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ACHIEVING SCALABILITY OF HUMAN-CENTERED SERVICE SYSTEMS: INSIGHTS FROM THE ACTIVE AND ASSISTED LIVING CONTEXT

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ABSTRACT

Human-centered service systems (HCSSs) create value in personal interaction. This fact impedes the dissemination of HCSSs. To counter the problem, service providers in healthcare or education enable their services with information and communication technology (ICT). This approach allows to maintain or even enhance their offerings while handling a growing amount of work. However, the integration of ICT in the HCSSs requires reconfigurations for value creation and value caption. How this reconfiguration is implemented in practice remains unclear. By using a multiple case study research design, our study will help to understand how to achieve the scalability of HCSSs.

KEYWORDS Human-Centered Service Systems, Service Innovation, Service Design, Business Model, Multiple Case Study

INTRODUCTION

Human-centered services systems (HCSSs) depend on sharing capabilities and create value in personal interaction. They are of great importance because they cover essential areas in our society and everyday life such as healthcare, education, and volunteering (Maglio et al. 2015). All of these areas include complex behaviors of the people and relationships involved (Peters et al. 2016). Therefore, service innovation that aims at increasing the value for the involved actors is becoming attractive and difficult at the same time (Barrett et al. 2015). It requires a systematic design of these services in which the service provider plays an active role (Breidbach et al. 2016; Böhmman et al. 2014).

Looking at a continuum, service providers in HCSSs are the opposite of digital ventures. The high degree of human-to-human interaction does preclude standalone self-services (Breidbach et al. 2013). The complex personal interaction as the core of value creation impedes the separation of contents and medium in service delivery (Yoo et al. 2012). Knowledge that is necessary for the value creation is usually implicit and unique, and is thereby slowing down the processes of change (Kleinschmidt, Burkhard, et al. 2016). Overall, these circumstances impede the scalability of these service systems (Lewis et al. 2011).

To counteract the effects, HCSSs are enabled with information and communication technology (ICT) (Barrett et al. 2015; Kleinschmidt, Peters, et al. 2016). The approach allows service providers to maintain or even enhance their offerings while handling a growing amount of work (Lewis et al. 2011). However, this integration of ICT in HCSSs requires reconfigurations and new designs for value creation and value capture (Barrett et al. 2015). How this reconfiguration is implemented remains unclear (Nambisan et al. 2017). Therefore, the research question of this paper is: *How to achieve scalability of human-centered service systems?* We will examine the methods used and the decisions made by service providers to adapt their services.

This article is structured as follows: succeeding the introduction we provide a background on HCSSs and the effects of achieving scalability through ICT-enabled service innovations. Then, we outline the case study approach we conducted for understanding how to achieve scalability of HCSSs. The following presentation and discussion of findings reveal recurring patterns and relationships of methods and decisions. Finally, we review theoretical and managerial implications of the findings, outline the limitations, and present opportunities for future research.

THEORETICAL BACKGROUND

Service systems are configurations including people, technology, organizations, and shared information that operate together for mutual benefit (Maglio et al. 2015). Hence, HCSSs are service systems with a focus on human behavior, cognition, emotions, and needs that require particular attention (Maglio et al. 2015). In such service systems, capabilities, interaction, and change are fundamental. Put simply, service systems are problem solving configurations based on the capabilities and interactions between the different actors. Coordination and cooperation connect the various parts (Vargo and Lusch 2016). HCSSs differ from other service systems because the personal interaction between the various actors is essential for the value creation (Breidbach et al. 2016). Traditionally, they are based on individual needs and adaptation to the context (Peters et al. 2016). This is the case in diverse industries such as hospitality, healthcare, retail, finance, and volunteering (Maglio et al. 2015). Improvements are essential for the operational and financial performance of those services (Breidbach et al. 2016).

