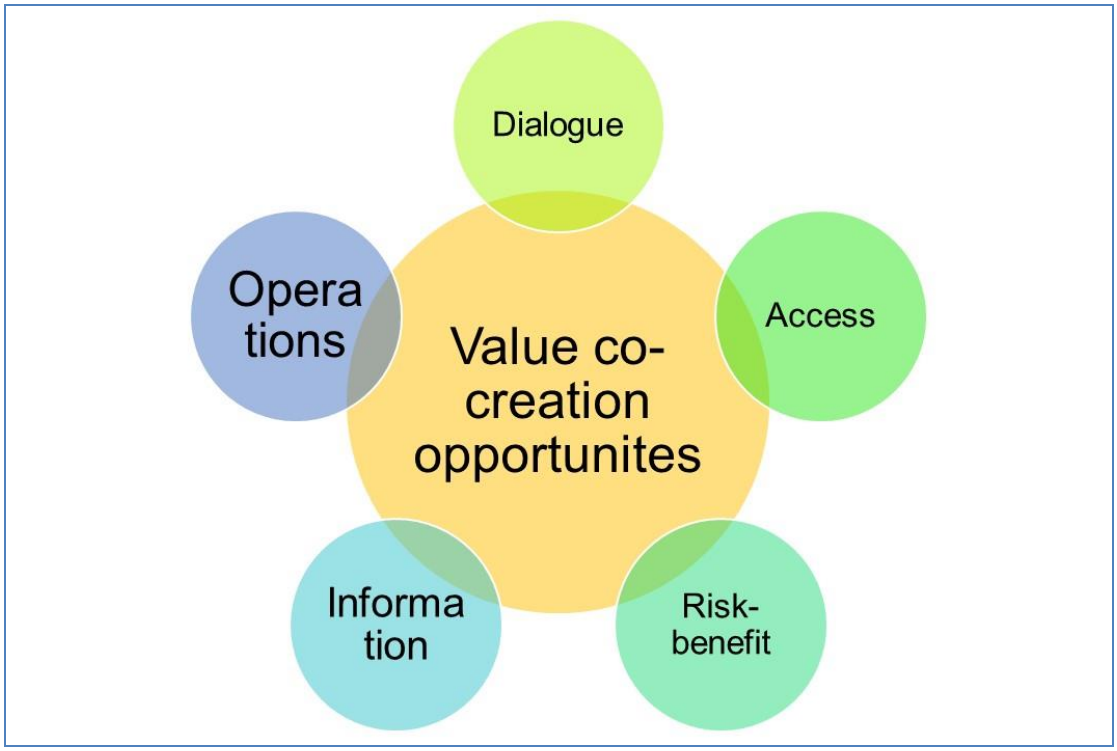


**Figure 1:** DARIO model of value co-creation in digitized services

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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