

# Making sense of the digital co-production of welfare services: Using digital technology to simplify or tailor the co-production of services

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## Abstract

This paper offers a theoretical framework for digital co-production in public services and considers the benefits and limitations such services can have for citizens. Based on examples from the Norwegian Labour and Welfare administration, we argue that digital services are being developed in primarily four directions, depending on a choice of goal and strategy. The four types of services create value for citizens in different ways, but also have different limitations. The proposed framework, along with the examples given, provides important insight into the multiplicity and limitations of public sector digital services.

Keywords: Digitalisation, co-production, citizen empowerment, automation, digital tailoring

## 1. Introduction

A new era of digital government is gradually being developed across most modern welfare states. While the first decades of government digitalisation entailed moving government services online, governments are continuously exploring new ways for digital technology to contribute to the creation and delivery of public services. As recognised by recent models of digital government development, public services are in many instances improved by using data to make them context-sensitive and tailor them to the targeted person's needs (Janowski 2015; Katsonis and Botros 2015). Furthermore, governments are moving away from simple, one-way communication on webpages to more interactive solutions. At the same time, digitalisation is also creating a more streamlined bureaucracy where fewer choices are left to civil servants and digital systems are given a more prominent role (Zouridis, Van Eck, and Bovens 2020; Bovens and Zouridis 2002).

As e-government has matured along these lines, the co-production view has increasingly been applied in studying and understanding public service administration and delivery (Osborne 2018; Osborne, Radnor, and Nasi 2013; Alford 2009). The term *co-production* is described by Grönroos (2007) as a series of activities whereby a provider and a recipient jointly create a service which is immediately consumed. The value a person receives is not produced and delivered but, rather, dependent on the expectations and abilities of all parties involved in the service delivery, and mutually created by them (Ramirez 1999). In the public sector, co-production is found in all services the government provides to citizens, ranging from complex service situations such as health care and teaching to more contained services like filing taxes or applying for permits. Citizens, as the term is used throughout this paper, is for whom these digital services are created. Citizenship, in its widest definition, entails being given rights and obligations by the state. Public administrators are thus tasked with ensuring that citizens have their rights upheld, and with giving them opportunities to meet their obligations. A co-production view of public services suggests that citizens should not be understood merely as recipients but as participants in creating value with the government. This view has been applied to government services such as health care, social work, policing, and other public services that require "boots on the ground" (Loeffler and Bovaird 2020; Vennik et al. 2016; Pestoff 2006). While there have been

a limited number of studies done on co-production in digital services, the subject has recently received increased attention (Lember, Brandsen, and Tönurist 2019).

Using the theory of co-production as a starting point for understanding digital public services seems like a relevant way of analysing how these services create value for citizens. While the co-production perspective has been taken to look at how digital technology can be used to create entirely new and novel ways for the government to interact with citizens (Alam 2021; Lember 2018; Linders 2012), the consequences of these modes of interaction for traditional service situations should not be overlooked. While the purpose of traditional public encounters is the same as it was before the digitising of public services, digital technology has changed the traditional meeting between bureaucrat and citizen in several profound ways (Lindgren et al. 2019). While the possibilities of digital encounters are frequently studied, a more comprehensive and systematic understanding of their limitations is also emerging. It has been argued that digital systems, for a wide variety of reasons, fail to meet the needs of many citizens, compared to public services provided by a human civil servant. The reasons for these failures include a lack of digital experience among some parts of the population (Madsen and Kræmmergaard 2016); insufficient registry data regarding all citizens (Peeters and Widlak 2018); and a loss of discretionary judgement by street-level bureaucrats (Bovens and Zouridis 2002). Consequently, while digitalisation offers new ways for the government to create value for citizens receiving public services, there are also new, systematic limits to this value.

### 1.1 Aim and context of the paper

This paper addresses the lack of theoretical conceptualization of the practical applications for digital co-production in public services, and of the obstacles that limit the value people receive from these services. It is important to note that, in previous research, the term *co-production* has been applied to describe citizen involvement in both the act of receiving services and that of collaborating with government in designing services and overall governance; the latter is often called co-creation or co-design (Osborne, Radnor, and Strokosch 2016). From a historical perspective, increased emphasis on co-production in public administration has been linked to the shift from classic administrative models to both New Public Management and New Public Governance (Sorrentino, Sicilia, and Howlett 2018). However, the starting point for the present paper pertains to the classic concept of public

administration and traditional public services. The services discussed are all digital services, developed to help deliver traditional public services. As such, co-production is considered an inseparable part of the public encounter between citizens and the government in the delivery of public services. However, digital technology is used to increase the value created in the encounter.

