

## **Inclusion through proactive public services**

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# Inclusion through proactive public services: findings from the Netherlands

Classifying and designing proactivity through understanding service eligibility and delivery processes

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## ABSTRACT

The COVID-19 pandemic highlights the dependence on digital public service delivery in many nations. The intensified use of digital public services also shifted the spotlight to accessibility and reactive design of digital public services. Inspired by the high level of proactivity provided in commercial digital services, policy-makers are looking for guidance on employing the vast amount of (personal) data available at various public agencies to proactively aid citizens during important life events. Proactivity, however, is a very complex multi-level concept with a myriad of case-specific forms and conditions and is not always desired. Moreover, there is little guidance in the literature on how to classify the level of proactivity and design more proactive public services. The objective of this paper is to provide guidance for classifying, understanding, and designing proactivity. Drawing on previous conceptualizations in literature, this paper introduces a proactivity classification framework that is substantiated using empirical cases from the Netherlands. We found that fully proactive services are not always desired or possible due to public service characteristics. The two key variables in this framework – service eligibility and service delivery – were used to propose design principles for increasing public services' proactivity. The principles were validated and prioritized by four public service innovators. Policy-makers looking to enhance inclusivity through service proactivity can start by classifying current services and integrating the design principles in their innovation roadmap.

## CCS CONCEPTS

• **General and reference** → Document types; General conference proceedings.

## KEYWORDS

Proactive services, proactive government, inclusion, digital government, design principles, transformation, public service innovation



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## 1 INTRODUCTION

Several studies suggest that proactive public services – services that require minimum effort of citizens and businesses – are the next step in the e-government roadmap [1], [2], [3], [4], [5], [6]. For instance, Taiwan's fourth e-government strategy includes a significant commitment to "proactive" service and information delivery [2]. The same focus can be observed in Estonia [4]. A key driver for proactivity is the widespread adoption of digital services in societies since they lay a foundation for digital interactions with citizens [7]. More and more citizens are tech-savvy and use a myriad of web portals and apps in their interactions with banks, insurance companies, and e-commerce platforms. Another driver is the massive amount of open and personal data – about citizens, policies, and services – available at various government agencies [8]. Citizens that use the data-driven services offered by the Big tech platforms have gotten used to a high level of personalization and instant gratification in the private sector. Google and Amazon often know and recommend what you need before you start looking for it. This stands in sharp contrast to public services that often require citizens to navigate through various government agencies, interpret eligibility criteria, find and fill in the proper (digital) service forms, sometimes at various agencies in a specific order. In the Netherlands, governmental institutions are highly autonomous and separated into different agencies tasked with policy creation, service delivery or supervision [9]. As citizens would not trigger services themselves anymore, proactive public services require exchanging information between different governmental organizations, which requires some level of collaboration. Although some government agencies are already providing services in a moderately proactive manner through automated data analysis and service delivery, the call for more proactive services is rising. In the latest National Digital Government Agenda<sup>1</sup>, proactivity is considered a spearhead in public

<sup>1</sup>Digitale overheid.nl (2020) NL DIGIbeter2020 Agenda. Retrieved from: <https://www.digitaleoverheid.nl/wp-content/uploads/sites/8/2020/07/nl-digibeter-2020.pdf>

service innovation efforts. Proactivity stands for a more citizen-centric approach and can pave the road towards more inclusive public services, enabling the less tech-savvy to benefit from various government agencies' full spectrum of services. Moreover, proactivity is even touted to be a prerequisite for an inclusive, fair and just society, because it can enhance citizens' equal access to public services [10], [11].

Considering the complexity, there are concerns that those who are most in need of services – but cannot deal with complex eligibility processes – cannot or are afraid to request the services and benefits they are eligible for. For example, in 2019 it was estimated that around half of all elderly citizens entitled to a supplementary income to their National Old Age pension, did not make use of their right to use this service.<sup>2</sup> There is, however, an important caveat to be made. Despite the benefits of proactivity, there are examples where forms of proactivity can have socially undesirable consequences, such as stigmatization and lack of transparency as to how decisions are made. A recent scandal in the Netherlands illustrates this. Thousands of families were wrongly profiled as being fraudulent and were told to repay child welfare subsidies.<sup>3</sup> It eventually led to the Cabinet's resignation.