Unfortunately, vertical scaling of HCSSs – the adding of resources to disseminate the service – is very resource-intensive as they resist optimization solutions (Maglio et al. 2015). The dependency on knowledge and customization increases customer involvement in the value creation (Breidbach et al. 2013). These services are shaped by rising expectations and the demand for personal services as well as

changing organizational and delivery structures (Barrett et al. 2015). A response to these challenges are service innovation activities including horizontal scaling – a disproportionate increase in dissemination.

Service innovation is the reconfiguration of a service system with the aim to increase value. One or more parts – people, information organizations, technologies – are replaced or changed (Breidbach et al. 2013; den Hertog et al. 2010). Thereby, ICT is one of the most discussed dimensions of service innovation (Peters et al. 2016). The developments in ICT increase digital innovation in service systems (Barrett et al. 2015; Nambisan et al. 2017) and HCSSs (Peters et al. 2016; Peters 2016). As coordination and cooperation are critical to value creation, the leveraging effect of ICT influences how HCSSs work. ICT can help to achieve horizontal scalability of service systems (Barrett et al. 2015). In most cases, a replication and scaling of the physical activities is not possible without further adjustments in value creation and value capture (den Hertog et al. 2010). The design can be broken down into two sections – value creation and value capturing (Zott and Amit 2010). Thereby, an integrated design of both parts is necessary to profit from service innovation (Chew 2016).

Value creation, especially those that involve the customer in the service, is planned in service design. Service design is the application of design methods and principles for influencing the customer experience (Patrício et al. 2011). This service design is mostly customer- and experience-centric (Zomerdijk and Voss 2010). However, there is no single service design approach because service systems need to be adapted to a particular context and customer problem (Grenha Teixeira et al. 2016). The results of designing service systems are artifacts such as prototypes that show a detailed representation of the particular value proposition and value creation (Ries 2011). A commercialization of the service system is usually not a part of the service design (Witell et al. 2016).

The planning of value capture is an integral component of the business model design. It describes how value is delivered and monetized to customers and companies (Teece 2010). Thus, business models and their components cover the essential activities of service systems (Zott and Amit 2010; Peters et al. 2015). The business model is mainly centered on the determination of the company's value-added components (Osterwalder et al. 2015). In practice, only a few models such as the business model canvas (Osterwalder and Pigneur 2010) are used to define these relationships (Kleinschmidt and Peters 2017). What is challenging to business model design is that, contrary to partial optimization, the system-level design is important (Zott and Amit 2010).

METHOD

Service innovation and the scalability of HCSSs contains in-depth problem solving knowledge that seems to be recurring. It is worth taking a deeper look at how companies implement this knowledge in order to understand their actions. The practical understanding of the actions can help to inform theory and practice (Feldman and Orlikowski 2011). To do so, we analyzed the specific activities, methods and decisions for scaling HCSSs and derive the recurring patterns and relationships across the actions (Nicolini 2009; Sandberg and Tsoukas 2011). This approach allows for a deeper understanding of the actions and a reflection of the details including the methods and decisions towards scalability of HCSSs.

Table 1: Overview of Case Study Companies

Company	A	B	C
Industry	Care Service	Regional Development	Volunteering
Country	Germany	Germany	Switzerland
Digitization	Low	Medium	High
Neighborhood	Urban	Rural	Small Town
# of Employees	940	15	75

For the data collection, we used a multiple case design (Yin 2014; Miles et al. 2014) in the active and assisted living context. We chose case study companies with different degrees of digitization, neighborhoods and company sizes (Table 1). The three service providers want to support their volunteering activities with an online platform to handle the growing needs of their clients. In each case, the scalability via ICT enables a more flexible service provision than in the traditionally used service delivery structures for HCSSs. Therefore, the service providers attended a larger research project that covered the implementation of the platform in the service system. The project consisted of a technical part including the development and testing of the matchmaking software for volunteers and a business part including the design and implementation of the services and business models. We have accompanied the implementation and the adjustments over a period of more than two years (11/2014 – 01/2017) and were able to participate in workshops with the project team where the basic ideas were developed and the most important decisions made. It was possible to us to conduct interviews with key participants of the project and thereby possible to reflect on activities, methods, problems, and decisions regarding the service design and business model design.