This considered, we ask the following two research questions:

- What are the different value-creating approaches governments take to co-produce services with citizens through digital channels?
- What are the limits to the value-creating potential of these different approaches for citizens?

To answer these questions, we offer a framework for how government agencies attempt to create additional value when designing opportunities for digital co-production. Throughout the article, the term “goal” is used to describe how the digital co-production is intended to provide value for the citizen, and the term “strategy” for the role of digital technology in this value creation. The framework shows how these goals and strategies lead to different types of services, and how they are restricted by different issues that limit the value they can create for the citizen. To exemplify our framework, we have included several digital development and innovation initiatives from the Norwegian Labour and Welfare Administration (NAV) as embedded, illustrative cases. Norway is among the most digitalised societies in Europe (Foley et al. 2021), and the Norwegian government has actively pursued a national digitalisation strategy (Ministry of Local Government and Modernisation 2016). Being responsible for most of Norway’s welfare services, NAV has sought to strengthen its digital services with up-to-date innovations, with the goal of creating value both for NAV and Norwegian citizens. As such, this Norwegian context provides a good starting point for discussing public digitalisation and value creation in public service delivery, and is an extreme and revelatory case.

There have been many attempts to categorise different types and levels of co-production; these will be discussed in the next section. However, as described above, the present paper uses the co-production concept at the micro-level. This entails considering the processes and activities that let individuals create personal value when interacting with

government agencies in public service encounters. The framework developed and presented in this paper is therefore not a categorisation of co-production in general, but shows how digital technology is used to improve co-production opportunities offered to individual citizens, and the type of value it adds.

The paper is structured as follows: It begins by discussing co-production in existing studies and research on public services. It then goes on to present the paper's main contribution, a framework for public digital service co-production. Examples from NAV are, in turn, used to show how this framework applies in practice. Afterwards, the framework is extended by discussing how each type of co-production has limitations in providing value for some citizens. Finally, the paper concludes by discussing the finding's implications on the digitalisation of public services and making suggestions for potential follow-up studies.

## 2. The co-production perspective in public services

While the co-production approach in the service literature has gone through many periods of ascent and decline (Ramirez 1999), the notion of viewing the citizen as an active partner in creating public services is currently receiving increased attention in the public administration field. However, the definition of co-production has become increasingly muddled by its many applications. For instance, the term has been applied in the New Public Management field to describe citizens as rational consumers, and in the New Public Governance view as governing partners (Nabatchi, Sancino, and Sicilia 2017). Nevertheless, governments have been motivated to pursue co-production for its potential to reduce administrative costs by sharing some of the workload with citizens (Brudney and England 1983). However, at a fundamental level, it has been recognised that any citizen acquiring public services is to some degree required to co-produce in order to receive any value from the service (Parks et al. 1981). As such, public administrators are left with the task of finding the best-suited and most beneficial way for this co-production to take place.

While the co-production literature in relation to public administration is diverse, Osborne and Strokosch (2013) simplified it by dividing it into two main strands. One strand is related to the administrative part of public administration and governance, and the second to service creation and delivery. The former represents a top-down inclusion of citizens by government, and the latter views co-production as taking place in the service encounter, where the provider and recipient are inseparable from the service that is being created.

Depending on the perspective, the concept of value is also viewed differently. In the more traditional view, value is created by the delivery of the service; as such, the citizen co-produces it with the service provider. From a New Public Management perspective, opportunities can be added to public services allowing citizens to seek out additional value for themselves (Pestoff 2012). Finally, in keeping with New Public Governance ideals, public services, by allowing citizens to engage with the government in how they are designed or developed, can also make government more transparent and inclusive (Sorrentino, Sicilia, and Howlett 2018). These alternate views have raised more principled discussions of how co-production can be viewed as empowering people to improve their lives (Jaspers and Steen 2019; Kayser et al. 2018; Lember 2018), or if the demands of co-production are placing an undue burden on some people (Trischler and Westman Trischler 2021; Peeters 2013).

So far, there have been few contributions to the literature where the digitalisation of public services has been tied to a theoretical and consistent change in how public services are delivered. One exception is offered by Bovens and Zouridis (2002), who argue that the increase of digital technology in public services reduces the use of discretionary power when the new systems lead to less interaction between citizens and civil servants. Similarly, Peeters and Widlak (2018) argue that the use of registry data in digital services can “contaminate” the outcome when a digital system fulfils public policy. While not directly related to the co-production literature, both these studies demonstrate the possible systematic vulnerabilities of digital co-production. Still, as studies of digital empowerment and participation have shown, digitalisation can also contribute to greater citizen involvement (Mäkinen 2006). Consequently, using co-production to theorise about the impact of digitalisation on public services requires a more granular view.

