

# OK computer: applying the public service logic on digital health services

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## ABSTRACT

Recent attention to public service logic (PSL) has resulted in the creation of several theoretical guidelines for value creation. This empirical study applies PSL framework to explore how PSL is fit to and can adapt to the evolving landscape of the digitalization of public services. This research is based on 12 semi-structured interviews with managers of digital health services in Norway. Our results demonstrate that digital technology alters service users' involvement in value co-creation, helps solve capacity problems, empowers service users to take care of themselves, and cultivates several societal values but additional resources facilitating the co-creation process are needed.


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## 1. Introduction

The digitalization of public services is widely seen as an enlightened way to revitalize democracy and improve the quality of citizen services (Lips 2019; Milakovich 2022; Spagnoli, van der Graaf, and Brynskov 2019). In light of this, public organizations across the world have adopted digital technologies to improve their interactions with citizens and other stakeholders (Clifton, Díaz Fuentes, and Llamosas García 2020), which has resulted in a move away from the traditional agency-centric approach to the delivery of online services towards a more citizen-centric one (Milakovich 2022). Public service logic (PSL) was developed to provide a deeper understanding of this type of co-production of public services by integrating insights from service management and marketing theory with public management research. In contrast to past goods-dominant logic to service delivery (product-centred), PSL argues that the overarching rationale of public service design and delivery is value creation (Osborne 2020). It underlines the responsibility of public service delivery professionals to genuinely interact with users, citizens and a range of other organizational actors

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involved in service provision (value is co-created collaboratively) (Engen et al. 2021; Eriksson et al. 2020; Osborne 2020; Skálén and Edvardsson 2016).

The most recent contributions to PSL research have aimed to clarify the content of 'value', 'value creation' and other 'magic value co-concepts' related to PSL, such as value co-creation (Cui and Aulton 2023; Dudau et al. 2023; Mills et al. 2023; Trischler et al. 2023). Despite this, the meaning of 'value' in PSL research remains elusive and undertheorised (Cui and Aulton 2023; Osborne 2018), and Trischler et al. (2023) suggest that unpacking different perceptions of value is significant for the further development of PSL. Although this article does not attempt to provide an additional conceptualization of 'value', it does connect 'value' to the context of digital technology. According to Dudau et al. (2023, 1) 'value emphasizes individual over collective gains from services'; therefore, in a digital context, 'value' will refer to the benefits, advantages, or contributions that individual can obtain through digital means in public services.

The aim of this study is to explore how PSL is fit to and can adapt to the evolving landscape of the digitalization of public services. In this study, we adopt Osborne's (2018) understanding of value co-creation from a PSL perspective that highlights interactive and dynamic relationships between multiple actors (service users, citizens and service providers), where value is created at the intersection of these interactions. Previous studies on the digitalization of the public sector have shown that digitalization involves the transformation of the relationship between service providers and users to achieve better efficiency, quality and transparency of public services (Andersson, Hallin, and Ivory 2022). Despite this, current research on PSL has limited focus on the role of digital technologies in value co-creation between PSOs, service users and other stakeholders (see the supplemental data). At present, empirical knowledge about the integration and implications of digitalization for public service design and delivery is scarce (Osborne et al. 2022; Trischler and Trischler 2022). In particular, there is a need to develop a deeper and more nuanced understanding of service users' participation and engagement in the creation of digital public services to ensure that digital technologies meet their needs and expectations, maintain public trust, avoid discrimination and improve public service outcomes (Hollis et al. 2015). To fulfil this need, we investigated digital health services coordinated by four regional governance networks in Norway. Digital health or e-health services are public services that leverage digital technologies wherein the interactions between citizens and public administration are facilitated by an information technology system (Lynn et al. 2022). We argue that health services are of particular interest in the context of digitalization and value creation, since the rise of digital technologies has empowered patients, making them active decision-makers in their medical care process (Kraus et al. 2021).

While some empirical studies on health services from a PSL perspective have recently been conducted (e.g. Skarli 2023), this study focus on exploring the elements of value creation for health services in the digital technology context. We evaluate the theoretical framework developed by Osborne, Nasi, and Powell (2021a) that distinguishes between five elements of value: 1) short-term satisfaction and user well-being, 2) medium- to long-term service outcomes, 3) the whole-life experiences of service users, 4) capacity building in the community and 5) societal value.

According to Trischler et al. (2023), this model requires conceptual evolution and empirical testing. Initial empirical evidence has already been provided by Cui

and Aulton (2023), who evaluated these five elements of value in the context of carbon reduction projects in Scotland. Our main contribution is to evaluate this model in the digital technology context from the perspective of public managers in healthcare sector. The following research questions were used to guide the study:

- (1) How does the digital technology context alter service users' participation in the process of value co-creation?
- (2) What are the implications of value co-creation in a digital technology context for PSOs?

Regarding the first research question, we focus on the following elements of value: short-term satisfaction/experience and whole-life experience of service users. The second research question then mainly relates to the two remaining elements of value: medium/long-term effects of a public service and capacity creation. Then, societal value is linked to both questions. We argue that value co-creation in a digital technology context carries several implications for PSOs. Although service users' participation in value co-creation may increase the legitimacy of public administration (Røiseland 2021), it also increases the complexity of interactions and resource sharing (Petrescu 2019) and generates management challenges as the collaboration bandwidth expands (Zyzak 2023). Recent studies have indicated that the previous instrumental approach to user involvement (top – down, one-size-fits-all), which treats users as passive recipients of government action (Torfing et al. 2021), is no longer appropriate, especially in the age of digitalization (Petrescu 2019; Trischler and Trischler 2022). Moreover, the interactive governance perspective (Edelenbos 2005; Edelenbos and van Meerkerk 2016; Torfing 2012), which provides conditions for two-way interaction, does not fully value civic engagement in value creation because citizens' roles are often undervalued. Therefore, to overcome this imbalance, future approaches and solutions should emphasize a systematic and more user-centred interaction between public administration and its recipients to increase both the transparency and efficiency of public services (Keast 2021; Lember, Brandsen, and Tonurist 2019).