This illustrates the challenges in the journey of becoming more proactive as a government: which services can and should be more proactive and what level of proactivity is needed under which conditions? Which checks and balances should be in place? Should citizens be able to choose between a reactive service and a proactive service themselves? And how can a citizen exercise control (e.g., opt-out) and view or correct the data that is used as input for service delivery? Moreover, how can responsibility for its correctness and its consequences be taken or ensured? While there are some studies on designing proactive services [1], [2], [3], [4], [5], [6], we lack a deeper understanding of what proactivity actually means and how we can determine the level of proactivity that is both possible and desirable for a particular service.

The objective of this paper is to provide guidance to researchers and policy-makers looking to determine which services can be more proactive and what level of proactivity is possible. We focus on two research questions: (1) how can we classify the current level of proactivity in public services and (2) which design principles can help to enhance the level of proactivity? Responding to the need to deepen the conceptualization of proactivity, this paper proposes a proactivity classification framework and design principles focused on enhancing the level of proactivity.

This paper proceeds as follows. Section two describes the design science research approach that was followed to answer the research questions. Section three presents the results of our literature review. Section four presents the analytical framework that can be used to classify public services based on their level of proactivity. This section also presents a framework of design principles for governmental organizations to transform their services towards a higher level of proactivity. The design principles derived from this framework are presented in section five. A discussion of the results

is presented in section six. Lastly, this paper is concluded and the limitations of this paper as well as avenues for further research are discussed.

## 2 RESEARCH APPROACH

This paper aims to develop guidance for determining which services can become more proactive and what level of proactivity is needed. This paper follows the design science research approach [12] as this approach allows for combining research instruments for deepening our understanding and prescribing validated principles for enhancing proactivity. Figure 1 presents an overview of the research approach.

First, relevant knowledge was extracted through a systematic literature review [13], which yielded 59 articles, of which ultimately 12 proved to be relevant for this study. Section three provides more details. Next, the business needs were determined by exploring cases of the (proactivity of) public service delivery of governmental service providers in the Netherlands through a combination of semi-structured interviews and desk research. A total of four interviews were conducted with three governmental service providers operating in the Netherlands. Interviews lasted between 60 and 90 minutes and were conducted in the period from August 2020 through September 2020. The information obtained was used to develop the initial list of design principles, which was consequentially evaluated and refined through interviews.

This paper's two main design artefacts are the classification framework (discussed in section four) and the design principles (presented in section five). The first design artefact, the classification framework, provides a lens for studying the level of proactivity of public services. The second design artefact is a coherent set of design principles for enhancing proactivity. The principles are inspired by the literature and the business needs stated in cases.

Design principles are useful because of their focus on goal attainment. This is imperative because public services are often designed and delivered in a multi-actor environment, spanning multiple governmental organisations with different legal mandates, different goals, legacy systems and resources. Design principles are more abstract than requirements and constraints, which increases the possibility for these actors to agree upon them, since it leaves more room for architects and IT developers to adapt their systems to the specific business environment of their respective organizations [14].

## 3 LITERATURE REVIEW

We performed a literature review using Scopus in the second half of 2020. The goal of the literature review was to identify and select academic contributions on understanding, classifying and designing proactive public services delivered by governmental organizations to citizens through digital channels. Based on this scope, together with the keywords of already discovered articles and their corresponding keywords, the following keywords were selected: 'Proactiv\*', 'E-govern\*' and 'Service\*'. The asterisks are placed to get results containing both 'Proactive' and 'Proactivity', 'Service' and 'Services' and 'E-government' and 'E-governance'. This search in Scopus resulted in 59 articles. The results were manually filtered based on their abstracts to include only those articles that

<sup>2</sup>Algemene Rekenkamer. (2019) Ouderdomsregeling ontleed. Retrieved from: <https://www.rekenkamer.nl/publicaties/rapporten/2019/11/13/ouderdomsregelingen-ontleed>

<sup>3</sup><https://edition.cnn.com/2021/01/15/europe/netherlands-government-resigns-scandal-intl/index.html>