Recently, Lember, Brandsen, and Tönurist (2019) suggested a partition of four types of technologies that impact co-production: communication, processing, actuation, and sensing. Such theorising is necessary to gain insight into the consequences of digitalisation on public services beyond an anecdotal level. The authors recognise the need for further research into the topic of digitalisation and co-production and suggest several possible paths for future research. While a more granular understanding of the contributions of different types of technologies to the provision of public services is one path of further study, they also suggest more research into the underlying logic of how digital technology provides value in the public sector and how public digitalisation impacts people differently.

### 3. Conceptualizing digital co-production

The use of digital services in public agencies fulfils a multitude of roles and purposes when it comes to interacting with citizens. Usually, the primary value is related to the service rendered, not the digital format itself. However, the digital component can contribute additional value. The most recognisable parts of digital government are webpages, which have become the front of many public agencies. For instance, a citizen can use a digital platform to book an appointment with a civil servant. For the citizen, value is created when the appointment is booked, but the digital format can create additional value. In this case, the citizen probably saves time, compared to doing it by telephone or just showing up. These potential benefits to the citizen are the value-creating goal of the digital co-production innovation. In enabling the creation of more value during government and citizen co-production, government agencies develop digital services in pursuit of two goals: simplification and tailoring. On one hand, public administrators simplify and streamline public services to make them easier to use and more accessible to citizens. On the other, governments deliver services that are context-sensitive and tailored to the citizen needs (Teknologirådet 2017; Janowski 2015; Katsonis and Botros 2015).

The main difference between a simplified service and a tailored one depends on whether the public agency developed the service to be streamlined, simple and standardized, or attentive to the more or less unique needs of citizens. However, this distinction may not always be visible to the citizen. A citizen with a simple or typical need may not need a tailored service, or, in other words, may experience a simplified service as tailored to their need, because their need is typical. Considering the value these services create, some citizens may receive the most value from a simplified co-production process; tailoring provides no additional value. Others, by contrast, may gain little from simplification, as value, for them, is dependent on the service being tailored to their situations. Returning to the example of booking an appointment with a civil servant, some people might benefit most from a process that allows them to quickly find a suitable time and book it, while others are best served by having the opportunity to convey their specific needs to the caseworker with whom they are meeting. If the booking service uses standardised forms and processes, the citizen may be unable to fully convey this need. When digital services become



more system-oriented, they may become less able to respond to the needs of some parts of the citizenry (Wihlborg, Larsson, and Hedström 2016; Bovens and Zouridis 2002).

From a co-production perspective, simplification and tailoring create different expectations during the public encounter. While simplification offers added value because using the service is easy, it also limits the possibility for meaningful interaction and demands extensive standardisation. On the other hand, tailoring demands that the service be differentiated depending on the citizen and their needs, potentially involving extensive interaction with the aim of fitting the service to each individual citizen.

### 3.1 The four endpoints of digital co-production

Regardless of goal choices, the digital format offers two possible strategies for reaching the goal. The value goals describe what type of value the digital service provides, the two strategies are related to domains of digital development. In other words, they are related to how a digital innovation creates additional value. First, the government can use digitalisation to influence how much citizens are required to participate directly in the creation of the service. This alters the rate of interaction during co-production from demanding great participation from the citizen to demanding none. The second strategy is creating value by including additional data in the service encounter, provided either by the citizen or the government.

When public administrators develop services based on these sets of goals and strategies, the result is four different types of digital public services. The differences between services can sometimes be difficult to distinguish, as they are often collected on digital platforms offering many services. However, once the services are separated, the differences and distinctions between them become clear. Beginning with the strategy of altering the level of interaction, the services either remove or increase the requirement of citizen-government interaction in the course of co-production. For instance, rapid interaction can be achieved on social media platforms (Hofmann et al. 2013) or specialised government applications that let citizens interact online with their caseworkers (The Norwegian Labour and Welfare Administration 2020). We label these types of services *dialogue services*. At the other end of the interaction spectrum are *automated services*. These simplify a citizen's encounters with the government by almost entirely removing the

