



Frontline workers' role in digital self-service co-production: Channel promoters, digital helpers, or intermediaries

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Abstract: When public services move online, citizens are expected to serve themselves on digital platforms and enrol in public services through self-service procedures. In this digital encounter, many citizens struggle to live up to the “self” in self-services and seek in-person assistance from public professionals. These professional actors play an essential role in enabling the co-production of self-services for citizens who struggle to be truly self-serving. This article explores the frontline workers' roles in self-service co-production when interacting with citizens seeking help in the service procedures. Service interactions have been studied in two meeting centres of the Norwegian Labor and Welfare Administration. We have conducted observations of office interactions in general and at digital self-service stations in particular. Interviews with public officials have complemented these observations. We use intermediation and co-production theory as analytical lenses in our data analysis. The findings show that the role of frontline workers can be both flexible and narrow in nature and that they take on the role of intermediaries when acting as a bridge between the analogue world and the digital domain. We also see that the intermediating role frontline workers take will vary and is influenced by organisational, personal, and external circumstances that can enable or restrain the co-production of self-services.

Keywords: Co-production, Digital self-service, Frontline worker, Intermediaries, Roles

1. Introduction

Government strategies that foster the implementation of digital public services are on the rise as they offer promises for public sector organisations and citizens. Such strategies often promote self-services and co-production as a part of a broader digital agenda to achieve greater efficiency and cost savings in public institutions (Margetts & Dunleavy, 2013; Mergel et al., 2019). It is argued that self-service gives citizens independent access to government services mediated through self-service technologies (SSTs), channels or modalities that include the Internet and digital devices (Kernaghan, 2012). Self-service platforms, kiosks or stations can favour citizens' service access, efficiency and cost savings for the public sector (Jeffares, 2019; Schou & Pors, 2019). Government websites and call centre assistance commonly support these self-services (Meijer, 2012). In this new service arrangement, citizens migrate to digital channels in their public encounters that traditionally took place in analogue settings (Madsen & Hofmann, 2019). They become digital self-service co-producers (Distel & Lindgren, 2023), directed to use online services from home or at public service offices (Schou & Pors, 2019). Prototypically, citizens are supposed to interact with digital technologies on their own, as self-service refers to. These rearrange the roles and relations between citizens and state actors (Gil-Garcia et al., 2018; Schou & Pors, 2019).

The concept of co-production has increasingly been used to denote such phenomena, albeit being the topic of ongoing scholarly debate. Co-production is commonly defined as a joint provision of services involving several actors (Brandsen & Pestoff, 2006). Studies have shown that technology, citizens and public officials play different roles in co-producing digital self-services during co-delivery (Ryden et al., 2023). Digital government can potentially engage citizens in service interactions, transforming them into active participants and co-producers of services (Distel & Lindgren, 2023; Falco & Kleinhans, 2019). Self-services extend citizens' ability to co-produce their public services by providing direct input into the service delivery (Ryden et al., 2023). In this process, citizens conduct work previously done by governments, thus changing public professionals' roles in delivering services and limiting in-person service interactions (Schou & Pors, 2019).

However, public sector employees still provide some assistance onsite, depending on the national context and government strategies (Höglund Ryden & De Andrade, 2023). Scholars such as Edelmann and Mergel (2021) and Mergel et al. (2019) have emphasised the role public administrators play in realising digital government, as they participate and hold responsibility as co-producers in its implementation. However, it is crucial to understand the specific role that frontline workers have as co-producers in service delivery (Ryden et al., 2023), as it has proven to change the responsibilities of frontline workers in public service centres (Schou & Pors, 2019). Often, these workers contribute to service delivery behind the scenes, with their involvement going unrecorded by the system (Rydén et al., 2023). In this article, we focus on the delivery stage of public services while recognising that co-production can be understood more broadly when studied across the entire service cycle (Sicilia et al., 2016). We analyse data from two case studies conducted in two public service centres

in the Norwegian Labour and Welfare Administration (NAV), focusing on public professionals', particularly frontline workers' role in on-site self-service that play out in the physical interactions at self-service stations at the office. We aim to (1) unpack the role expectations placed on frontline workers in self-service delivery and (2) explore how these roles are fulfilled in practical self-service settings. We investigate these issues through two case studies in NAV. To answer our research questions presented in the method, we draw on observations, conversations, and interviews with frontline workers, caseworkers, and managers at NAV, as well as observations of the assistance requested by citizens during the self-service process.

We combine the concepts of co-production and intermediaries to analyse our data and explore the role of frontline workers in digital self-service based on the argument that intermediaries can enhance human-computer interaction in government operations, thus promoting co-production (Williamson, 2014). Intermediaries are individuals who assist and facilitate service interactions (Sorrentino & Niehaves, 2010). While most studies on intermediation in digital government focus on intermediaries outside of the organisation (Van Schalkwyk et al., 2016; Dombrowski et al., 2014; Sein, 2011), fewer studies examine how intermediation unfolds within organisations. By viewing frontline workers as intermediaries within their service organisation, our study offers a novel perspective on role configuration in digital government (Margetts & Dunleavy, 2013).

Our findings show that when frontline workers assist citizens with digital self-service, they act as intermediaries, engaging in the co-delivery of those services in collaboration with citizens (Ryden et al., 2023). In this intermediary role, frontline workers take on a new function, which we conceptualise as internal (unofficial) professional intermediaries. In hybrid service settings, they bridge physical and digital realms, making important contributions to the co-production process governed by organisational motives (Ryden et al., 2023). Acting as brokers or boundary agents, they are intermediaries facilitating the exchange of knowledge (Perry & Smit, 2023) and performing activities that enable service access (Sein, 2011). However, our cases reveal that their practices can both enable and limit the co-production process in digital self-service. How frontline workers perform their role also varies based on organisational, situational, and external factors that have implications for service co-delivery.

Being among the few that highlight the critical role of employees in co-producing digital self-services, our study makes several contributions. First, it empirically shows how the roles of organisational actors evolve as public services move online, particularly in the context of self-service practices. Additionally, the study demonstrates how adopting these roles impacts the conditions necessary for co-production of self-services. Finally, we connect the intermediary discourse to co-production in a novel way. This is done by challenging the existing literature, which often views intermediaries as external third-party actors, by showing how intermediation occurs within rather than outside service organisations.

2. Theoretical background

In this section, we present the theoretical background grounded in intermediation and co-production literature. We will use these conceptualisations when analysing the empirical data on frontline workers' roles in self-service practices. First, the conceptualisation of co-production in digital self-services is presented, followed by the intermediation dimension.