This article is structured as follows: The next section consists of a review of the PSL literature and the digitization of public services. Subsequently, we present our methodology and findings on digital health services in Norway. The final section discusses the results and suggests new avenues for future research.

## **2. Literature review**

### **2.1. Public service logic (PSL)**

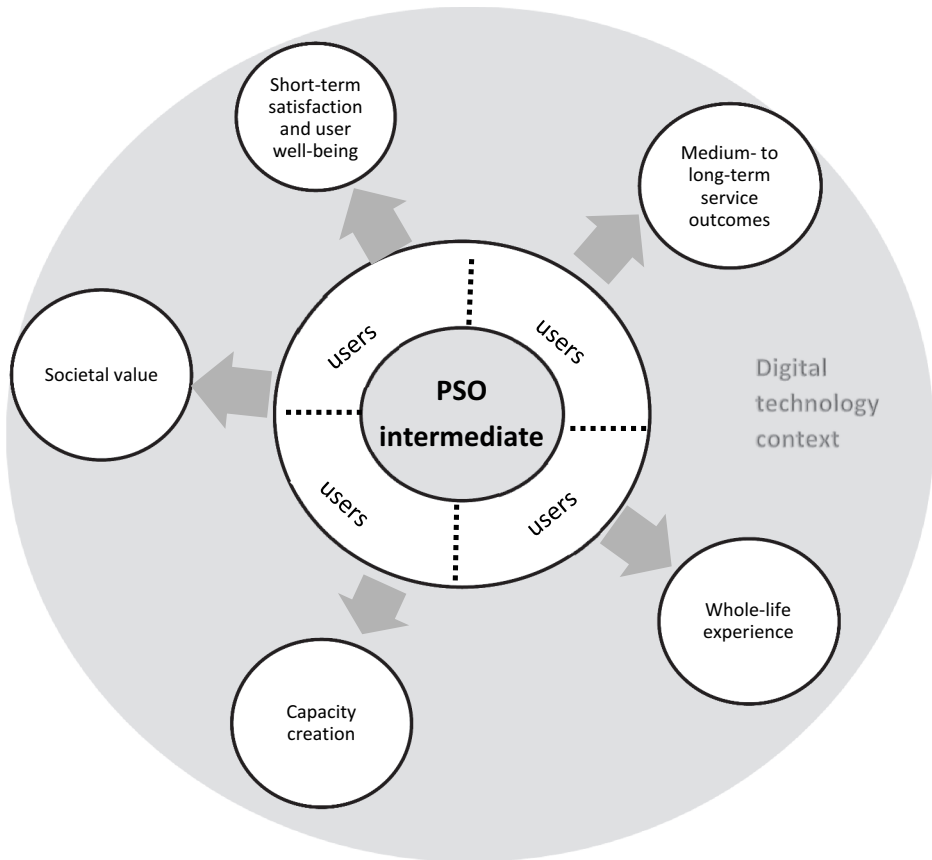
PSL is a recently established approach to value creation in the public sector that changes the focus and locus of public service design and delivery (Engen et al. 2021; Eriksson 2019; Osborne 2020). This novel approach accentuates the potential of service users' participation/involvement by bringing their knowledge and experiences into the design and delivery of public service; it also aims to develop a deeper understanding of the essence of value creation in the public service context (Røhnebak et al. 2022). Initially, PSL research focused on users as co-producers of services (Osborne and Strokosch 2013). However, more recently, scholars have

emphasized service users as co-creators of value because ‘co-creation assumes interactive and dynamic relationships where value is created at the nexus of interaction’ (Osborne 2018, 225). This shift boosts the service user’s role at different stages of value creation (from design to implementation), as PSOs rather dominate the co-production process (Alford 2016).

In a recent critical review of PSL, Kinder and Stenvall (2023) argued that this novel theoretical framework has deeper roots than the seminal paper by Osborne, Radnor, and Nasi (2013), linking PSL to the critical work on service logic by Grönroos’ (2011). They refer to an early call for user involvement in service design made by Stewart and Clark (1986) and several other scholars who have contributed to the development of user-centric public services (see Kinder and Stenvall 2023). Nonetheless, a significant body of research has responded to the PSL approach since Osborne et al. (2013) seminal paper was published. In our state-of-the-art literature review, we identified 41 such publications (see the supplemental data) that either advance (e.g. Engen et al. 2021; Jenhaug 2021; Trischler et al. 2023) or criticize the PSL theoretical framework and its limited empirical evidence (e.g. Kinder and Stenvall 2023).

A recent bibliometric analysis and interpretive review of co-production in public services (Palumbo and Manesh 2023) called for further research to expand our understanding of the challenges that influence the implementation of PSL. Trischler et al. (2023) argued that although PSL is currently positioned in the literature to understand public service delivery and value creation from a user-centred perspective, this focus is still too narrow to fully understand how value is co-created in and beyond interactions with PSOs. According to Palumbo and Manesh (2023), there is a particular lack of empirical evidence on citizen engagement in value co-creation, both in the context of traditional and digital public services. The PSL literature also stresses that although the digitization of public services creates opportunities, it also erects barriers (discrimination and exclusion) to citizen participation (Rösler et al. 2021). Therefore, we argue that the process of value co-creation in a digital technology context requires appropriate coordination of actors to avoid discrimination against groups of citizens and service users who are unable to use digital tools.