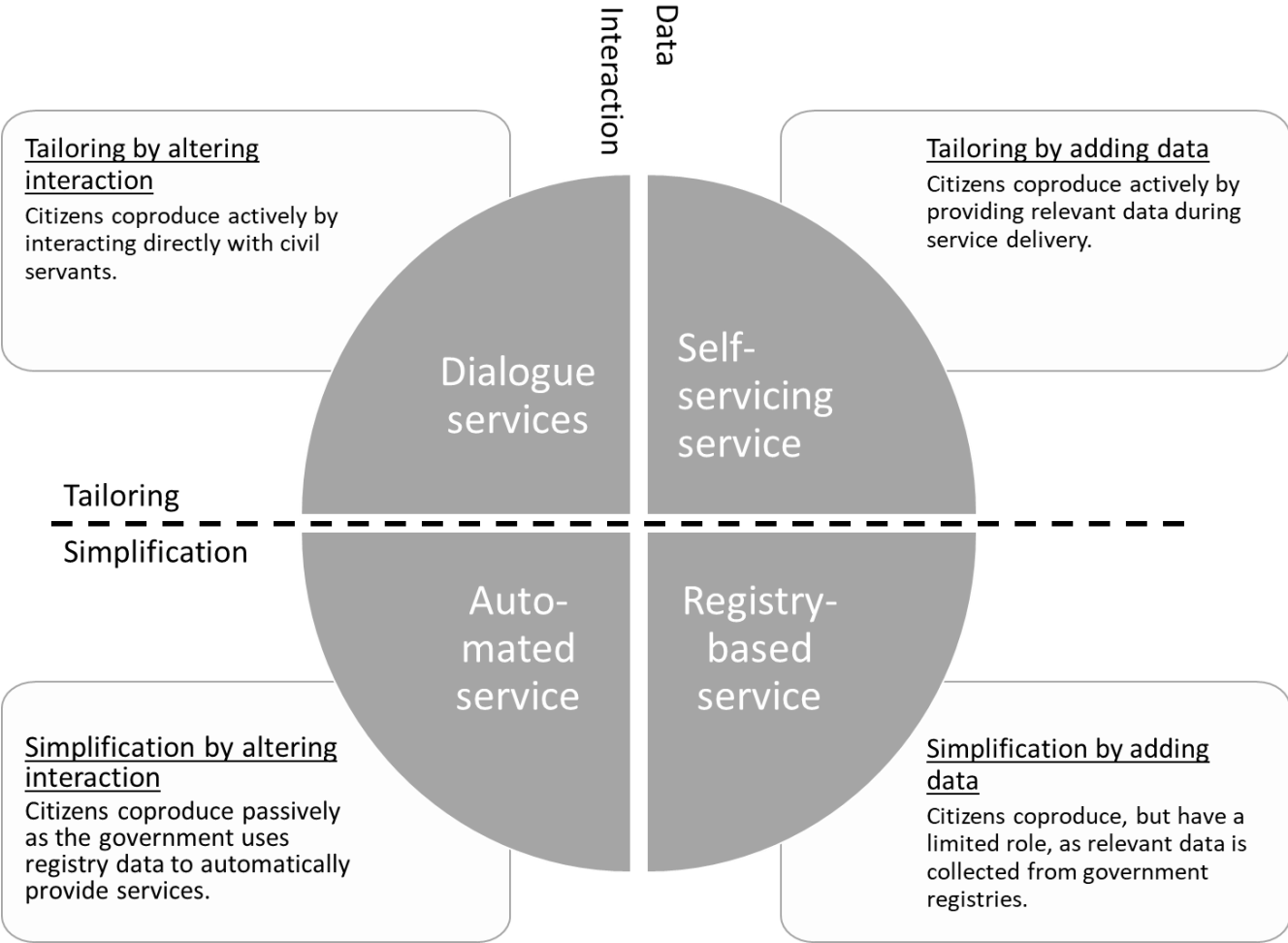
need for interaction, having the government or the citizen initiate a process that is otherwise entirely automated (Scholta et al. 2019; Sirendi et al. 2018). At their most advanced, proactive and automated digital systems allow for the payment of benefits or delivery of other public services, without requiring the citizen to seek these out. As such, the government can provide value, not by offering venues for interaction, but, rather, by removing the need for them. In a “no-stop shop”, the government can even render services to citizens proactively.