The data analysis included within-case and cross-case analysis for the different methods and decisions. Beginning with the assumption that suitable solutions and approaches are developed for digital innovation

(Yoo et al. 2012), we wanted to question their use in HCSSs. Moreover, the assessment of the problem solving in HCSSs is difficult due to the featured properties. Referring to von Hippel and von Krogh (2016), we attempted to figure out specific problem solving relationships and patterns. In doing so, we applied an inductive approach in the cases to identify and document underlying usage patterns. Based on the field notes of the workshops and the relevant results we synthesized the corresponding need-solution pairs of decisions and method usage (Nicolini 2009). In the interviews, we discussed the pairs with team members of the project. Cross-case syntheses (Yin 2014) was used in order to derive how the data differ in the various cases. Subsequently, propositions were derived from the results.

FINDINGS

The overall findings show that companies are using existing tools for their emerging needs. When selecting the methods, it is crucial which decisions and needs are paramount. When using the methods, the adaptability to the needs is important. Therefore, the degree and the ending point, with respect to digitization determines, the focus of the tools on value creation and value capture. Value capture is an important parameter for reconfigurations with completely revised service concepts.

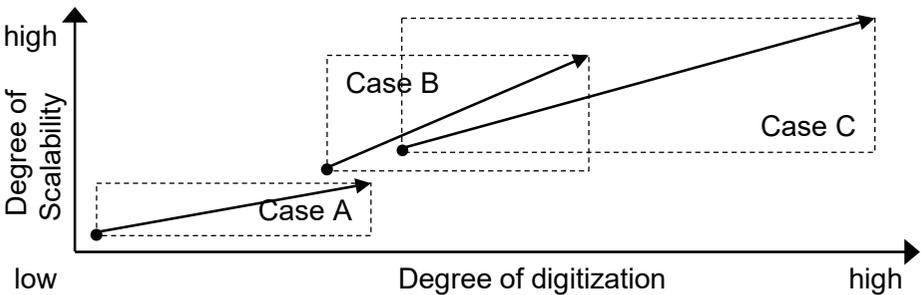
Table 2: Need-solution pairs for achieving scalability of HCSSs

Need	Learn shortcomings	Improve service (development)	Improve implementation
Solution	Define parts for ICT support without changing the value	Define value creation and capture including limitations	Test fit for customer interactions
Methods	Customer Journey Value proposition canvas	Customer development methodology Business model canvas	Lean startup approach

The findings regarding the need-solution pairs (Table 2) show that the service providers use a method combination to promote scalability. We were able to identify three primary needs-solutions pairs in achieving scalability of HCSSs. First, the companies need to learn the shortcomings of their services. Therefore, they have to define the parts of their service and must analyze if using ICT-support changes the core business of their service. Secondly, they need to know how to improve their service and its development. The solution contains a service concept that includes value creation, value caption, and addresses the specifics of HCSSs. Thirdly, the companies need an approach that transfers the needs of the customer into the service, as easy as possible. Hence, the customer

interaction is used as a central element in testing and verifying the service concept. The method used is selected according to the need that appears in the scaling of HCSS. The methods include parts of the value proposition canvas (Osterwalder et al. 2015), the customer journey (Zomerdijk and Voss 2010) the lean startup approach (Ries 2011), the customer development methodology (Blank and Dorf 2012), and the business model canvas (Osterwalder and Pigneur 2010). A project leader (Company B) explained the approach: “We organize a workshop for each part with a specific tool to meet our needs. This is the easiest way for us.” Therefore, Proposition 1 is the following: Using a method combination that respond to the user needs improves the scalability of HCSSs.