2.1. Co-production and digital self-services

There is a broad spectrum of definitions of co-production which varies between scholarly fields. This makes it important to understand and contribute to the conceptual clarity of co-production. Within the service management literature, the concept of co-production is often associated with positive outcomes as it is assumed to bring about empowerment, ownership, and voice to actors in service procedures (Lember, 2019). The literature agrees that co-production is about involving actors outside (citizens) and inside (professionals) service organisations in the process of service delivery (Clifton, et al., 2020; Nabatchi et al., 2017). In a digital government context, co-production has been referred to as the collaborative production and provision of public services to deliver public value (Cordella et al., 2019), foster the common good (Meijer, 2014) and provide input to the individual service delivery (Rydén et al., 2023). In this sense, co-production is about different actors collaborating in joint service provision and providing input to the service process. For example, this is the case when actors inside a service organisation (public officials) and outside (citizens) contribute with knowledge, actions and information needed to shape the service delivery process (Ryden et al., 2023). Some scholars differentiate these actors in co-production as state actors – professionals within service institutions – and lay actors – private individuals who contribute to the service process based on their own interests (Nabatchi et al., 2017). In the context of digital self-services, the role of the technology actor has also been highlighted (Ryden et al., 2023). This involvement of actors can occur at various stages of the service cycle but is often associated with transforming how public services are delivered in a shared production process (Brandsen & Pestoff, 2006).

It is argued that co-production resides within the service practice (Osborne et al., 2016), making the co-dimension equally present in the context of digital self-services, which is the core of our study. Self-services enable co-production through the involvement of different actors, humans and digital, who all have distinct roles in the service delivery process (Rydén et al., 2023). In its original form, self-service refers to the access to public services through digital technologies without the involvement of government employees (Jeffares, 2019). In many cases, this means the reduction of face-to-face interaction between citizens and service workers in favour of online transactions and interactions (Madsen et al., 2022). However, in its true sense of the wording “self-service”, such processes should altogether bypass personal interactions, regardless of whether such interactions are analogue or virtual. This will, in turn, alter the roles and expectations of all the actors involved in the service process (Lindgren et al., 2019).

Digital services also enable actors to be in charge of their service procedure and get access to the services needed (Bovens et al 2002; Reddrick, 2005) and become empowered by service ownership

and responsibility (Lambert, 2019, 2018). In addition, digital self-services can be seen as more user-friendly than traditional analogue services as they simplify citizens' lives by offering more convenient service provision (Lindgren et al., 2019). For example, integrated one-stop-shop platforms can benefit many citizens by providing multiple self-services in one place while also setting the stage for proactive services that can benefit citizens (Scholta et al., 2019). However, it has been suggested that service characteristics play a role in determining the suitability of public services for self-service, which is crucial if citizens are to benefit from these services (Lindgren et al., 2024). This perspective is supported by studies indicating that digital self-service can challenge co-production in certain service contexts (Ryden et al., 2023). Edelman & Mergel (2021) address that organisational actors can create opportunities for co-production but also point out limitations in involving citizens in digital co-production. For example, when service processes fall short of human support, digital co-production's value gains can sometimes be overshadowed. The shifting responsibility towards citizens in digital self-services will create challenges for some individuals, particularly those facing complex life situations (Madsen et al., 2022; Breit & Salomon, 2015). Depending on the situation, some interactions may require the physical involvement of human professionals rather than relying solely on digital co-production (Lambert, 2018). Those seeking help in self-service situations do not live up to the "self-ideal" in self-service (Ryden et al., 2023) and may experience burdens in self-services that support from others can alleviate (Heggertveit et al., 2023; Höglund Ryden & De Andrade, September 2023).

When self-services distance experts from citizens, this creates challenges. While digital encounters aim to provide more user-friendly services, they also complicate service interactions (Lindgren et al., 2019) and change frontline workers' practices (Pors, 2015). Their engagement with citizens has decreased with their new role as screen-level workers as digital procedures take over and make human intervention more partial (Buffat, 2015; Bovens & Zouridis, 2002). This shift poses difficulties since the role of digital helpers is frequently designated to generalists with limited experience in the service area where they support citizens (Pors, 2015).

Although self-services aim to enhance access and participation for citizens (Jeffares, 2019), which reasons well with the potential of digital co-production (Lambert, 2018), these benefits may be challenged in practice. In "self-service politics", ideals of active citizenship are emphasised, with technology seen as a means to foster new opportunities for co-production (Eriksson, 2012). This narrative has led to an increase in self-service platforms framed as co-production initiatives (Polzer et al. 2022), visible in national digital strategies. In Norway, for example, this ideal has extended to local governments, where digital self-service is promoted to encourage active citizens to participate in the public service procedure (Astrup & Helgesen 2019).

However, to better understand co-production potential, we need to study the practicalities of policy implementations in a real self-service setting and understand the actors' roles. To explore the preconditions of digital co-production in self-services, we turn to intermediation theory to better understand the actors that, through their practices, bridge the digital and analogue world.

2.2. Intermediation

Intermediation in digital government

Intermediaries play an essential role for citizens with scarce resources to access digital government services (Sein, 2011). Helpers who engage in citizens' digital government matters have often been titled "e-government intermediaries" as they assist other citizens in accessing electronically provided information and services (Saylam & Yilduz, 2022; Dombrowski et al., 2014). Sein and Furuholt (2012) have framed these intermediaries as actors that can enable citizens to access government services and bridge the digital divide. Various intermediary actors are involved in the digital government service provision, serving businesses and citizens (Sorrentino, & Niehaves, 2010). While businesses that use digital public services typically turn to professional intermediaries, citizens often seek help from family and friends (Sorrentino & Niehaves, 2010; Agnihotri, 2023). These private or individual intermediaries (Sein, 2011) are to be distinguished from the organisational and technological intermediaries (Sein & Furuholt, 2012).

Private individual intermediation

The mistakes and confusion citizens encounter in adopting new technology have actualised a need for personal assistance in digital government service procedures (Agnihotri, 2023; Höglund Ryden et al., 2023). We understand those actors as individual intermediaries who can be family members and friends, acting as bridges between citizens and government in service interactions (Sein, 2011). The individual intermediation has been addressed from the perspective of "warm experts", which describes these intermediating actors as persons who share their knowledge and assist fellow citizens in digital procedures as they "mediate between the technological universal and concrete situation" (Bakardjieva, 2005, p.95).