The second strategy is enabling the delivery of the service to be enhanced by additional data. While data is used in most digital services, for instance, the automated services discussed above, a data-oriented strategy does not attempt to do away with or change the interaction between citizen and government, but, rather, to ensure that the most value is co-produced during the encounter, with the help of structured data. Depending on the goal, services differ by whether the data is supplied by the government or the citizen. In other words, whether the citizen is empowered and trusted in the service encounter to supply their own data, or the government fully uses data it has gathered through its own processes. Digital services that allow citizens to self-service or provide relevant information to the government on webpages have a growing presence in public services (Haustein and Lorson 2021; Breit 2019; Breit and Salomon 2015). As such, *these self-service services* are tailored to the citizen, as the latter can be their own caseworker. On the other hand, governments can also create registry-based services where the citizen’s input is small compared to the government’s contribution. This is similar to automated services, though *registry-based services* do not necessarily remove the citizen as an active participant. The citizen is still an active party and makes conscious choices; however, their range of options are limited, as they often can only approve of or object to steps already taken by governmental processes or decision-making systems. This is a simplification of the service, where computer systems can process tasks quickly and consistently through the service encounter.

These four types of digital service types have been condensed into a figure on the next page (see Figure 1). The two services below the horizontal axis are services that simplify service encounters, while the top two are digital solutions that deliver tailored services to the citizen. The vertical axis indicates the choice of strategy. On the left are services that create value by pursuing the strategic choice of either reducing or increasing interaction

between the government and the citizen, either by automating a service or enabling interaction between citizen and caseworker in a web-based dialogue service. On the right are services pursuing the strategic goal of creating potential value by adding more data, either from the citizen (in an online service enabling self-service) or from the government (in a registry-based service).

Figure 1: The four endpoints of digital co-production



### 3.2. NAV as an illustrative case

Examples of all four types of digital services described above are found in NAV’s recent digitalisation efforts. Below is a brief description of each of type, including how these digital services have been brought into NAV’s portfolio of digital services, how they create value for citizens, and how they fit within the framework described above. Most of the services described below are either available or planned to be available on NAV’s website, which provides a united front for all programmes and

schemes for which the agency is responsible. The most prominent exceptions are automated services, which have no need for any user input.

#### *Automated services (Simplification by altering interaction)*

Typically, a public welfare provider acts when it is triggered by a citizen, for instance when it receives an application. With automated systems, an agency can instead use digital systems to proactively react to the data it receives. As far back as 1998, NAV automated how it awarded child benefits to eligible parents. NAV's systems were connected to the national registry, allowing it to initiate payments when new-born children were entered into the registry (Andresen 2008). In doing so, NAV could remove most of the need for caseworkers as well as ensure that most eligible citizens received their entitlement without having to actively apply for it. Registry data is similarly used to discontinue payments when parents are no longer eligible. In recent years, NAV has more vigorously pursued a strategy of automation and hopes to be able to provide pensions and family benefits automatically to eligible citizens (The Norwegian Labour and Welfare Administration 2020). The goal is that welfare services would be given not when the citizen requests them, but, rather, when the government acquires data verifying the citizen's eligibility. The ideal is to provide welfare services throughout a citizen's life based on the government's collection of data regarding important life events (Larsen 2018a).

#### *Registry-based services (Simplification by adding data)*

The Norwegian government has developed a range of digital services that enables it to collect data more easily. Of great importance to NAV is the Norwegian Tax Administration's collection of data regarding people's income (Ministry of Local Government and Modernisation 2019; The Norwegian Labour and Welfare Administration 2019). Employers report monthly payroll information to the tax administration, which then shares the information with other government agencies that require it. In NAV, this information is used to evaluate eligibility when citizens apply for benefits and to uncover cases of erroneous payments. The registries are also important to NAV's online user-centred services. While NAV's websites are open access, they also contain pages that require the citizen to log on to access services that use registry data about their situation collected by the government. To

log on, the citizen is not required to create an account; instead, they use their national identity number and one of several available types of digital identification. With a nationally coordinated means of identification, information collected by one government agency can be used be shared with other agencies. As such, when a user wants to apply to NAV for benefits, they can log on to their digital NAV profile and access a wide range of services (The Norwegian Labour and Welfare Administration 2017). This allows NAV to use information it already has about the citizen to ensure other services are delivered more smoothly. Recently, as part of the COVID-19 relief effort, NAV also streamlined the application process for unemployment benefits (Vågeng 2020). While the citizen had to apply manually, the processes of resolving the applications were mostly handled automatically with available registry data.