Our literature review confirms that most of the early research was theoretical/conceptual and conducted mainly by British and Scandinavian scholars. Since 2022, we have seen a significant increase in the number of empirical studies, especially those related to health and welfare services. *Public Management Review* is a leading journal that has published half of the PSL articles so far ( $N = 22$ ). These publications develop or criticize the PSL framework in the context of service-related ‘magic co-concepts’ (Trischler et al. 2023), such as co-production, co-destruction, co-creation, co-construction, co-governance, the concept of ‘value’ and by taking different perspectives: public service ecosystem, design for experience, value propositions, street-level bureaucracy and responsabilisation (see the supplemental data). Although PSL research expands quickly (12 publications in 2023), there is still limited empirical evidence of users or citizens’ engagement in the co-creation of public services. Moreover, our review shows that there are only two conceptual publications on PSL in a digital context (Petrescu 2019; Trischler and Trischler 2022) and only one empirical study (Rösler et al. 2021). This empirical research contributes to the PSL literature by focusing on a specific digital service context, namely healthcare. The importance of context for value creation has been emphasized in the marketing literature on service-dominant logic (Vargo and Lusch 2008) and recent PSL research (e.g. Sønderskov and Rønning 2021).



**Figure 1.** Value co-creation between service users and PSO in a digital technology context. Source: Authors

There is a lack of research on health services in a digital context from a PSL perspective. Regarding the recent call for an evaluation of Osborne et al'. (2021a) five elements of value model and following Trischler et al'. (2023) premises on value co-creation, we suggest involving an intermediary body who can facilitate interactions and balance collective and individual interests between different groups of service users in a digital context in relation to these 'five interacting elements of value'. We argue that an intermediate role is important, since digital participation requires additional attempts to avoid favouring groups that are more confident with digital resource use. Service users in a healthcare service correspond to a collective form of users, such as citizens, health personnel and patients. In Figure 1, we illustrate the interaction between the PSO intermediary and service users' groups in terms of these five elements of value in the digital technology context (Figure 1).

This model will be further evaluated in the context of digital health services. Before that, however, in the next section, we describe how digitalization has altered the interactions between public administration and service users in value creation.

## 2.2. Digitalisation of public services

Digital era governance or digital governance places the human – computer interface at the heart of government agencies (Dunleavy et al. 2006; Janowski 2015; Lips 2019; Margetts and Dunleavy 2013). However, it requires fundamental changes in the interaction between individuals and public administration and demands regular utilization of digital means in their communication (Milakovich 2022; Panagiotopoulos, Klievink, and Cordella 2019; Wilson and Mergel 2022). The definitions of digitalization are many and context dependent. Digitalization of public services involves transformation of the relationships between service provider and users, reshape the work of public administration, and also change the nature, content and quality of the service delivered (both positive and negative outcomes) (Andersson, Hallin, and Ivory 2022). This development has created new capabilities and improvements for the public sector, businesses and people's lives (Dobrolyubova, Klochkova, and Alexandrov 2019; Martin 2008). However, digital technology recognized as an 'operant resource' is understood as a resource that can interact with other resources to contribute to the creation of value, and it may or may not be integrated by service users into their own value-creation process (Lember, Brandsen, and Tonurist 2019). Trischler and Westman Trischler (2022) argued that such integration is not only dependent on the user's motivation to do so but also on whether the user has actually access to other resources required for the effective use of digital technology (e.g. knowledge, platform, tools, networks, etc.)

Since public services operate in a different context from private sector services, they follow a different path in applying digital solutions (Milakovich 2022; Ribeiro-Navarrete, Saura, and Simón-Moya 2023). Moreover, they require different approaches to citizens' and users' involvement, as one size does not fit all. Nowadays, digital technologies provide advanced ways for PSOs to interact with citizens in the creation and delivery of services. Nevertheless, citizens' participation requires the capacity and skills of public administration to absorb and include their feedback in its negotiations and policy-making processes (Bertot, Estevez, and Janowski 2016).

In the public management literature, value co-creation refers to the inclusion of multiple actors and service users to utilize their competencies and resources to provide a better solution to a shared problem (Osborne 2018; Rösler et al. 2021; Skälén et al. 2018). From this perspective, the creation and provision of public services no longer take place in silos; rather, such complex processes require collaborative actions, including public networks embedded in an institutional context (Eriksson et al. 2020). It is believed that such diversity of perspectives may create more user-friendly, proactive and personalized public services (Osborne 2020).

Nevertheless, this collaborative approach to value co-creation demands that public service managers and other stakeholders change their perceptions of the role of users towards more user-centred. Some of the PSL research highlights that service users and citizens are the ultimate value makers and that public officials can only support them by offering and integrating resources (Osborne and Strokosch 2022; Rønnebak et al. 2022). In turn, this issue has been criticized for the lack of flexibility in the roles between organizational actors and users involved in value co-creation (Trischler et al. 2023). Osborne et al. (2021b) recently suggested that public managers may play different roles such as appreciate, engage, facilitate across three levels: institutional (macro), service (macro) and individual (micro). Managers at the macro- and meso-

levels are mainly responsible for the promotion of societal values and the engagement of resources in co-design and delivery processes with diverse organizational actors. In turn, the micro level actively engages the individual service user as well as other stakeholders (such as friends or family), citizens and service staff. However, the use of digital technology in such a process may modify the ways of value creation at the micro level by enabling or disrupting the active participation of service users and other stakeholders (Cordella and Andrea 2018). Therefore, we claim that the digital technology context creates conditions for better user engagement but thus requires a support from intermediates or super-users who can act between service providers, service users and other stakeholder.