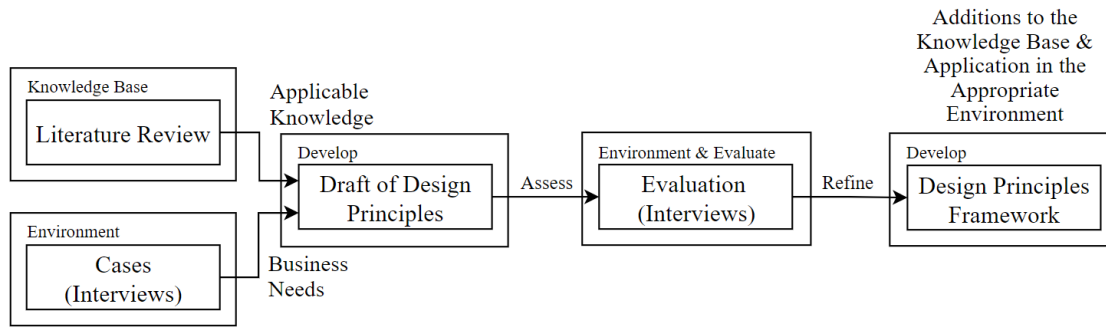


Figure 1: Research approach

focused explicitly on proactive public service delivery or development, which resulted in the selection of 12 papers. The outcomes show the limited attention given to this field.

We found that while proactivity is about moving the required initiative from the citizen to the government [2], proactivity can be incorporated into public services to a degree where a citizen does not have to put in any effort to receive a service [10]. Some studies argue that not all public services can be transformed into proactive services [1], [2], [3], [6]. However, many services can benefit from the incorporation of proactivity to a certain level. These different desired levels of proactivity depend on their characteristics and acceptance of the citizen. Within the framework of Brüggemeier [15] an interesting pattern can be observed, which is that an inverse relationship exists regarding proactivity and the amount of interaction effort a citizen has to put in the entire service process. This is applicable to triggering the service itself, as well as for the provision of information that is required to be able to deliver that service. Overall, the literature suggests that the most critical factor determining the level of proactivity of public services is the amount of effort required from a citizen, which depends on the triggering actor and the amount of information and number of interactions requested from a citizen [1], [16]. From the literature review, we conclude that public services cannot simply be dichotomously classified as either reactive or proactive. More levels of proactivity exist and a more detailed classification is needed. Moreover, a wide range of service characteristics influences the suitability of a public service to be a candidate for becoming a proactive service.

## 4 CLASSIFICATION FRAMEWORK

### 4.1 The need for a framework

Only few frameworks were found in the literature review. The framework of Brüggemeier [15], as translated and described in Scholta & Lindgren [1], as well as the frameworks of Erlenheim et al. [6] and Scholta et al. [17] all address proactivity in the context of public service delivery and provided useful insights, such as the aforementioned inverse relationship between proactivity and effort required from a citizen [15], the notion of proactivity as a spectrum [6] and the *limited no-stop shop* and *no-stop shop* governmental stages [17]. However, these frameworks do not sufficiently aid in classifying (existing) individual proactive public services on a detailed level. Considering different public services have different

desired levels of proactivity and the total proactivity of public services can vary along different variables, there is a need to be able to differentiate individual services on a more detailed level than is currently possible in these existing frameworks. Therefore, we developed a new more fine-grained framework for the classification of proactive services.

### 4.2 The framework

*Fully proactive services* are services that can automatically be delivered without having to interact with a citizen. Two essential processes are required for providing these fully proactive services. Governmental organizations must be able to: (1) determine when a citizen is eligible to receive a service: *the eligibility process* & (2) be able to subsequently deliver this service to that citizen: *the delivery process*. Figure 2 presents the classification framework.

A combination of a stage in the eligibility process (E1-E5) with a stage in the delivery process (D1-D5) leads to a certain level of proactivity. If both of these processes can be fulfilled without interacting with a citizen, a service can be classified as a fully proactive service (E5+D5). If this is not possible, there are various moderate levels of proactivity possible (All other combinations). These are defined by the extent 1) to which citizens are able to determine their eligibility themselves, and 2) by the amount of information and interaction requested from a citizen. If citizens are not proactively assisted in fulfilling these processes in any way, then a service is a *reactive service* (E1/E2+D1). Understanding how proactivity is incorporated in both the eligibility and delivery process is essential for understanding the total level of proactivity in a public service. This is important since proactivity cannot be fully incorporated in all services due to their characteristics and proactivity is not always desired by citizens in services. Therefore, this framework can be used for two purposes. Firstly, it provides more understanding of the incorporation of proactivity in public services. Secondly, it can be used to classify public services based on their proactivity in more detail. The framework allows for more differentiation between moderate levels of proactivity, which can help to understand the barriers and enablers that exist for raising the level of proactivity of public services.