#### *Dialogue services (Tailoring by altering interaction)*

Internet chats and other dialogue interfaces give the citizen and government efficient and quick methods of exchanging information. NAV has created several internet-based chat and dialogue services. For instance, there is a chat service operating on NAV's website for questions regarding work assessment allowance (Rygh 2019). Furthermore, citizens receiving counselling from NAV can exchange messages asynchronously with their counsellors in a dedicated dialogue application (The Norwegian Labour and Welfare Administration 2019; Larsen 2018b). Both innovations improve upon more traditional, time-consuming means of communication, as well as helping both the government and citizens to convey relevant information during counselling or casework. Compared to other channels, like sending letters, visiting a local branch office, or telephoning a call centre, chat services are usually more convenient and cost effective. Consequently, co-production can take place without many of the rigours of bureaucratic interaction, and citizens can more easily convey what they require.

#### *Self-servicing services (Tailoring by adding data)*

In NAV, many of the application processes for government benefits have been moved online, reducing the need for paper forms (The Norwegian Labour and Welfare Administration 2019). NAV has also sought to empower citizens by offering them an online activity plan to

help them in seeking re-employment (The Norwegian Labour and Welfare Administration 2020). With the new digital activity plans, citizens are less reliant on caseworkers to administer their ongoing cases. Instead, they can use the digital tool provided by the government to do some of the planning and administrative work previously done by their caseworkers. Similarly, people on paternity leave are also offered an online digital tool to help them plan their leave. With this tool, they have some control over how they spend their allotted days of paternity leave (Ringnes 2018). In all these services, the citizen provides the data that shape the services and tailor them to their needs and situation.

### 3.3 The limits of digital co-production

There is no guarantee that value is created when citizens acquire public services. In fact, poorly designed services or a lack of impactful co-production can even lead to value destruction (Strokosch and Osborne 2020). Furthermore, New Public Management reforms have to some degree overemphasised the product and process aspects of public services, failing to consider the value they can extend to the citizen (Osborne 2020). While a poorly designed digital service may limit citizens' ability to co-produce value, the types of digital services discussed above also have systemic constraints in their ability to create value. When additional value is created by simplification or tailoring, a systemic limitation in potential value can cause some citizens either not to receive this added value from digitalisation or to benefit less from the welfare schemes to which they are entitled.

Descriptions and explanations of the limitations some citizens have in co-producing digital services with the government are found in a growing digital divide literature. The general skills-based digital divide has been studied for at least two decades (DiMaggio et al. 2004), also in relation to public services. As argued by Lips (Lips 2019, 228), there are two ways in which citizens can be divided in how well they acquire digital public services. First, there are divisions determined by their ability and skill to use public digital services when using digital public services; and second, by how well the government manages to utilise data regarding the citizen in providing services. Considering the previously described framework, the services that are designed to provide a tailored service typically require a greater contribution from the citizen. This contribution may be hindered by a lack of skill or knowledge. In services where the government has reduced the citizens' contribution and

instead uses data about the citizen as a means of co-production, a lack of data is the primary limitation.

Requiring citizens to self-service and provide the necessary data for digitised services places additional burdens on them, especially when they have no alternative channel. These types of administrative burdens can exclude citizens who are unable to take them on from receiving the service (Herd and Moynihan 2010, 2019), or force them to find alternative strategies for acquiring services (Madsen and Kræmmergaard 2016). As digital application platforms have become more common, NAV has seen a substantial increase in applications that are turned down. One of the reasons for this increase is that citizens, removed from the assistance offered by frontline bureaucrats, may lack the skills or knowledge necessary to applying correctly over the internet (Mandal et al. 2016). While internet access is not as exclusive as it once was, there is still a digital divide in terms of how widespread digital access and competency are across the population (Van Deursen and Van Dijk 2019). Furthermore, even groups that are usually familiar with digital technology, such as young people, may still have problems using digital services provided by the government (Van Deursen and Helsper 2015). However, while the issue may be a lack of competency, there can also be other explanations for the divide. For instance, many young or educated people may lack the motivation to use online services, as they are dissatisfied with what they are being offered or they mistrust the government's digital offering (Thorgersen 2017; Reddick 2005). Public digital services must therefore appeal to a wide range of citizen capabilities and expectations.