### 3. Methodology and data

This study draws on insights from a multiple case study (Yin 2018) of six projects of digital health services in Norway that seek to elucidate how does the digital technology context alter service users' engagement in the process of value co-creation. Moreover, we attempt to explain what the implications of value co-creation in a digital technology context for public administration/PSOs are. The selected projects were at different stages of development, both completed and in progress (see Table 1).

#### 3.1. Case presentation and selection

Health services are highly relevant for investigating the influence of digital technology on user involvement in value co-creation. Healthcare is one of the main public sectors in which digital technologies have been adopted (e.g. Agarwal et al. 2010; Kraus et al. 2021; Marques and Ferreira 2020). Over the last few decades, the Norwegian government has strongly promoted the use of digital technology in the health sector (Saunes, Karanikolos, and Sagan 2020), which makes the country a well-suited case for our study. Responsibility for primary care is handed over to the 357 municipalities (2024), while the state is responsible for the provision of specialized care through four regional health authorities (for more detailed overviews, see Martinussen (2013).

Norwegian municipalities have recently (2017–2022) established 11 regional governance networks to make digitization faster and provide better digital services for their residents and businesses. These governance networks consist of all the municipalities in the county, the Norwegian Association of Local and Regional Authorities (as coordinator between municipalities) and the county governor (as observatory). Moreover, these networks coordinate different types of projects on the digitalization of welfare, health and education. The selected case projects on digital health services are linked to four out of these 11 Norwegian governance networks (127 out of 357 municipalities). We used a diverse case method as a case selection strategy to achieve maximum variation along relevant dimensions in selected projects (Eisenhardt 1989; Seawright and Gerring 2008). The selected case projects provide variance along different dimensions of the phenomena being studied. We used the following two criteria in case selection. The first criterion was that the service users in the projects represented different but related target groups (medical staff, patients, their relatives and citizens/society). The second criterion was that the projects had different goals and durations but focused on digital health services.



**Table 1.** Selected projects on digital health services coordinated by four Norwegian governance networks.

Project (P) name	Period	Purpose of the project	Target group/service users	Complexity (involved actors)
P1: ICT Seniors	2021–2022 (Final phase)	To increase digital competence among elderly.	Main target group: elderly	Regional project: 2 municipalities, county council, county library, library, pensioners' association
P2: Common Municipal Journal (FKJ)	2021–2023 (Middle phase)	To provide health personnel with effective solutions for the allocation, administration, performance, and documentation of healthcare.	Main target group: health personnel	National project: national authorities, KS and eight partner municipalities
P3: Welfare technology program: *Digital remote follow-up /previous medical distance follow-up *Electronic medication dispenser *Active and participating seniors	2012–2021 (Project completed) (2020 COVID-19 patients) (Project completed)	Better physical and mental health, better patient experience and lower cost of healthcare.	Main target group: patients with different diagnosis (kols/COPD, heart failure, diabetes, mental health, combination of these; COVID-19) Health personnel	National project that consists of six regional projects till 2021: municipalities, hospitals, and family doctors (GPs)
P4: From Isolation 2 Inclusion	2020–2025 (Early phase)	To enhance innovation and good flow of health-related data in social service delivery.	Main target group: patients (different diagnostic groups) Health personnel Citizens	International project: tree regions from tree countries, university hospital (Center for Connected Care), companies with different roles
P5: Welfare technology program: Innovation partnership	2020–2004 (Middle phase)	To solve challenges faced by healthcare professionals today and simplify usage of technology.	Main target group: health personnel	Regional project: 22 municipalities, hospital.
P6: Digi-health centre	2021–2022 (Early phase)	To offer secure digital communication and digital services for different users' groups.	Main groups: employees and citizens (users of the health centre service, the midwife service and the school health service)	Regional project: 12 municipalities, KS

Source: Authors.

### 3.2. Data collection

The data in this study was primarily collected via semi-structured interviews conducted with 11 project managers and one coordinator in Norwegian governance networks between 2 March and 8 April 2022. Since the COVID-19 pandemic resulted in unprecedented challenges to conducting in-person interviews, the interviews were mostly conducted digitally through the communication platform Teams, and one was



conducted via telephone (in total 12 interviews, lasting approximately 1–1.5 hours). The interviews were recorded and then transcribed. As information on digital health projects is not always updated/available on networks' webpages, we used a snowball method to identify potential interviewees. This technique allowed us to identify interviewees who were especially knowledgeable or experienced with digital health services. We invited project managers from four out of 11 regional governance networks that coordinate digital service projects to participate in the study. The other seven networks could not participate due to the lack of a project portfolio for digital health services (six networks), and the lack of capacity caused by the pandemic and internal organizing (one network). The number of interviewees in each network differed (network A = 5, network B = 2, network C = 3, network D = 2) and corresponded to the number of projects on digital health services in the network.