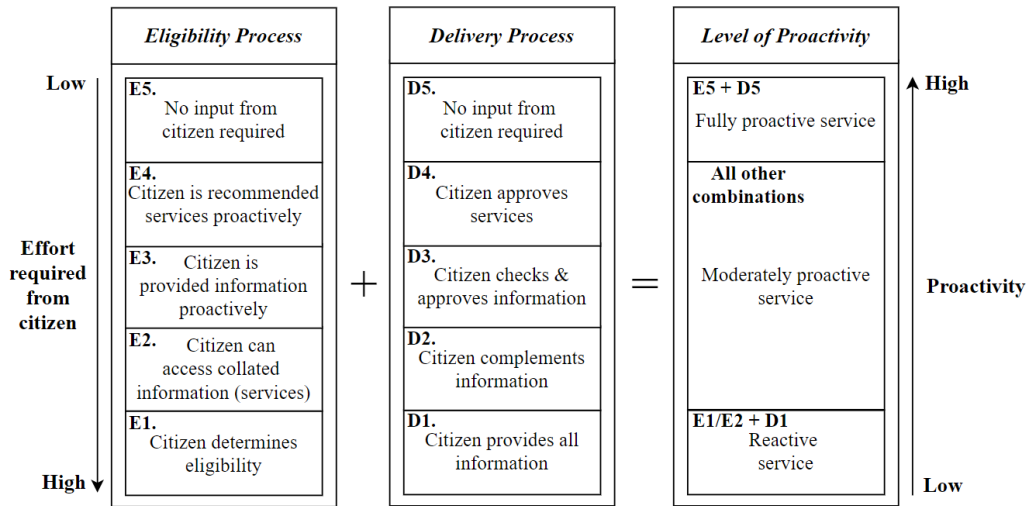


Figure 2: Classifying proactive services (derived from elements of existing frameworks [6], [15], [17]).

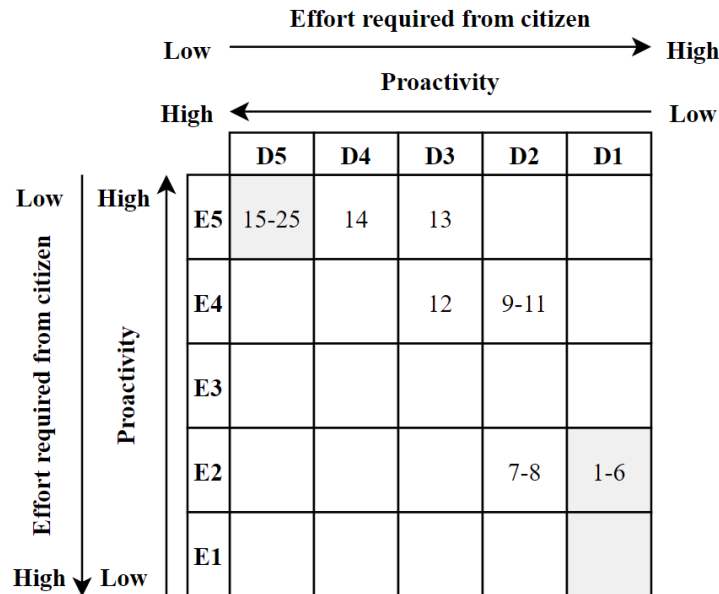


Figure 3: – Classifying proactive services

### 4.3 Substantiation and demonstration

This framework is substantiated using 25 cases of public services found in the Netherlands. These cases can be viewed as examples and are used to illustrate how the framework can classify public services. The purpose is not to get an exhaustive overview of the proactivity of all existing public services in the Netherlands, but to get an overview and understanding of the currently existing levels of proactivity of public services in the Netherlands. Cases were selected based on several criteria, including that a public service must be delivered by a governmental organisation to a citizen and require personal information or input from that citizen. Table 1 outlines the cases.

The exemplary cases have been identified through a combination of desk research and interviews with practitioners. We selected the cases using a form of stratified sampling based on the various levels of proactivity identified in figure 2. Note that the specific classifications were not evaluated further with the respective service providers and that generalization of the findings should be made with care. Next, figure 3 presents the classification of these cases.