Turning to the data divide, recent research into public services has looked at streamlined or automated services based on the government's own data (Widlak and Peeters 2020; Scholta et al. 2019; Peeters and Widlak 2018; Wihlborg, Larsson, and Hedström 2016). Governments usually collect substantial amounts of data about their citizens, and from this wellspring, the needs of citizens can be met or even predicted (Dornan and Hudson 2003). However, a citizen may think they are entitled to a service but then be excluded if data in the digital systems are interpreted otherwise. A similar example of such failure can be found among some immigrant workers in Scandinavia, who are unable to easily claim benefits, since they lack the necessary digital ID (Jaakkola 2018). If the quality of data is insufficient, the service either fails or creates inferior value (Wihlborg, Larsson, and Hedström 2016). Since digital systems operate with an information architecture unrelated to

the demands of policy execution, there will be cases where services cannot be provided simply because the citizen does not conform to the expectations of the data in the system (Peeters and Widlak 2018). In NAV's service, people of a lower socioeconomic status are less likely to be covered by proactive automation (Larsson 2021). All these possible limitations of automation might also become more difficult to adjust and control for if the creation of automated systems is outsourced to external providers (Dickinson and Yates 2021). While these examples show how a lack of data can bar citizens from receiving the value associated with a simplified process, for some citizens even the inclusion of data about them can be destructive to the support they receive from government programs. As public agencies share data amongst themselves, some citizens may find that the data used by the government when co-producing services on their behalf is hostile to their interests. For instance, data collection and automation have been used by governmental agencies as tools to cut costs by moving citizens more efficiently off welfare services and benefits (Eubanks 2018). Consequently, the type of governmental data that can improve some citizens' access to public services and benefits can also be exclusionary to others (Widlak and Peeters 2020; Peeters and Widlak 2018).

#### 4. Discussion and conclusion

The framework above, developed from previous literature in the field of digital government and the NAV case, describes the justifications for what we argue are the primary digital innovations used by public administrators to increase the co-production value of public services. The present paper has argued that new digital services are designed to enable either simplification or a greater degree of service tailoring. In tailored services, citizens have to contribute more, either by providing the information that allows for the tailoring or by interacting with civil servants. On the other hand, simplified services require the government to dictate how a service is created, removing, as much as possible, meaningful input from the citizen.

Most striking is the impact digitalisation can have on citizen empowerment. A tailored service can empower a citizen to find opportunities for co-producing with the government, but it is also dependent on the citizen's active participation. Citizen empowerment, in general, is not without criticism, as some scholars have argued that the relationship between neo-liberal policies and a "responsibilisation" of the citizen results in a



government that is less willing to intervene to help citizens (Juhila, Raitakari, and Hall 2016; Trnka and Trundle 2014). This is evident in NAV's self-service options and dialogue services, which depend on the citizen's active and correct use to be beneficial. As such, tailored services align most with the New Public Management-oriented view of co-production. As described by Brudney and England (1983) on how governmental agencies pursue co-production to cut costs, tailored services allow willing and able citizens to increase the value they receive by being more active co-producers.

While it is relevant to ask which citizens are excluded from this value creation, some citizens might also become "super-users", being able to acquire additional value from public services (Rumball-Smith, Shekelle, and Damberg 2018). This makes the difference between those who can contribute to additional value and those who cannot even greater. For those who lack the ability to efficiently digitally coproduce value, whether a digital service is empowering or contributes to responsabilisation depends on whether the citizen can acquire the value from a public programme without having to use the digital format. It cannot be considered empowering if a citizen has no option for acquiring a public service other than a digital service they are not able to use properly. There is, however, a counterargument to be made: that digital solutions level the playing field, allowing for people of disenfranchised background to mobilize and use their digital capital to create value for themselves and their community (Xu and Tang 2020).

While online self-service and dialogue require the citizen to participate, automation and government registries can enable the government to act with little or no input from the citizen. In NAV's automated services, citizens can receive services with very little work, and in some instances even receive them without active participation. This simplification reduces the role of the citizen's role as co-producer in public encounters. In other words, the co-production process has been digitalised; the citizen remains a co-producer of value, but their conscious participation has been replaced by the data derived from their life and activities. In a sense, it is co-production by proxy. If neo-liberal responsabilisation was a strategy to downsize government bureaucracies, it has come full circle with digitalisation: automated systems can produce services with very little administrative cost and without the citizen's having to take responsibility. While it is possible to argue that citizens should take responsibility when acquiring services and thus are partly to blame when they fail to do so, it is harder to justify data-driven exclusion.

Different government agencies can also have conflicting interests in how data is best collected and used. This sort of tension in expectations across different levels of the public sector's value-creating ecosystem can have a negative effect on the creation of value (Strokosch and Osborne 2020). There is, however, a danger that public administrators end up being stuck in a "damned if you do, and damned if you don't" situation, as digitalisation is expected from most parts of society, despite potentially being detrimental to some agencies' wider societal agendas. Such public value conflicts need to be identified and analysed if they are to be successfully accommodated (Røhnebæk and Breit 2021).