Few studies have addressed how human individual intermediation practices impact citizens' service interactions or how they enable digital interactions (Madsen & Kræmmergaard, 2016). However, some studies show that access to digital government services can depend on intermediated assistance from citizens in similar situations of encountering self-service procedures (Höglund Rydén et al., 2023; Höglund Ryden & De Andrade, 2023). This individual perspective on intermediaries accounts for private actors, i.e. fellow citizens being actors outside the digital government service domain, rather than professionals who are tied to organisations or institutional practices. Others argue that when the recipients of government services are citizens needing support in private service matters, the intermediaries can be individuals and professionals within organisations (Sorrentino & Niehaves, 2010).

Organisational intermediation

From an organisational level of abstraction, intermediaries have been defined as "any public or private organisation that facilitates the interaction with customers, i.e. citizens or businesses" (Janssen & Klievink, 2009, p. 3) and as "organisations that act as brokers between two other parties" (Löbel et al. 2016, p. 336). In a more general sense, Van der Meulen et al. (2005, p. 3) define organisational

intermediaries by emphasising the relational dimension of intermediation as “any organisation that mediates the relationship(s) between two or more social actors”.

The organisational perspective focuses on intermediary service providers in the role of organisational entities that bridge the needs of service users by providing services and digital systems that mediate the service interaction between the parties (Sorrentino & Niehaves, 2010). For example, studies have shown how outreach workers in non-public organisations can act as e-government intermediaries by assisting their clients (citizens) with online service applications (Dombrowski et al., 2014; Agnihotri, 2023). Such professional intermediaries reshape organisational boundaries in the role of institutional carriers and relational agents that facilitate information flow, resources, and knowledge across formal organisational borders and as symbolic agents that embody tacit knowledge embedded in their intermediation performance (Sorrentino & Niehaves, 2010). However, they can create power asymmetries when mediating between individuals and digital government, as citizens might become dependent on the intermediary organisation (Sein, 2011).

Organisational intermediaries have been argued to be essential in bridging the digital divide as these actors can take on different roles that provide access to digital government services (Sein & Furuholt, 2012). Intermediaries can act as brokers as knowledge is exchanged between actors, and intermediation can also enable boundary crossing between actors in favour of co-production (Perry & Smit, 2023). Furthermore, they can enhance trust between parties in an e-government context by supporting and assisting users with new systems (Al-Sobhi et al. 2010). Organisational intermediaries can provide the right conditions for access (“facilitating intermediary”), sometimes access services on behalf of citizens (“direct intermediary”) and combine facilitation and directness, being framed as “enabling intermediation” (Sein, 2011). However, to our knowledge, there are no studies focusing on the organisational intermediaries from the perspective that they can operate within the same service organisation.

3. Method and case description

In this section, we present our research design, rooted in two qualitative case studies of self-service practices in the NAV. We conducted both observations and interviews with public professionals in NAV. The value of a research design based on two case studies lies in its ability to integrate multiple data sources, offering a rich, contextual understanding of a real-world situation. Complex dynamics that shape behaviours and processes can be revealed by triangulating data from interviews, observations, and documents within the specific organisational context of NAV. This deep, contextualised insight helps refine or challenge existing theories and supports the development of new frameworks grounded in real-world complexities (Yin, 2009).

3.1. The Norwegian case

During the last decade, Norway has undergone significant changes in how the government provides and administers public services, mirroring the changes in government digitalisation in Europe.

NAV, founded in 2016, has been an important player in realising digital transformation. Being Norway's most prominent government organisation, NAV administers a third of the national budget and provides state and municipal services to citizens (Askim et al. 2011; Christensen et al. 2014). When the Norwegian government unveiled a comprehensive digitalisation strategy in 2019, NAV had already embarked on digital transformation with key milestones in 2005, 2006, and 2010, including a web portal and the My NAV online service platform (Astrup & Helgesen 2019).

Norway's governance structure comprises a multi-level government with a central-local relations structure. This multi-level approach promotes efficiency, responsiveness, and citizen engagement in delivering public services (Baldersheim & Ståhlberg, 2002). As part of the broader goal to develop a digital public sector, the Norwegian Digital Agenda and Channel Strategy in NAV (NAV Horizon Scan 2021, 2021) aimed to encourage citizens to choose digital channels over physical meetings and in-office visits. The national-level strategies are mirrored in the local agendas that follow central directions. At the time of observations, this agenda was to increase the digital application rates at the NAV office. Therefore, the local agenda was a "digital first" approach evident at both NAV offices, especially the larger one. This meant that most citizens with a digital ID were directed to and expected to use the digital self-services when they came to the offices.

The offices that provide our cases represent two NAV offices that differ in size. At the time of the observations, the larger office had five employed frontline workers who served the citizens coming to the drop-in office. The smaller office had two employed frontline workers and one itinerant case worker who changed depending on the day. This third person who helped serve the office became an occasional participator in the work practices of the drop-in office. In general, the frontline workers that serve the local drop-in offices are employed by the central level in NAV while operating at a local level, meaning that some employees operate under different rules and conditions. Although the two offices differ in structure, they generally encompass a range of similar functions and operations, spanning responsibilities from a wide range of welfare services (Baldersheim & Ståhlberg, 2002; Brennan et al., 2017).

Both offices provide a computer area that we refer to as self-service stations. In this area, citizens can log on to nav.no to apply for services, send information to NAV and collect information and documentation online. However, some of the actions that the self-service stations allowed citizens to perform differed between the offices, as the functionality of saving documents to the computer was only possible at the bigger office. In the service setting of the larger NAV office, the frontline workers were on-site generalists with knowledge about service portfolios. In comparison, at the smaller office, the caseworkers who work at other divisions within NAV occasionally served the office and were experts in specific service areas.

According to the office protocol and the role descriptions of frontline workers, they are responsible for guiding citizens from the knowledge of generalists at a nav.no level. They are supposed to assist citizens who need their help the most. Citizens who qualify for assistance are framed as those who 1) cannot use digital self-services and 2) do not have a designated contact person at NAV. To fulfil the role, the frontline workers need to know a lot, have a broad understanding of the services

within NAV, and be updated on service portfolios at nav.no. Some service areas are supposed to be handled by experts at the NAV call centre, and in situations when citizens have questions about these specific services, the frontline workers are to direct citizens to call NAV or help them contact their assigned contact person at NAV. However, there are exceptions to this rule, as citizens sometimes need assistance in calling NAV if the situation is complex or when a translator is needed. In those cases, frontline workers shall book an appointment to call NAV's call centre with the citizen to sort out the service needs and sometimes fill out documents during the appointment. When offices are busy, citizens are sometimes asked to return to a booked appointment.