Figure 1: Project Space of the Case Study Companies



The findings regarding the similarities and differences in the cases (Figure 1) reveal specifics of the projects. The starting and ending points of the initiatives differ in the three cases. The setting includes that not all service providers have planned to digitize their service completely. In particular, the companies with an advanced degree of digitization have to be aware that a reconfiguration in the service processes requires an adjustment for the scalability of the HCSSs. The difference is most striking at case C that wants to move away from a simple service towards a service that corresponds with each stage of the customer lifecycle. Furthermore, the personal interaction are the central variable that limits the horizontal scalability. Nonetheless, the methods have been adapted to the extent that in more digital settings the coordination and testing with the customer have been awarded a more important role. A team member of the project (Company A) concludes about their objectives: “Our goal is to support people as best as possible. If IT gives us the time for people, we will change our service. [...] Not everything needs to be digital.” Therefore, Proposition 2 is the following: The greater the extent to which digitization is attained in HCSSs, the more important is the tension between personal interaction and scalability.

DISCUSSION

Several authors have acknowledged that achieving horizontal scalability is an important step in an increasingly digitized world (Lewis et al. 2011; Huang et al. 2017; den Hertog et al. 2010). To implement this in HCSSs is challenging because of their inherent properties (Maglio et al. 2015). The reconfiguration of value creation and value capture needs different tools and approaches from service design and business model design (Kleinschmidt, Burkhard, et al. 2016). Thus, the presented findings for the reconfiguration of the services show practical implications and limitations for the scalability of HCSSs.

We used the explicit assumption that the use of ICT increases the horizontal scalability of HCSSs (Barrett et al. 2015; Huang et al. 2017). The findings, thereby, show that ICT support cannot replace personal interaction rather it should complement it as it is the core of service delivery in HCSSs. The coordination and deeper understanding of value creation and value capture influences the integration of ICT in services that depend heavily on personal interaction. The service providers with contact to and knowledge about the customer as a core business remain a key stakeholder in the reconfiguration activities. A reconfiguration of the digitized services and thus the possibility of scalability is possible by using established methods. These can be adapted to different needs of service providers in HCSS and thus support service innovations.

The integrated design of value creation and value capture improve the service innovation for the customers and service providers (Chew 2016). The findings show that the level of digitization shifts the focus of the reconfiguration for achieving scalability. The operationalization via the need-solution pairs is a good opportunity to move away from service innovation as a process or result, and, rather, understand it as a tool oriented at problem solving (Nambisan et al. 2017). In the depicted cases, these pairs were questioned regarding the used methods and decisions as they are part of achieving scalability. Through the methods used, we were able to represent a concrete application between problem and solution concerning this application field.

Overall, this research contributes to the service design and business model design literature by being one of the first to explore design methods and decisions for scaling HCSSs. The design knowledge uncovered for implementing ICT in HCSSs enhances the design for other services. The problem solving focus extends the solution space in service innovation and gives a concrete application with the presented example. Also, we demonstrate how the link of service innovation, service design and business model design could be implemented.

This research does not seek to draw statistical inferences about the scalability of HCSSs. Instead, the findings demonstrate and justify in-depth problem solution knowledge for ICT-enabled scalability in the HCSSs context. Thereby, the methodological approach was designed to identify need-solution pairs that reflect this problem solving knowledge in the form of method application. Based on this knowledge, further research can be done to understand the impact of service design and business model design on the success of ICT-enabled service innovation and service systems. In particular, the integrated design include the use of methods and decisions, as well as the demonstration of the effectiveness of the application in service innovation.

CONCLUSION

The purpose of this article was to understand how scalability is achieved HCSSs. We examined the service design and business model design methods used and decisions made by three service providers in the active and assisted living context. All services providers introduce an ICT-based platform to adapt their services and to achieve scalability. The findings were presented in two propositions and included need-solution pairs to demonstrate the concrete problem solving knowledge of the service providers. They show that the scalability of HCSSs can be achieved by using known methods that support clear decisions. The level of digitalization influences the focus of activities related to scalability. This knowledge is very helpful concerning the application of design methods in the service innovation and is a first step towards the improvement of the outcome.

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