### **3.3. Interview guide**

Semi-structured interviews engage a combination of closed- and open-ended questions, often supplemented by follow-up why or how questions (Adams 2015). The interview guide relates to the theoretical model used in this study (Figure 1). Thus, we asked about 1) project organization and participants (PSO, managers and users); 2) users' involvement in different phases of value co-creation (i.e. definitions of users, users' engagement in co-design, co-production, implementation, application of digital technology to users' engagement, what facilitates and hinders users' involvement); 3) evaluation of services (i.e. utilization of various methods), user experience, user satisfaction, user life experience, recruitment of test users, application of digital technology to evaluation and testing and experience from other similar projects; 4) capacity building, communication and training/guidance of users (i.e. methods, information dissemination, utilization of digital technology, reactions and tensions with users during training and communication); and 5) societal values or potential benefits of digital solutions.

### **3.4. Data analysis**

To analyse the data, we used the coding process suggested by Hsieh and Shannon (2005), which is based on direct approach to qualitative content analysis. The purpose of a directed approach to content analysis is to 'validate or extend conceptually a theoretical framework or theory' (Hsieh and Shannon 2005, 1281). This method is used to analyse various types of textual data, such as written documents or interviews (semi-structures interviews in this study). Previous studies on PSL conceptualizing the five elements of value (e.g. Osborne, Nasi, and Powell 2021) and digital technology (e.g. Petrescu 2019) were useful for identifying variables as initial coding categories. Our strategy was to read the transcribed interviews and highlight those parts of the text that seemed to be related to the predetermined codes: the five elements of value and the digital technology context. We then reanalysed the data after the initial coding process. The data that was not highlighted in the initial step was then considered in the second step as to whether it could be combined as a subcategory of existing code or create a new code. Finally, we agreed on the

new codes involving different user categories, service organization (involved actors and their roles) and service coordination/management. The content analysis was conducted manually by two researchers. Although we considered using NVivo, we believed that manual analysis was more accurate in this study because we could read all transcripts in detail.

## 4. Findings

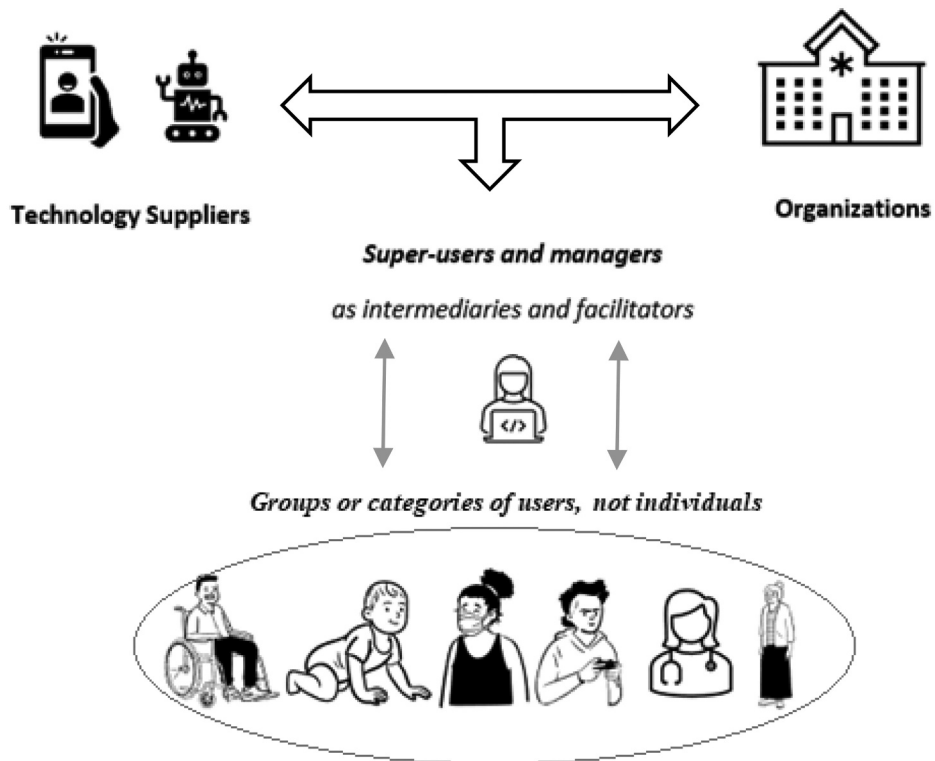
### 4.1. *Groups of users in a digital context*

Before presenting the results, we need to clarify who the service users in our study were. The selected projects for this study demonstrate distinct target groups of service users. First, service users refer to patients with various diagnoses and their relatives as well as healthcare staff (doctors, nurses, midwives, administrative staff, etc.). Second, 'service users' refers to society and citizens who can benefit from a digital service if it is needed (see P4 in Table 1).

According to our interviewees, it is difficult to define 'user', as it can mean many things: 'As in all other projects, it is an endless dilemma because there are so many users. Both employees, citizens in general and patient groups' (Interviewee 4); 'everyone who receives healthcare through decisions in all municipalities' (Interviewee 9). However, it is easier to distinguish a target group of users in a project in which they partake. According to interviewee 4: 'we look at patient groups as the main users' or 'home nursing and those who work in the home care service. Those who use digital home follow-up we refer to as users' (Interviewee 4). One project manager suggested a potential group of future users: 'It is a goal that managers also become users . . . . They can make decisions based on aggregated data. But we are not there yet' (Interviewee 2).

As illustrated, digital health services are designed to meet the collective needs of individuals corresponding to different categories of users (see Figure 2). In addition, the digital context determines an additional, intermediate group of 'super-users' /agents who must enable the use of these services among service users. One of the interviewees described super-users as 'those who are trained and follow up the use of the digital technology' (Interviewee 10). 'Super-user' is an ordinary healthcare (nurse, doctor) or administrative employee who has both health expertise and computer skills. These key people support or advise their colleagues and patients in the use of digital services.