3.2. Data collection

The first author carried out participant observations of organisational practices in the two offices of NAV, thus following a qualitative methodological approach (Moeran, 2009). The meeting centres were local public sector offices based in two different Norwegian municipalities and had similar organisational structures but differed in size. The observed practices involved citizens, frontline workers, occasionally private helpers, and technology at self-service stations. The observed interactions were mostly occasional self-service encounters, while some encounters between citizens and frontline workers were counselling as citizens returned regarding the same errand. The interactions often served to cover the needs of citizens that the solid interactions with self-service stations did not cover. At both offices, we qualitatively studied the self-service practices that unfolded during the opening hours of the two offices, which spanned between 2.5 to 4 hours, 2 to 5 days a week (holidays not included). The smaller office had fewer opening hours. The observations occurred during fifteen office visits over six weeks in spring 2022, with follow-up visits in winter 2023.

The data was collected in field notes from observations (see Table 1 and 2 in section 3.3), informal conversation notations and recorded and noted interviews with professionals employed at the two offices (Table 3 in section 3.3) that engaged in the self-service practices (Myers, 1999). During most of the observations, the frontline workers were present at some point during the interaction. Questions were asked of the frontline workers during and after the interactions. These informal talks were, in some cases, followed by more in-depth discussions and interviews with the frontline workers. All actors in our interviews had experience assisting citizens at the drop-in office in the frontline worker role. The field notes and the researchers' instant reflections followed up on the situations. This data set has been interpreted with the ambition to understand the lived conditions of people from their real-life experiences and realities (Klein & Myers, 1999), and the analyses have been guided by the following research questions:

RQ1: What roles are frontline workers expected to take in the self-service procedure?

RQ2: How do frontline workers fulfil these role expectations in practice?

We selected our research design based on the perspective that knowledge about frontline workers' roles should be gained directly from their own accounts. During observations, citizens and front-

line workers expressed their thoughts and struggles about being involved in the self-service procedure. By allowing frontline workers to describe their work practices, observe them in action, and reflect on their lived realities, we are brought closer to understanding the role in a specific context. Gathering these perspectives, the ambition is to provide a rich understanding of the phenomena at play (Goldkuhl, 2019). By employing an abductive approach, we integrate both theoretical perspectives and emergent findings in an iterative process (Goldkuhl, 2019). Field notes and interview transcripts were coded in NVivo according to themes related to our theoretical lens. In total, we analysed 40 data entities in a structured and unstructured way as we allowed the theoretical understanding to evolve throughout the analysis process by adjusting and expanding our coding scheme as we analysed the data (Goldkuhl, 2019).

The interpretation of the material and coding started with a content analysis of the qualitative material guided by our predefined research question regarding the role frontline workers play and how such roles impact co-production in service delivery. The co-production element was operationalised as the expected input (motives), and actual input (contributions) frontline workers provide into the co-delivery of self-service (Ryden., et al., 2023). This provided us with predefined themes according to which we arranged our codes (Krippendorff, 2018). This initial coding structure helped us arrange our codes in two broad themes: i) role expectations and ii) actual roles of frontline workers in self-service practice, understanding frontline workers as important actors in co-production (Ryden., et al., 2023). While arranging our data into these themes, sub-categories appeared that helped us rearrange these secondary categories further, which provided a further refinement of frontline workers' roles. In this process, the concept of frontline workers as intermediaries became clear, making us integrate this idea more formally into our coding process and further develop our coding scheme as we went on with this lens in mind (Goldkuhl, 2019). This required us to revisit existing intermediation literature, thus establishing a connection between intermediation and co-production. By examining frontline workers as internal intermediaries within their organisation, we contribute to the intermediation theory and expand its application within the co-production framework (Krippendorff, 2018).

In summary, our abductive approach combines structured and flexible coding methods, resulting in a refined theoretical perspective that links intermediation and co-production. This approach enhances intermediation theory and opens the idea of a conceptual framework for understanding the dual role of frontline workers in the co-production of self-services.

3.3. Overview of collected data in NAV

In Tables 1, 2 and 3, we provide an overview of our data collection. In addition, further field notes from conversations with public officials have been used as additional data sources.

Table 1. Overview of data from observations at the bigger NAV office¹

ID	Duration	Situation
OB1	30 min	Came to apply for financial assistance. Struggled with the digital application and tried the digital self-service for a long time without success and getting assistance. Had to leave the office.
OB2	5 min	Two women came to use the self-service to print out documents and struggled to use the copy machine. Got assistance from the security guard as frontline workers were busy.
OB3	10 min	Came for personal assistance regarding the digital unemployment plan. Struggled with providing information in the digital scheme. Got no assistance as all the frontline workers were busy.
OB4	5 min	Came to assess his decision regarding financial assistance that was unavailable at nav.no. The frontline worker collected it for him.
OB5	10 min	Came because she needed an appointment regarding financial benefits with a translator. Could not write, and the frontline worker copied her number from a letter that she had brought to the office.
OB6	10 min	Came to print documents for her application for financial assistance and to get assistance in finding the documents online.
OB7	10 min	Came to talk to a frontline worker as he got rejected on his application for financial assistance. Struggled to understand the reason and received information about how to send a complaint.
OB8	5 min	Two women came to the office as they struggled to hand in a work assessment report and could not get hold of their counsellors. They got help from frontline workers.
OB9	5 min	Came with a friend to register his CV on the digital (unemployment) activity plan and got assistance from frontline workers. System failure made the procedure time-consuming.
OB10	40 min	Came to get help to apply for financial assistance. Preferred the paper application but did not get this at the office and got help from a frontline worker to apply.

¹ Abbreviations; Observation big office (OB)

OB11	45 min	Came to get help to apply for financial assistance. Had contact with NAV for many years and struggled with the digital application, did not get help and did not manage to deliver it.
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Table 1. Overview of data from observations at the smaller NAV office²

ID	Duration	Situation
OS1	30 min	Came to the office to get help with a complaint and to re-enrol in unemployment benefit. Struggled to get hold of her counsellor and to use the digital self-service. Got help from the frontline worker who guided me on how to navigate on nav.no and formulate a complaint.
OS2	5 min	Came as she struggled to apply digitally for financial assistance. She is known at the office as she often visits for digital assistance, and a frontline worker conducted the digital application.
OS3	10 min	Came to get help to apply for financial assistance. Struggles with mental health issues and is known at the office. Got assistance on the self-service station to get bank transcriptions.
OS4	5 min	Came to assess his decision regarding financial assistance. He could not find this at nav.no because he did not have full access due to the security level of the digital ID.
OS5	10 min	Came to get assistance in receiving documents on nav.no. Struggles with mental illness and is known at the office. Got redirected to a counsellor in NAV.
OS6	10 min	Came to get help to calculate her pension at nav.no. Got redirected to the call centre as pension was not within the frontline workers' area of responsibility and knowledge.
OS7	10 min	Came to get assistance in finding the digital decision at the self-service station. Frontline workers assisted her to find it in her digital mailbox.
OS8	5 min	Two women came to the office to get frontline workers' assistance to report on sick leave and work-related benefits. They received guidance on how to understand the forms.