### 4.4 General observations on the classification framework

No service could be classified as E1, meaning no public service required the citizen to individually collate information from multiple

**Table 1: – Outline of public services in the Netherlands**

#	Public service	Service provider
1	Parking permit application	Municipality
2	Birth registration	Municipality
3	Benefits application	Tax Office
4	Unemployment benefit application	Employee Insurance Agency (UWV)
5	Company registration	Chamber of Commerce (KvK)
6	Supplementary income elderly (AIO)	Social Insurance Bank (SVB)
7	Driver's license application	Vehicle Authority (RDW)
8	Study loan application	Education Executive Agency (DUO)
9	Passport renewal	Municipality
10	Child benefit application (first child)	Social Insurance Bank (SVB)
11	National Old Age pension (AOW)	Social Insurance Bank (SVB)
12	Pilot income test housing corporation	Tax Office
13	Pre-completed tax return	Tax Office
14	Statement of conduct application	Ministry of Justice and Security
15	Child benefits application (second child)	Social Insurance Bank (SVB)
16	Marriage registration	Municipality
17	Notification of death municipality	Municipality
18	Notification of death Tax Office	Tax Office
19	Notification of death DUO	Education Executive Agency (DUO)
20	Company registration Tax Office	Tax Office
21	License plate registration	Vehicle Authority (RDW)
22	Private motor vehicle and motorcycle tax (BPM)	Tax Office
23	Donor registration	Ministry of Health, Welfare and Sport
24	Study loan repayment	Education Executive Agency (DUO)
25	NL Alert	Ministry of Justice and Security

sources to determine one's eligibility. One possible explanation is that the classified public services were identified through digital desk research, which introduces a bias. Furthermore, no public service was classified as E3 either, meaning no public service provides information proactively to citizens without recommending specific services for which the citizen is eligible (like in E4). It is assumed that proactive information provision does occur, but finding proof of this through governmental websites is not done quickly. One example of proactive information provision was found during a personal interview with employees of the Employee Insurance Agency (UWV). In some situations, the customer service of the UWV can predict (financial) problems a citizen is likely to run into, based on information provided by the citizen. By linking this information to past experiences of similar users, potential future problems can be predicted and information is provided proactively to prevent that citizen from actually running into these problems.

Proactive information provision could be useful in certain individual life events, such as turning 18, for example. When a citizen turns 18 it could be proactively notified of information services related to that life event.<sup>4</sup> After that, it is up to the citizen to select the relevant services. While the service delivery stays reactive, the information is provided proactively. Whether a service is a right or a duty influences the observed proactivity in the eligibility process.

<sup>4</sup>Ministry of General Affairs: Overview of life Events. Retrieved from: <https://www.rijksoverheid.nl/onderwerpen/levensgebeurtenissen/overzicht-levensgebeurtenissen>

In the case of mandatory public services, it is often easier to determine if a citizen is eligible. Specifically, for duties like mandatory registrations in base registers or payment of taxes, proactivity can be incorporated easier as these are triggered by a certain (life) event, such as the birth or passing away of a citizen or the height of income.

#### 4.5 Specific observations from cases

When looking at the different cases, several case specific observations can be drawn. First, *consecutive services or services that build on other services can have higher levels of proactivity*. We observed this in the case of child support benefits. When a child is born, a citizen must register their child with the municipality. The municipality automatically informs the Social Insurance Bank (SVB), which informs the citizen within two to four weeks about how it can apply for child benefits at the SVB. The citizen must fill out an application after which the benefits are granted. After a second child is born and registered at the municipality, the municipality again automatically informs the SVB, after which the SVB updates the total amount of child benefits, as this is granted for each child. While the application of the first child is not a fully proactive service (E4+D2), the application for child benefits of other subsequent children is (E5+D5).

Second, *when a citizen is already a recipient of a service and therefore known in the systems of the governmental organisations more proactivity can be provided*. We observed this in the case of study loan application and repayment at the Education Executive Agency

(DUO). For a study loan application, the citizens must determine whether they are eligible to receive a study loan. Naturally, the citizen must decide for themselves whether it actually wants to receive a study loan and if so, state the amount it wants to receive as well. However, after the study loan is granted, its repayment is a fully automated process that automatically starts two years after a student has graduated, of which the date is known at DUO. The amount of repayment is based on the income of that citizen two years earlier. This information is acquired from the Tax Office. For the repayment, the citizen does not have to do anything. It could be argued that repaying the study loan is part of the initial service and agreement itself. However, the repayment and modification of the amount is a fully proactive process (E5+D5). The amount of repayment is updated each year, based on the updated income statements known at the Tax Office.