Moreover, municipalities offering digital health services do not act on their own; instead, several diverse actors are involved in different interdisciplinary collaboration-distribution networks. This is also evident in the PSL research emphasizing that value negotiation concerns all involved stakeholders. In our study, we can distinguish three types of such actors: organizational (different administrative representatives from municipalities, county councils, regional hospitals, healthcare centres, libraries and user organizations who are involved/have different roles in value co-creation with service users), autonomous technology suppliers and categories of service users' groups (doctors, nurses, midwives, administrative staff, patients, relatives and citizens; see Figure 2).



**Figure 2.** The loci of digital health services. **Source:** Authors.

#### **4.2. Value co-creation in the digital technology context**

Our results demonstrate that digital technology alters service users' involvement in value co-creation. Moreover, the findings illustrate that PSOs' intermediaries and super-users play a unique role in the co-creation of value with service users and other stakeholders in a digital technology context. Based on interviews with project managers, we present the results in the context of the five elements of value creation (for a summary of the findings, see [Table 2](#)).

##### **4.2.1. Experience/short-term satisfaction**

Our data shows that most of the project managers do not employ a regular evaluation of service users' satisfaction or experiences with co-creation of digital health services. Rather, the evaluation of public services is based on informal and individual feedback from service users, or other relevant feedback from various reports: *profit realization report* (nor. Gevinstrealiseringsrapport 2021, the Norwegian Directorate of Health), *final reports on digital home follow-up* (2018–2021) from different regions in Norway, or *experience report on GP involvement and implementation of piloting of digital home follow-up* (2022). According to the project managers, most of the healthcare employees are rather reluctant to learn and use the new technology in the beginning, as they are unmotivated and struggle with digital competence: 'Digital competence among employees in the health service is good when it comes to social media, etc., but there

Table 2. Five elements of value creation in digital health services.

ELEMENTS/ PROJECT	EXPERIENCE/ SATISFACTION	IMPACT	LIFE EXPERIENCE	CAPACITY CREATION	SOCIETAL VALUE
P1: ICT Seniors	Lacks regular satisfaction tests. Observation of digital festivals for seniors. Evaluation meetings with the library and the seniors.	Positive impact after festival about digital training and competence for the elderly. Seniors see the need for digital tools.	Notice significance of digital technology in many aspects of seniors' life.	Elderly can use security alarms, or digital supervision to relieving the home service. They are flexible and manage their own daily life.	Elderly lives at home (not public institution) as long as possible.
P2: Common Municipal Journal (FKJ)	Better citizen experience and increased trust to municipal health and care services.	Positive impact for healthcare professionals: less time looking for and compiling information about patient. Better decisions about patient course and treatment. Reduce unnecessary examinations and appointments.	Effective solutions for the allocation, administration, performance and documentation of health care by health personnel. Better collaboration between primary and specialist health services.	Less administrative burden for health personnel.	Medical record solution for municipal health and care services that link doctors, emergency services, home care services and other services better together with the rest of health in Norway. Fewer unwanted incidents in municipal health and care services. Better ICT security and easier protection of privacy.

*(Continued)*



Table 2. (Continued).

ELEMENTS/ PROJECT	EXPERIENCE/ SATISFACTION	IMPACT	LIFE EXPERIENCE	CAPACITY CREATION	SOCIETAL VALUE
P3: Welfare technology program	Own test centre to test technology. Interviews with different groups of users. Meetings, telephone conversations, experience reports, user surveys (every quarter) and final evaluations. Increased patients' confidence Complexity of illnesses makes challenges to use digital services. Health personnel is sceptic to many existing record systems. New patients are more positive to use digital technology.	Positive effects of COVID-19 on the digital competences among patients. Negative impact of COVID-19 on health service: less incentives, more tasks, less time.	Essential to reduce the time a patient needs health care until the time s/he dies. Better awareness of patients owns health (understand the symptom picture better, and avoid hospitalization) Better confidence/trust to healthcare. Patients become more social and involved in the family and surroundings.	Digital solutions helped solve the problem of capacity across municipalities through training and competence programs necessary to following up patients.	Need for a shift from reactive to proactive health. Saved costs, better services, increased quality and equality (remote areas), safer services
P4: From Isolation 2 Inclusion	Satisfied about the development of the service that help to control their own health and health data. Lacks systematic testing of healthcare professionals' satisfaction. Informal feedback through workshops in the beginning.	Very positive, but the feedback is from few people so far.	Lacks, early phase of project.	Lacks, early phase of project.	Live longer and safer at home Improve knowledge and competence of patient health, ageing population. Slow down the development of
P5: Welfare technology program: Innovation partnership		Both positive and negative consequences on digital participation in projects caused by COVID-19 (lack of informal communication, but increase participation from remote areas)	Easier and faster use of digital health systems for healthcare professionals.	Administration of different health systems cause extra work for healthcare professionals. Digital technology reduces the capacity problem	Development of an ecosystem enabling the use of different technologies from different suppliers as a uniform system for employees (less complicated for end-users)

(Continued)

Table 2. (Continued).

ELEMENTS/ PROJECT	EXPERIENCE/ SATISFACTION	IMPACT	LIFE EXPERIENCE	CAPACITY CREATION	SOCIETAL VALUE
P6: Digi- health centre	Lacks assessment and feedback from users.	No resistance, but it takes time to get into a routine and work it out. The positive impact of COVID-19 on digital communication.	Lacks, early phase of project.	Focus on faster communication than capacity building.	Flexible and more effective communication between users.