Maximizing or minimizing the contribution of one participant downplays other considerations. Making one of the parties more dominant in the co-production also means that the consequences of their failures become more significant. If the citizen is made more responsible, they can fail to take this responsibility, and the government might not be able to provide the same level of service quality to all citizens. A question related to this has been raised by Herd and Moynihan (2010), who ask how much disparity is acceptable when services are more accessible to some than to others. For public administrators, the question is how to balance the value digitalisation can have for different groups of citizens. While simplification of services can be beneficial to a majority, the need for services tailored to a minority should be evaluated. The existence of a wide range of dependent users of public digital services necessitates a great deal of flexibility in these services in order to meet the needs of all citizens. Furthermore, in cases where a digital solution cannot meet the needs of some citizens, public administrators must ensure that alternatives of equal value exist.

In research and practice on public service management and service design, co-production is often viewed outside the wider implications of social policy (Osborne 2020). However, being less able to benefit from a digital service can not only create negative outcomes for individual citizens, but also have ramifications on a larger scale. An important consideration in understanding the co-production of public services is thus the value it creates not only for the individual citizen, but for society as a whole. These issues are increasingly being discussed within the public value literature (Scott, DeLone, and Golden 2016; Bannister and Connolly 2014; Hellang and Flak 2012). While the ability of digital technology in public services to create great value for individual citizens is recognised, a growing concern is that this value is unevenly distributed. Therefore, increased government

digitisation might increase societal exclusion and have a negative impact on the government's ability to deliver social policies equitably.

With this in mind, the framework brings forward several possible research questions regarding the use of the different types of innovations, their limits, and the relationship between them. A good starting point for identifying divides in citizens' ability to use digital services is Lips' (2019) digital divide framework. Lips' framework not only distinguishes between a data and technology usage divide, but also further divides each category into different reasons for why there is a divide. While skill and knowledge disparities could make citizens less effective co-producers, a lack of trust and perceived benefit can also make them less willing to co-produce. In addition to this, it might be relevant to explore the difference between dialogue services and self-service, as both require many of the same digital skills; there might, however, be differences between citizens who prefer the impersonal act of self-servicing over digital dialogue.

In the two data-oriented types of co-production, registry data replaces some of a citizen's conscious participation. While questions regarding the categorisation and ordering of personal data has been explored with great rigour (Bowker and Star 2000), the increasing application of structured data in public services creates new questions related to the consequences of information management in public services. For the services that are completely automated, the mechanics that decide if a person is included or excluded seem particularly relevant. As some researchers have argued that marginalised groups in the population are being under-supported by public benefits, goods, and services (Le Grand 2018; Standing 2011), full automation could give some citizens an inside track to public services at the expense of others. The decision to use registry data over self-service during more active co-production is also illustrative of whether a governmental agency trusts its own data rather than the citizen's direct contribution. As such, the level of trust awarded to citizens as influential co-producers or mere passengers in a process largely controlled by the government is worth further study.

There is also a need for further empirical study of how the design of public digital services can either mitigate or reinforce these limitations. This is particularly important for public services that are not aimed at specific groups but have a wide range of users in the population. Such policy studies would require data from the government itself, affirming the importance of making such data available for study. While the large amount of data stored in

digital systems might present unique challenges when analysed, they can give a unique insight into actual behaviours and outcomes when studied from a policy perspective (Dunleavy 2016). The present study has only looked at digital solutions as stand-alone services. However, digital platforms are ideal for creating multiple services that work together, offering simplification to some and tailoring to others. An example would be a chatbot that handles simple requests with artificial intelligence, while also moving a conversation, if the interaction became too complex, seamlessly over to a human caseworker. While such multi-layered digital services may not resolve all the limitations of digital services, they might provide some relief. However, such services would be costlier for public agencies to develop and operate.

The present study, having been developed using findings from Norway, could also benefit from a look beyond the Norwegian context to evaluate the applicability of the framework and to achieve a more comprehensive understanding of why and when governments use different strategies for digitalisation. In some instances, NAV has sought to simplify, for example, how citizens claim benefits, while at other times it has opened channels for more comprehensive interaction between the government and the citizen. The relationship between the purpose of the service and how it is digitised remains an important question when considering digital co-production, especially considering how the divides discussed in this paper may lessen the value of digital services for some citizens. Furthermore, the technologically-oriented framework offered by Lember, Brandsen, and Tönurist (2019) contains even more emerging types of digital innovation, not yet fully realised in Norway. As more empirical studies are conducted on public encounters supported by cutting-edge digital systems, they need to be taken into consideration when theorising about digital co-production.

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