Third, *whether a service is a right or a duty, matters for the possible incorporation of proactivity*. The eligibility of a citizen can more easily be determined for services with are mandatory, such as duties, while rights can require interaction and therefore a minimum level of effort from citizens. For example, a study loan is not mandatory for citizens. It is a right, after which repayment becomes a duty. While public services, which are duties, can often be fully proactively provided to citizens, public services that are rights can only be recommended or offered to citizens, as these often require a decision and therefore interaction and effort with that citizen. Therefore, proactivity only is incorporated to a certain degree, or citizens must be opted in by default. Regarding the proactivity of the case of the study loan, the government can proactively inform all new students about the existing service. After all, the government does know when a citizen applies to a university, for example. This is not applicable to all public services, as the government cannot always know when a citizen desires a public service or information. For example, whether a citizen wants to start a company is a decision made by the citizen which cannot be known beforehand. Only after the citizen uses their right and has registered their company at the Chamber of Commerce (KvK), more proactivity can be incorporated. In this case, the Tax Office is informed automatically by the KvK, for example. However, if certain signals can be detected that a citizen might be interested or be eligible for a right, proactive information provision or proactive (offering of) services could possibly be initiated. Yet this is heavily dependent on the suitability of the public service. From these cases, it can be observed that the characteristics of a service influence its suitability for proactivity and multiple levels of proactivity can occur within the same public service. This is in line with the observations in the literature [17].

The fourth observation is the *limitations for proactivity by the General Data Protection Act or GDPR* [18]. As the Dutch government aims to give more control over their data to citizens, this definitely applicable to the case of proactive services, as these often rely on the exchange of information. An interesting case in this regard is a pilot between the housing cooperatives, the Tax Office and MijnOverheid, which is an online portal where citizens can receive and view messages from the government as well as check their personal information [9]. When applying for social housing at a housing cooperative, citizens are obliged to provide an income statement, which must be acquired from the Tax Office, to the housing cooperative. This is necessary for the housing cooperative to

determine whether and to what housing a citizen is eligible for. Citizens currently have to request this information from the Tax Office and consequently send this to the housing cooperative themselves. In the pilot citizens can digitally share their income, which has been validated by the Tax Office, with a housing cooperative. During an in-depth interview with an employee of the Tax Office, two options were discussed that could ultimately be selected, either all information can be shared with the housing cooperative, or the housing cooperative can test whether the income fulfills certain criteria, without getting to know the actual income of the citizen. Several advantages come from the solution of the piloted. The supplied data is extracted from the source and therefore validated, which reduces possibilities for fraud. The citizen no longer has to go through a frustrating process in which it has to interact with both the Tax Office and the housing cooperative. The citizen is in control and knows what is happening with their personal data. It must be mentioned that increasing the proactivity of the service was not a goal of the pilot.

It is the goal of the Dutch government to enable citizens to view and share their personal data digitally (with third parties). The pilot was meant to find out how this could be done, what rules should be applied to the process and find out what needs to be done for implementation. However, it can be argued that the proactivity has increased. Instead of having to interact with two governmental organisations and having to provide all the information (D1), the citizen now only has to check and approve their information and share it with a simple click of the button (D3). The service could theoretically have a higher level of proactivity if the housing cooperative would be allowed to do the income test themselves and no effort from the citizen would be required anymore (D5). In this pilot however, it was purposefully designed to have the citizen perform the action of sharing their personal data themselves to keep the citizen in control.

The fifth observation is that *having citizens in control of their data and requiring them to be the actor that decides what personal data can be shared with whom, every time data needs to be exchanged, somewhat conflicts with the purpose of fully proactive services in which the initiative is moved from citizens to the government and no input of citizens is required anymore*. While at first this might seem like a problem, it does not necessarily have to be. Fully proactive services could be useful in certain scenarios or public services. Having the citizen in control of their personal data is a desired outcome of the Dutch government, but if a citizen has to perform effort every time it shares data, the citizen can become fed up with the required effort quickly. Therefore, fully proactive services can probably be an outcome for certain public services. Moreover, if fully proactive services prove not to comply with citizens being in control and having grip on their data, proactivity can still be incorporated to a certain (moderate) level. Again, when looking at the example of the housing cooperative, a citizen has control over their data and can decide to share their personal information with a third party themselves, however, the minimization of the effort that is required from the citizen is still desirable, just as having the service recommended to the citizen is desired. Moreover, it must be noted that the housing cooperative is a third party for which the government wants citizens to be in control. This does not necessarily have to be the same for information exchange between governmental organisations. The goal of the pilot was not to develop a fully proactive



service, but to allow the citizen to share their data and be in control at the same time. However, how such data sharing systems will be designed and facilitated in the future will influence to what extent proactivity can be incorporated. Many different possible designs of data sharing systems exist. No one-size-fits-all solutions exists as each different system requires customization to their specific context.

These design choices regarding sharing of information will be influenced by several interconnected components, such as technology, governance and context, which cannot be viewed separately as changes within these components influence each other.