Source: Authors.

has not been good enough digital transformation within the health service ...' (Interviewee 3) or 'I find that employees are satisfied, but it depends on the technology. I think you might want to measure more dissatisfied people at the start, and as you learn it well and can see benefits, it will get better' (Interviewee 11). Moreover, according to Interviewee 3 public sector must 'ensure good enough [digital] competence among personnel and managers to be able to take care of citizens' (Interviewee 3). As illustrated, digital technology context puts additional burden on service users and managers in value creation, but the time dimension, digital competence and technology influence users' experiences and satisfaction with digital services. Interviewee 10 emphasized that the experience with digital health services depends on the type of technology, as some services have technical problems such as security alarms (e.g. poor battery life): 'It leads to irritation for the healthcare staff because they have to follow up on technical challenges'; while when it comes to digital control or medication dispenser, it worked well: 'We have several feedbacks where there are only smiles and applause for the work done, and that they [patients] also get to take part in the ongoing digital development'.

#### **4.2.2. Medium/long-term service outcomes**

This second element of value combines both the medium- and long-term effects of a public service. In this study, we connect this element with the impacts of the COVID-19 pandemic on the digital literacy of service users and digital solutions for health services in municipalities. All of the project managers declared a positive impact of the pandemic on digital skills development among health personnel, patients and society as a whole. As Interviewee 7 mentioned, 'I think that we have received some free help during the COVID-19 [pandemic], where the use of digital tools for meetings and surveys was more accepted. ...' However, some interviewees emphasized the problem of digital fatigue immediately after the pandemic: 'Many patients have probably become digitally mature. However, it is going too slowly in municipalities and health services ... High pressure on employees, managers and less money are hindering digital development, not accelerating it' (Interviewee 2). Although pandemic-induced digitalization has resulted in improved digital competences of many service users and other stakeholders (long-term impact); the period after the pandemic has led to digital fatigue/exhaustion of healthcare staff in public administration (medium-term).

#### **4.2.3. Whole-life impact among service users**

Third, the whole-life impact element corresponds to the influence of a digital public service on the whole-life experience of a service user. According to project managers, the benefits of digital solutions on life experience (whole-life impact) are recognized in many aspects of service users' lives. The interviewees stressed better awareness of digital technologies among the most vulnerable target groups, such as the elderly: 'The elderly are getting smarter and smarter, and Kari [female name] at 89 has no problem understanding technology. This is because there is a good level of competence among super-users who give good advice and good follow-ups' (Interviewee 3). Project managers claimed that service users (patients) were more responsible for their lives and had greater insight into and understanding of their diseases through digital



means such as apps and videos. This finding illustrates that digital health services bring benefits to the whole life of service users (patients) through intermediates. In addition, digital technology has a positive impact on collaboration among diverse groups of health personnel (e.g. access to patients' data; projects P2, P4 and P5 in [Table 1](#)). Still, there are some challenges. According to Interviewee 5, 'The challenge is to scale and get it [digital service] out in larger volumes because it requires a lot of administration'. This is also connected to the next element, which describes capacity creation among service users.

#### **4.2.4. Capacity creation**

The fourth element of value concerns capacity creation for future change. The results suggest that digital technology brings both opportunities and challenges for PSOs and service users. The interviewees expressed how digitalization of public services has helped public health sector to solve capacity problems and reduce costs, but such savings are necessary to serve more patients today and in the future: 'It's not about saving money, but about helping more people with the same resources' (Interviewee 11). For instance, in the project 3 ([Table 1](#)) digital home follow-up provides remote monitoring of patients who have a high risk for hospital appointments. Patients communicate via digital means with healthcare personnel that is in a different location.

Interviewee 7 saw another problem for both public administration and service users: 'The hours we save by using digital means are eaten up by the increase in the number of more complex users we must use resources on'. In addition, interviewee 7 mentioned several quality benefits with digital technology (that corresponds with the final report on Digital home follow-up, 2018–2021) such as 'increased independence, self-control and responsibility for your [patient] own life and health, which also gives patients insight into their own illnesses in a completely different way than before'. This finding illustrates how digital technology is empowering patients to take control of their health and increase their awareness of diseases. In turn, one of the project managers said that the complexity and diversity of digital technologies used in the health sector may create challenges for service users (especially healthcare personnel). Therefore, PSOs need to invest more time and resources in training healthcare personnel: 'If you use many different technologies, you have to deal with many different systems, and that takes time in terms of training of employees and so on' (Interviewee 5). Despite investments in training, digitalization brings profits for the future: 'One patient was clear and said that before he received a digital home follow-up, he was ill for up to a month, but after we came with this offer [home follow-up], he was sick for a maximum of four days' (Interviewee 3). This finding shows that digital technology has the potential to improve capacity in the healthcare sector and patient well-being. Additionally, Interviewee 3 mentioned that patients with some digital competences and living far from primary care can benefit from digital solutions such as digital home follow-up/telemedicine for healthcare. This gives both the patient and the PSOs a number of benefits, such as fewer trips, saving time waiting for a home visit, greater freedom, safety and quality in everyday life, and lower costs. These results highlight how service users can create value themselves (Osborne, Nasi, and Powell 2021).