² Abbreviations; Observation small office (OS).

OS9	5 min	Came to get help to print out a front page that she needed to send in for additional pension documents to NAV.
OS10	40 min	Came to get help to register as a jobseeker at nav.no. Got a default message from home and got help to get a manual registration, as the digital registration did not work.

Table 3. Overview of data from interviews and conversations with office managers and frontline workers at the two offices³

Participants at BO	Duration	Participants at SO	Duration
FW1	1 hour	FW2	30 min
FW2	1 hour	FW3	30 min
FW3	1 hour	FW4	30 min
FW2	1,5 hours	OM1	30 min
FW4	1,5 hours		
FW5	1,5 hours		
OM1	2 hours		
OM2	2 hours		
Total time	13,5 hours of interviews altogether		

4. Findings

4.1. The organisational, situational, and external expectations placed on frontline workers' roles

The findings from the observations, conversations and interviews with frontline workers and managers at the two NAV offices show that frontline workers' role expectations and practices are shaped by three different streams: The organisational directives embedded in the office protocol and digital strategy in NAV, the situational elements embedded in frontline workers' interpretation and alignment with the structures, and, finally, the external factors of how other organisational actors within NAV fulfil their roles as well as citizens' expectations, needs and preconditions. This means that

³ Abbreviations; Frontline worker (FW), Office manager (OM), Big office (BO), Small office (SO)

internal factors within the organisations, individual situational practices of the frontline workers, external expectations, and other actors' role fulfilment impact the frontline workers' expected role in the self-service setting. We will now account for the three perspectives and expectations of frontline workers in self-service.

The organisational role expectations: Alignment with organisational channel strategy and needs

Many frontline workers state that they encourage citizens to use the digital self-services at nav.no as this approach aligns with NAV's channel strategy. This has also been evident in our observations, where most frontline workers, especially at the bigger NAV office, typically direct citizens to use digital self-services. At both offices, frontline workers and managers emphasise the organisational perspective as they describe the importance of moving those citizens who can manage to be digital to digital self-services. According to the office managers, the frontline workers are expected to turn as many citizens as possible into digital citizens. *"They [the citizens] cannot choose to avoid the digital; they must learn to use it, and we motivate them in relation to that [...]. The manual applications we have here today, we try as much as possible to end this."* (Office manager)

Similarly, the observations also show that most citizens with a digital ID are asked to use the digital self-service, but that many citizens struggle to use them and request help. Both offices argue that the digital procedures make it easier for NAV to handle applications and service requests. After the office closes, NAV needs to handle all the paper documents through a manual scanning procedure, a task described as time-consuming. When citizens use digital self-services and digitally submit their information and data, this saves resources for NAV. According to the frontline workers, the digital procedure is also more secure for the citizens that follow through. *"The paper schemes become scanned into the system [...] If they use the digital procedure, things get into the system correctly and are registered at the right place at once. But some citizens do not manage this, to attach digital documentation [...]."* (Frontline worker)

At both offices, the digital-first approach is important, and determining and filtering which citizens have preconditions to be digital is part of the frontline workers' responsibility. *"The main approach is that you should apply digitally. We try to find out and ask if they have access to their bank because then you probably have a BankID⁴".* (Frontline worker)

Both managers and frontline workers mention that the office directives state that they shall guide citizens at a nav.no level. What this exactly means is unclear, but according to the frontline workers, it symbolises a general service level that is sometimes hard to live up to. Frontline workers state that, in addition to merely guiding citizens to nav.no, they need to be able to give citizens hands-on assistance in different aspects of the self-service procedure. Observations show that the time frontline workers have at their disposal to help citizens often makes it hard to ensure that citizens follow through in the self-service.

⁴ In Norway, the BankID is the unique identifier for many digital services, including public services.

Summarising organisational role expectations, managers and frontline workers explain that they follow the office's strategy and that preventing paper applications will redirect resources to citizens who need help the most. However, limited resources challenge frontline workers' expectations as channel strategy promoters. The channel strategy is not always followed or assured in the service interactions, making the practice of frontline workers seem to be guided, rather than governed, by the strategy. What kind of digital assistance and at what level the frontline workers are expected to perform seem to be interpretable, making the organisational role expectations unclear.

Situational role expectations and individual practices: Restraints by the office protocol

NAV's organisational structure divides the responsibilities and work tasks between the frontline workers and other organisational actors. According to office protocol, the frontline workers at both offices are expected to redirect those citizens who have a contact person in NAV to nav.no and not assist them in the self-service procedure. A contact person is a designated caseworker or counsellor in NAV who should assist citizens in managing the self-service at nav.no. The frontline workers should assist those citizens who do not have a contact person at NAV. To redirect citizens, the frontline workers need to know if the citizen who requests help has a contact person. They also need to know if this person can assist the citizens in the self-service. This demands some detective work that often poses practical challenges. *"It is also difficult to decide and find out who we need to help and who has a contact person in NAV. That counsellor should own all the things related to NAV and assist those citizens in need. But it is difficult for us to separate those who have a counsellor and those who do not."* (Frontline worker)

During observations, only a few citizens who requested help with the self-service were asked if they had a contact person in NAV, and when they were asked, some of them did not seem to know. The work practices rarely followed the protocol: *"[...] we are not asking or looking for if someone has a counsellor either. But if that worked according to protocol, we would have had more time to help those who needed our help."* (Frontline worker)

Many of the frontline workers refer to the dilemma of scarce resources as the time is not enough to fully depict the situation of each citizen. Thus, frontline workers often address the matters with which the citizens come to the office. Occasionally, check-ups were done by the frontline workers, but this was seldom observed. The bigger office had a history of measuring how frontline workers followed office protocol: *"[...] we have had counts after office closure, and when we have gone through the visits and requests afterwards, I have seen that almost half of those who have been here, have a counsellor, so they should not have been here at all."* (Frontline worker)

Some frontline workers reflected that their assistance in citizens' self-service procedures had to extend office protocol to ensure citizens' service access. The downside was that it made them struggle with time and task management, and they could seldom assist all the citizens who needed help.