In summary, public services can have varying levels of proactivity for different situations. Furthermore, if it turns out fully proactive services are undesirable for certain public services as more control for the citizen is desired, this does not mean proactivity is completely undesired. This would mean a lower level of proactivity is desired. Therefore, it is essential is to understand the different moderate levels of proactivity as provided in our framework in figure 3.

## 5 DESIGN PRINCIPLES

### 5.1 Overview

This section presents a set of principles that researchers and government officials can use to enhance the level of proactivity of public services. Principles are defined as normative and directive statements that can guide actors in designing proactive services. Governmental organizations in the Netherlands are operating in a multi-actor environment in which different organizations have different (individual) goals. Principles are useful in such environments since they focus on goal attainment instead of providing specific solutions, which can limit the ability of information architects to develop creative solutions for their specific situation.

The principles are inspired by the literature and business needs stated in cases and use elements of existing principles for (proactive) public services of [6] and the Dutch Governmental Reference Architecture (NORA) principles, which contain government-wide agreements which aim to enable and improve digital public service delivery.

Table 2 provides an overview of the design principles. The principles are structured using the template of architecture principles of The Open Group (TOGAF). Each principle contains a name, statement, rationale, and implications. The name should represent the essence of the rule, be easy to remember and do not contain ambiguous or unnecessary words, the statement should briefly and unambiguously communicate the fundamental rule, the rationale should describe the benefits of following the principle and describe relations with other principles and how these should be combined, the implications should explain the (potential) impacts to both the business and IT regarding adopting a principle in terms of resources, costs or activities.

### 5.2 Evaluating the design principles

The first draft of design principles was evaluated in an online workshop with four public service innovation experts, experienced in public sector innovation and knowledgeable of the concept of proactive services. The principles were evaluated on four criteria: clarity,

consistency, completeness and usability. These criteria were developed by the authors, as no existing applicable set of evaluation criteria for design principles were found.

- Clarity, meaning the extent to which the principles are clear and understandable.
- Consistency, meaning the extent to which the principles are consistent and coherent both for the different elements in their structure as well as for the overall set of design principles.
- Completeness, meaning the extent to which the principles are complete, that is, without important elements missing.
- Usability, meaning the extent to which the use of the principles would achieve their desired specified goal of achieving proactive services.

After an online presentation on the goals of this study, a short introduction to the subject and substantiation of the development of the design principles was given. Next, four real public service cases were presented in order to focus the attention and reference framework of the experts. These cases were discussed in a 'before the principles are applied' and 'after the principles are applied' manner. This gave the participants some feeling of the expected impact of the design principles. Afterwards the evaluation criteria were presented, after which each principle was presented and evaluated individually. Finally, the experts were invited to rate both each individual and the complete set of design principles on a 5-point Likert scale. Table 3 presents the means of the ratings during the evaluation session with the innovation.

The criteria were rated on a five-point Likert scale (1-5) both individually as well as for the whole set of design principles. The overall average given rating was high (4.5). Of the four criteria, clarity was rated highest. The completeness of the individual principles was rated slightly lower than the other criteria, although the completeness of the overall set of design principles was rated higher. This indicates that while the overall set of design principles is not missing any elements, the individual principles could become more complete. This is understandable, however, due to the overlapping challenges of proactive services, such as information exchange and consent, which were discussed by the participants. Furthermore, interestingly enough, while the individual principles were rated as very consistent (4.6), the consistency of the overall set of design principles was rated significantly lower (3.4). When looking at the principles, minimization of interaction was rated highest (4.8), while minimization of the requested information was rated the lowest (4.0).

The main observation that is drawn from the ratings is that the mean of all given ratings based on the four presented criteria was high, which means the feedback was generally positive. However, please note that the sample size was rather small.

## 6 DISCUSSION

Even though not all services can become fully proactive services, several indications can be given for their suitability to become proactive based on certain service characteristics. First of all, whether a service has the ability to become a (fully) proactive service will depend on whether a service can be triggered and delivered without