#### 4.2.5. Societal values

Finally, societal value takes a broader perspective on service users. It means that digital public service adds value to society, not only an individual service user or category of users. All the project managers suggest that digital technology brings several societal values: lower costs, better services, increased service quality and equality especially in the remote areas or small municipalities, safer services, living at home longer and reduced use of various health services. All these opportunities help face the future demographic and capacity problems in the healthcare sector mentioned above: ‘We believe that using technology will create more capacity in the health service’ (Interviewee 10); ‘When we get so many more users in the next 20 years, we will not be able to afford to provide services in the same way, so it is important to use technology. It is not about saving money, but about helping more people with the same resources’ (Interviewee 11). However, as one of the interviewees underlined, the health services need to shift the focus from reactive to more proactive because ‘through technology, one can predict much more, rather than being there after the injury has already occurred (such as security alarms that only help after the injury has occurred) . . . . Major structural changes are needed, as well as the creation of new professional models that can facilitate prevention’ (Interviewee 2). These findings show that digitalization of health services adds value to society. However, as shown in the remaining four value elements, the digital technology context also poses challenges for value co-creation. Therefore, we argued that the PSOs’ intermediaries and super-users are necessary resources in value creation to facilitate interactions and balance collective and individual interests between different categories of service users and other stakeholders.

### 5. Concluding discussion

Despite research promoting the shift from agency-centred to citizen-centred public service delivery (Milakovich 2022), the engagement of service users in value co-creation needs empirical evidence. Scholars must take greater responsibility and engage more effectively with policymakers and professionals to overcome barriers and challenges with service users’ involvement. The ongoing development of digital technology provides unique opportunities for governmental agencies to enhance their interactions with a broader range of participants. As Keast (2021) stressed, these new modes of collaboration through digital engagement will shift power relations and shape new thinking, behaviours, systems and logic in public administration. Given recent research development on service user involvement in value co-creation endorsed by the PSL approach (see the supplemental data) and the ongoing technological advances (Clifton, Díaz Fuentes, and Llamosas García 2020), this article aimed to gain insight into how PSL is suited and can adapt to the evolving landscape of the digitalization of public services.

In this study, we evaluated the framework on five elements of value by Osborne et al. (2021a) to elucidate how the digital technology context alters service users’ involvement in value co-creation and the implications for PSOs (Figure 1). Based on our analysis of six projects on digital health services from four Norwegian governance networks, this study found that digital technology facilitates service users’ involvement in value co-creation (especially in turbulent times such as the COVID-19 pandemic), helps solve capacity problems in the

healthcare sector, improves users' experiences with public services, empowers service users (patients) to take care of themselves and cultivates several societal values (e.g. quality of services, lower costs). However, to realize all five elements of value and meet the current and future challenges (e.g. improve digital competences), value co-creation in a digital technology contest requires additional resources, such as the PSOs' intermediaries and super-users who facilitate and guide service users' participation. Super-users are digital service experts and have the capacity to coordinate and inspire/engage individual user, stakeholders and citizens.

The PSL literature shows that the traditional role of managers and professionals as the only value creators has changed (Osborne et al. 2021), and PSL perceives service users as value co-creators. It means that value is created collaboratively between different stakeholders (including service users). To take advantage of the opportunities offered by new technology, public sector managers are required to develop 'a combination of digital and human skills, mainly related to the ability to communicate effectively in a digitalized context' (Cortellazzo, Bruni, and Zampieri 2019, 17). Based on our results, we argue that such digital managers are crucial for improving users' participation in service co-creation because they can facilitate processes and build digital awareness among them in broader institutional settings via digital means.

Our findings reveal that digital public services are often created with different target groups of users such as patients and healthcare personnel. Obviously, such an emphasis on groups rather than an individual service user may seem to contradict the increasing prominence of personalized healthcare. Like many other countries, personalized medicine is becoming popular in Norway. In 2016, a national strategy for the implementation of personalized medicine in public healthcare was launched. It aims to build expertise and coordinated, knowledge-based developments in the field of personalized medicine and to stimulate research and innovation (Norwegian Directorate of Health 2016). However, the development of personalized medicine is still in its early days in Norway, and personalized medicine is a concept that first and foremost involves specialized health services rather than the primary health services.

Despite current trends in research involving PSL and digital technology (e.g. Petrescu 2019; Rösler et al. 2021; Trischler and Trischler 2022), this study provides the first empirical evidence on five elements of value in the context of digital healthcare services. According to our interviewees, digital technology is an essential mechanism for capacity building, dissemination of information, feedback loop, knowledge sharing and communication between actors co-creating value. Although this study presented the perspectives of managers on service users rather than service users themselves, our interviewees have extensive knowledge and based their arguments on diverse project evaluations and research reports.

Finally, although turbulent times such as the COVID-19 pandemic has led to unprecedented challenge to public health, it has also been a lifelong experience for the healthcare users, as it has increased digital literacy and awareness of users' involvement in value co-creation. Our results emphasize the benefits of digital platforms for active users' participation. Specifically, they reveal that digital communication was the only means of contact between organizations, technology suppliers and service users. According to Meijer and Boon (2021), digital platforms are not only technological systems but also a new organizational model that connects various users (patients and healthcare personnel in our study) and requires coordination of their interactions to achieve value.

This study also has some limitations. First, our primary data represent a managerial (not user) perspective on the five elements of value. Therefore, future studies might involve the service users' perception to gain more insight into their roles in both value co-creation and also value co-destruction in a technology context. Second, we used a small number of case projects and focused on only one sector. We recommend that future studies evaluate the five elements of value conceptual model in other sectors and countries (outside Scandinavia and the United Kingdom). This would allow us to better understand the complexity of value co-creation in a technology context.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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