In summary, according to protocol, the role of the frontline workers should be restrained to assist those citizens who do not have a contact person in NAV. These expectations become challenged in work practice as many frontline workers assist citizens in self-service occasionally. Thus, the office

protocol does not restrict the frontline workers' role in practice. Instead, the frontline workers interpret and adjust the protocol to the situation, for example, when citizens who need assistance struggle to reach their contact person in NAV.

External role expectations: Extending the frontline workers' role

As mentioned above, many citizens who come to the office struggle to be digital and to get assistance from their designated contact person in NAV. In this situation, they expect the frontline workers at the office to assist them in the self-service procedure. The frontline workers in the drop-in office take on roles that other actors in the organisation should take, assisting citizens who do not master the digital self-services at nav.no. This behaviour is shaped by external factors, as the role performance of other organisational actors and citizens impacts the role frontline workers are expected to perform in self-service. A dilemma is that they end up doing the work of others:

"If you have work allowance, sickness benefits, or some follow-up from NAV about work plans, you have a counsellor [...]. They should just come in here and drop off the papers, but everything else should go through the counsellor [...]. We do a lot of work that others [in NAV] should be doing [...]. They should not have come in here if the system had worked as it should." (Frontline worker)

Frontline workers also describe that they feel that NAV had become more distanced from the citizens when services moved online, emphasising that personal assistance at the office is important:

"You can feel that it has become more distanced [...] much of the services in NAV should be about the channel strategy [...] about many of those we meet here [at the office], they have completely different needs about meeting a person that can guide them before they are ready to be independent." (Frontline worker)

We observed several citizens who did not receive personal assistance and could not finish what they came for and, thus, left without accomplishing the self-service.

Many citizens visit the office as their last resort after experiencing struggles to get in contact with their counsellors or caseworkers. Some of the citizens that came to the office perceived no other option than to ask for personal help at the drop-in office: *"I would guess that maximum 50% of those who we direct to the self-service succeed, all the others need help from X [another frontline worker]. They do not master the digital." (Frontline worker)*

Some citizens are also in challenging situations, needing NAV to assist them. When citizens struggle a lot, they do not manage to handle the self-service procedures: *"We had people coming here that told us that they meet up here as their last option before they end their lives. It is important that we take care of this, that we are there, it is scary." (Frontline worker)*

In summary, the role frontline workers are expected to fulfil is often extended fluently and varies depending on the citizens' situation and needs and how other NAV actors fulfil their roles. The counsellors also expect frontline workers to have the expertise and knowledge to assist citizens in self-services. Many citizens must get through the digital self-service procedure to receive benefits. The observations show that most citizens who use the self-services at the office request and expect

assistance from the frontline worker, even when citizens are accompanied by families or friends to assist them.

4.2. Frontline workers' role fulfilment

Our findings show that frontline workers adopt different roles and practices depending on the context. What roles frontline workers take depends on time and available resources and varies between the situation and needs of citizens and how the individual frontline worker handles the problem. In this sense, role fulfilment is impacted by many different components in the self-service setting, linked to the categories of role expectations described in the previous section, making them channel promoters, digital helpers and knowledge bridges.

The role of a digital channel promotor - director, guide, or doer

When frontline workers at the larger office direct citizens to use digital self-services, they rarely guide them in the self-service procedures on the first occasion. To ensure that the citizens manage the digital procedure was not perceived as part of their work practice. However, they were often explicitly requested to guide or to perform activities on citizens' behalf. Some frontline workers provide guidance and assistance, while some take over the digital service procedure from the citizens. Others felt frustration about this role and avoided it: *"There are many people who come back to get help to use the PC, and that we must show it repeatedly. And I don't know if they just expect us to explain it, so they don't need to learn it."* (Frontline worker)

We also observed that frontline workers performed guiding and hands-on assistance, and some, more often than others, assisted citizens who struggled: *"Then I told him - listen here, if I'm going to help you, you must look at me as a helper in the system [...]. It demands time."* (Frontline-worker)

At the smaller office, frontline workers described that different offices have different preconditions to direct citizens in a way that helps them become truly self-serving:

"There is a difference between this office and other places in Norway where they can teach the citizens. It also depends on the employees, but at this place they have committed to teach the citizens to be digital, make it more efficient." (Frontline worker).

"We do not have as many visitors; we do not need to extend office opening hours [...]. We have worked hard to get citizens to use the digital services at nav.no". (Office manager)

The frontline workers at the larger office reflected that they could work harder to give instructions and show citizens how to be self-serving by guiding them, that such work was time-consuming, but that this was no priority when many citizens visited the office.

In summary, our observations show that most frontline workers take the role of directing citizens, while some also assist and guide citizens in self-services. They all take on the role of digital channel promoters as they mostly direct citizens to the self-service activities. In the smaller office, assistance and guidance were more frequently performed. At this office, the work to make citizens self-serving was described as a priority.

The role of a digital helper - extending formal responsibilities

The role frontline workers take on depends on contextual and personal preconditions that go beyond formal responsibility. The frontline workers do not have similar knowledge about the different services or training to guide at nav.no. Some take on the role of digital helpers, while others do not assist the citizens digitally as they do not have the time, do not perceive this as their responsibility or feel uncomfortable engaging in digital self-service. Observations show that office protocol tends to be bypassed when frontline workers have time and know the citizens' life situations.

During the observations and conversations with frontline workers at the two offices, we found that the frontline workers at the smaller office often had more knowledge about the citizens' digital preconditions and situations. They usually extended their role as frontline workers and assisted citizens, even if they knew they had a contact person in NAV:

"I met a woman that had over 100,000 NOK in debt to NAV because she did not manage to deliver the right documents at the time in the digital system [...]. I helped her complain, and after some time, it was solved [...]. She had not gotten help from anyone who took the time to help." (Frontline worker)

The level of digital assistance depends on the frontline workers' knowledge, time and preferences. Some frontline workers perceive the digital system as challenging and some service procedures at nav.no as complex: *"It seems easier on paper, it seems more transparent because you have all the stuff, but digitally, you must go back and forth all the time, and check. For me, it seems easier to fill out the application form for social assistance on paper than on the Internet." (Frontline worker)*

"I think the digital scheme is very heavy to get through. I think it is very heavy [...]. I do not have time to assist at the computers. I am no expert in nav.no" (Frontline worker)

Frontline workers' knowledge about nav.no differs and impacts who can assist and teach citizens in the self-services: *"We could also have some education [...]. We are no teachers. We should have more knowledge in this, in uploading of documentation, and learn to teach others." (Frontline worker)*

From a holistic perspective, it is important for citizens to receive assistance in locating documents from other authorities that NAV requires them to submit. One frontline worker argued that this should be regarded as a part of the service within NAV when it relates to NAV matters in a larger sense. Others claim that they shall not assist in digital matters outside the area of NAV.

In summary, assisting citizens in self-services depends on the frontline workers' i) knowledge of the citizens themselves, ii) knowledge of NAV's overall organisation, and iii) knowledge of the digital self-service system per se. The role fulfilment and the extension of such also depend on personal ideals and willingness to diverge from formal role descriptions and responsibilities. This impacts if, how, and to what extent frontline workers enact an extended role and become digital helpers in self-service.

The role of bridges in the digital self-service - balancing resources and responsibility

How the frontline workers provide digital consultation and assist those citizens who struggle to use the digital services independently depends on external factors such as time, situation, and citizens' access to support within and outside of NAV. Time and available resources are evident factors that impact the ability to assist citizens who need help in the self-service procedure: *"The challenge is that we do not have time. It [service] needs to be fast. Sometimes, you need to sit down and explain, but then you just need to be done because you need to help the next person."* (Frontline worker)

Others struggle with the expectations to provide the help that extends the formal role expectations in a stressful work environment: *"It's very difficult, it's a balance because we are not so many of us at work and we are in a way a drop-in [...]. This is not really what we should be involved in, we should not consult on this."* (Frontline worker)

When citizens get assistance from their network to perform the self-service, the frontline workers become eased from some work and can focus on those who cannot manage.

"It is the weakest that come. Because those who can and have an understanding sit at home. Some with the help of children or partners. But it is not those we meet; it is not them who come here. It is the weakest in society. It is the most vulnerable." (Frontline worker)

Some situations are unsuitable for private helpers in the citizens' network; thus, the frontline workers need to take the role of bridges and help in such situations.

"I know a woman that had help from her daughter [...]. This is wrong when it is information that you don't want to share. You might not want your daughter to know that the mother struggles financially [...], you want to protect children from financial difficulties." (Frontline worker)

Depending on the situation, the focus of frontline workers' assistance varies. Some prioritise teaching rather than doing, as this approach can empower citizens. Taking the time to show citizens how to upload documentation digitally is integral to bridging the digital gap.

"I try to get them to do things, they need to own these things, I think it is important [...]. It [the digital self-service] is hard for many citizens, but we work a lot with this individual teaching and that they need to navigate in the system [...]. I ask many times if they understand." (Frontline worker)

In summary, personal assistance provided by frontline workers is crucial as they balance resources and responsibilities in a way that enables citizens to use self-services. Such practices depend on the resources at hand. They also play a role in protecting citizens' privacy and support individuals in citizens' networks - acting as private intermediaries - from service tasks that should not fall on them. When other organisational actors fail to fulfil their roles, the responsibilities of frontline workers extend to bridge the gap in digital self-service.

5. Discussion

In this article, we shed light on the role of frontline workers in digital self-services from an understanding that they are important actors in co-producing digital self-services. We study in-person

self-service at two public sector offices, focusing on the practices of frontline workers in the public sector, guided by our two research questions: RQ1. What roles are frontline workers expected to take? RQ2. How do frontline workers fulfil these role expectations in practice?

Analysing the role expectations of frontline workers (RQ1), we discover that several actors and mechanisms shape these expectations. These include i) organisational expectations embedded in the digital strategy, ii) situational expectations on frontline workers and directives in office protocol in NAV and finally, iii) external expectations from other organisational actors within NAV and citizens. Altogether, these role expectations do not always match the lived realities in the practical self-service setting, making frontline workers' interpretation and alignment with the expectations vary. From an organisational perspective, frontline workers are expected to act in alignment with organisational channel strategy and needs. Similarly, situational role expectations, such as office protocols, expect frontline workers to restrain their self-service assistance to citizens. Finally, external factors such as unavailable counsellors, caseworkers, and citizens' expectations extend the role frontline workers must play in digital self-services. This creates a dilemma and potential role conflict. While frontline workers are expected to promote digital self-services, they are also expected to limit the assistance they provide during these procedures. These contradictory expectations can challenge frontline workers' work practices since they are not responsible for fully enabling citizens' self-service. However, our observations show that many frontline workers surpass these role expectations, offering more self-service assistance than NAV expects. By doing so, they help to balance the role conflict.

How frontline workers fulfil these role expectations (RQ2) depends on time constraints, available resources, and knowledge; it varies between the situation and needs of citizens and how the individual frontline worker handles the situation. They take on several roles as i) channel promoters as they direct, guide and perform activities in the self-service procedure, ii) digital helpers when diverging from formal role descriptions and office protocol, and iii) bridges in the self-service as they balance responsibility and resources in NAV. Fulfilling these roles, frontline workers might direct citizens to self-service stations, guide them in their digital self-service, or complete the service on their behalf. In such practises, they extend some of the role expectations and become digital helpers, a role often challenged by limited recourses that they need to balance. Our findings show that the frontline worker role is complex and that role fulfilment includes balancing the often-contradicting expectations in their enacted roles.

Our findings have several implications for both theory and practice. First, it provides us with a deeper understanding of frontline workers' role as co-producers in self-service. Through practising several roles, we show how these actors contribute to the co-production of self-services and become enablers of the service procedure. We link role expectations to hold the motives of the state actors in our study, mainly originating from the service organisation of NAV, that provide the realms that frontline workers are to operate within. These realms that hold motives and expectations impact role shaping and performance of actors when they are contributing to the co-production during service delivery (Ryden et al., 2023). Second, we also link the role of frontline workers in co-production to intermediation theory. We do this by showing how the role expectations that shall motivate frontline

workers and direct their contributions change when roles play out in practice. This is evident as frontline workers often take on the roles of enabling intermediaries as they facilitate service interaction and help access services on behalf of citizens (Sein, 2011). This is still done if office protocol expects them to be channel promoters. For example, when frontline workers take over tasks from citizens, they extend their role expectations and enable co-production in service delivery. They fulfil their roles as co-producers by intermediating in self-services by performing activities that citizens are expected to perform. This indicates that as informal intermediaries, frontline workers can replace citizens in co-production or at least take over some of their contributions (Ryden et al., 2023). Furthermore, frontline workers might enable citizens to use digital self-services by intermediating between the digital world and the analogue service setting. This extends their role as digital government intermediaries (Sorrentino & Niehaves, 2010) to become intermediaries in a co-production process (Saylam & Yıldız, 2022).

Our findings align with other recent studies and show that the involvement of frontline workers in on-site self-service is important as it enables self-services for citizens who struggle to co-produce services independently (Rydén et al., 2023). The intermediary role points towards the tension between the roles frontline workers are expected to fulfil and how they do so. To embody an intermediary role in self-services will sometimes be crucial to enable co-production when self-services play out on-site, which shows an important link between co-production and intermediary conceptualisations.

Thirdly, this paper also has theoretical implications as it shows that intermediaries do not necessarily need to figure between service users and service-providing organisations. On the contrary, such practices can be formed within the same service organisation as digital services reconstruct organisational roles and frames. This role reconstruction provides an additional service layer to the organisation that needs to be recognised to be given the right preconditions and situate clear frames for organisational actors to operate within. This finding adds to the intermediation research as it widens the idea of conceptualisation, which can be interesting for future studies to explore. However, most frontline workers take on the informal intermediation role as they perform activities on behalf of or with citizens. Out of this intermediation role, they bridge the digital and analogue service settings (Sorrentino & Niehaves, 2010). Guiding at nav.no and performing digital tasks become necessary intermediating facilitating acts (Agnihotri, 2023) that enable self-service practice. They play an important role when self-services do not work as the planned dyad between citizens and technology (Breit & Salomon, 2015), and this challenges citizens' service access (Schou & Pors, 2019). Thus, the frontline workers can be considered e-government intermediaries (Dombrowski et al., 2014; Agnihotri, 2023) in the role of professional intermediaries (Sein, 2012; Sorrentino & Niehaves, 2010). However, their role diverges from the professional intermediary role that has earlier been described in intermediation literature (Sorrentino & Niehaves, 2010). This is because the frontline workers, in our cases, operate inside the same service organisation as the actors that they intermediate between. They intermediate between the state technology actor and other state human actors in NAV (Ryden et al., 2023) that counsellors and case workers represent, all belonging to the same service organisation of NAV.

The practical implication of our study is important as it shows the important role frontline workers play in enabling digital self-service in on-site office locations and that this arena for service interactions is important to preserve. It also raises awareness regarding how organisational, situational, and external expectations shape the expected roles of frontline workers in digital self-services, showing the need to clarify such expectations and balance them with the needs visible in practical service situations. We understand these expectations as co-production motives, impacting the practical fulfilment of the frontline workers' roles and their preconditions to contribute to co-producing self-services (Ryden et al., 2023). We see no clear official role description or protocol that tells the frontline workers how to assist citizens in using self-services. Directions exist but are hard to follow in practice, thus making their co-production contribution occasional as it plays out differently in different self-service encounters.

In summary, frontline workers take on several roles and often contribute to self-services in ways that extend organisational motives, thus becoming important enablers for the co-production of such services. Our findings show that barriers to such co-production often reside in the organisational preconditions given to frontline workers to meet role expectations from organisations and citizens. This precondition will contribute to shaping their roles and is therefore important for service organisations to reflect upon in relation to both the work environment of frontline workers as well as successful achievement of organisational strategy and goals. We see frontline workers intermediate between the analogue service setting and the digital world in the role of guides, digital helpers and bridges of responsibility (Madsen & Kræmmergaard, 2016). They often take informal responsibility for assisting citizens in the co-production of their self-services. Such informality makes co-production optional, which becomes evident as some frontline workers do not take on the intermediating role in the self-service delivery. One example is when they refer citizens to their contact person according to office protocol instead of assisting them at the offices' self-service stations. Not taking on the intermediary role may have different reasons. For example, limited timeframe, lack of digital self-service expertise and sometimes lack of motivation can impact these situations. Also, the self-understanding of the frontline worker role may contribute to different practices. This can be the case as the role is not recognised, specified, or framed. In this way, the frontline workers in NAV are organisational actors who can choose to embody the role of digital helpers (Saylam & Yilduz, 2022; Dombrowski et al., 2014) and service co-producers (Perry & Smit, 2023). When embodying these roles, the frontline workers become internal professional intermediaries, mediating between citizens and the self-service technology at physical service stations. Otherwise, they are channel directors with limited involvement in the co-production of self-service and may also limit the preconditions for citizens to co-produce their self-services.

6. Conclusions and implications

Our study visualises how organisational roles are reconstructed in a digital self-service setting and how role fulfilment can be framed as an intermediation practice. The findings also pinpoint the need for a "human in the loop" in digital self-services as the interpersonal dimension, in a way, challenges the original idea of "self" in self-service practice. Our study points to challenges in the digital

encounters when services move online and raises awareness of the risks when efficiency gains of digitalisation are used as arguments to cut down on on-site office services.

Further, our work points to a potential dilemma as professional role performance needs to mirror organisational strategy and citizens' needs and point to challenges when these interests diverge. When organisations promote digital services, the implementation of self-services restructures organisational work practice (Clifton., et al., 2020). This occurs regardless of whether the public sector organisations recognise the role configuration. However, when the new work practices are not recognised, the professional roles risk being blurry for professionals. What implications this has for the public professionals' work environment and how it impacts citizens' experience of service and service access has not been addressed and is a limitation of this study. Not accounting for the citizen perspective in interviews and observations has also been a limitation, as our study focuses mainly on the organisational actors. However, we argue that our study provides an important perspective on the informal intermediary role and its work practices. We argue that recognising and supporting such role fulfilment will benefit citizens and organisations. We also argue for the need for public organisations to recognise the importance of and enable organisational actors to contribute to the co-production of self-services.

Our study took place in one public organisation in Norway. To further validate our findings, future research should investigate the role of frontline workers in digital self-services in different settings. We also see that the role of frontline workers gets caught between organisational and citizens' expectations in self-services. In this dynamic, digital technology is also an actor that can both ease and constrain co-production. Future research could extend this perspective by jointly capturing these three perspectives in co-production, thus depicting the unfolding interactions and conflicts. In addition, we have introduced the combination of co-production and intermediation. We believe this is a fruitful start and see the need to further investigate the relationship between these two concepts.

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Author Contributions

Both authors, Hanne Höglund Rydén and Sara Hofmann worked closely together during manuscript development. Hanne led the initial phases of data collection and took primary responsibility for the initial draft of the manuscript. Sara validated the findings by reviewing them thoroughly, based on the written analysis provided by Hanne, followed by collaborative discussions on data interpretation. In the writing process, Hanne produced the initial draft, while Sara contributed significant revisions, adding critical aspects, clarifying arguments, and enhancing the overall coherence of the text.

All authors have read and agreed to the published version of the manuscript.

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