**Table 2: Overview of design principles**

Name	Statement	Rationale	Implications
1. Government in the lead.	Governmental organisations must take the initiative to provide services to citizens.	More ease of use is experienced as citizens do not have to determine when and how to initiate services themselves, while services can be provided more efficiently by governmental organisations.	Governmental organisations actively identify what services are needed when by what target groups or individual citizens and consequently initiate service delivery, recommend services, or provide relevant information to the citizen when eligibility cannot be determined completely. This can be achieved both through civil servants or information systems and is applicable to services of other governmental organisations as well.
2. Citizen in control.	Citizens must be in control of the use and exchange of their personal information and can specify their desired level of proactivity.	Forced fully proactive service delivery or exchange of information, without the citizen being in control, can result in privacy issues and service rejection. By enabling citizens to decide the amount of initiative they want to keep themselves or want to give away, citizens are in control, but can enjoy the benefits of (fully) proactive service delivery as well.	Every service (situation) has a substantiation of when and why consent is required or not for both the exchange of information as well as the actual (level of proactivity of the) service delivery. Citizens are always able to opt-out and opt back in (fully) proactive services delivery. Fully proactive services are always accompanied by the possibility to opt-out. This means services should be able to be provided along different (lower) levels of proactivity.
3. Minimal interactions.	Citizens' total number and effort required during interactions with governmental organisations must be minimized.	Governmental organisations provide services automatically, without interacting with the citizen, or if this cannot be achieved, in a single interaction in which the effort required from a citizen is minimized as well, if possible to a single click of a button. This will increase the ease of use for the citizen.	Proactive services require a substantiation of the minimal required amount of interaction. This requires an assessment of all possible consequences for the recipient, (ir)reversibility, stakeholder responsibilities, information quality, individual preferences and desirability. Furthermore, for every service, related and complementary services should be known and (processes of) services should be able to be combined or bundled as this can decrease the total amount of interactions with the citizen.
4. Data minimisation.	Citizens are not to be bothered with information requests already available in public systems.	Retrieving information from another source than the citizen can possibly result in higher quality information, which can be acquired faster, thereby increasing overall service efficiency. Consequently, the user experience will improve due to data minimization.	Governmental organisations only use, exchange and re-use information known at other governmental organisations and, if applicable for public service delivery, third parties (once only-principle). If necessary, the citizen can be asked to verify the correctness of the information. Eligibility criteria should be simple and based on readily available information.
5. Personalized services and delivery.	Citizens are provided services tailored to their individual situation, needs and preferences.	Personalized services and personalized delivery increases ease of use and minimize interaction for citizens.	Personalized services can be achieved through bundling and combining of services. This requires interoperability or modular design of (processes of) services. Personalized service delivery is achieved through gathering and sharing customer information by governmental organisations to identify the individual needs and preferences of citizens for which legal and practical implications have been investigated. Note that personalized services are not a .
6. Understand-ability.	Citizens must be able to understand when, how and why services are provided.	Informing and ensuring citizens understand when, how and why services are offered is essential for the acceptance of proactivity as well as a requirement for giving consent and being in control.	Transparency of how the proactive offering came to be is required. Citizens should always be informed of triggered services, decisions made and the underlying used and exchanged information. This should be accompanied by an overview of all involved stakeholders, along with their obligations and responsibilities. This should be done in a simple and user-friendly manner and should be able to be accessed and (re)viewed at later moments in time.

**Table 3: Mean results for the design principles**

	Clarity:	Consistency:	Completeness:	Usability:	Total principle mean:
1. Government in the lead.	4.8	4.5	4.5	4.8	4.7
2. Citizen in control.	4.5	4	3.3	4.8	4.2
3. Minimal interactions.	5	4.5	4.8	4.8	4.8
4. Data minimisation.	4.3	4.8	3.5	3.3	4
5. Personalized services and delivery.	4.3	4.8	4.5	3.5	4.3
6. Understandability.	5	5	4.3	4.3	4.7
Criteria mean.	4.7	4.6	4.2	4.3	4.5
Total framework of design principles.	4.6	3.4	4.5	4.2	4.2

(or with minimal) involvement of the citizen. This will often decrease as service complexity increases. Furthermore, the suitability of proactivity depends not only on its achievability but also on its desirability. The maximum achievable level of proactivity will be dependent on the level of initiative a citizen will want to keep or give away to the government regarding their personal information and service delivery. Moreover, this will depend on certain service characteristics. Fully proactive services (E5+D5) can be suitable for compulsory services, have clear eligibility criteria, and have no negative consequences for citizens [1]. Fully proactive services can be rejected by citizens for services as they might need to use sensitive personal information. Services that are rights and require the expression of the will of a citizen, therefore, require interaction. This means their maximum level of proactivity will be (E5+D4), which are click-of-a-button services. For services that could have negative consequences for citizens, this interaction could present the ability for citizens to take responsibility for the correctness of the information and to accept the possibility for these adverse consequences to occur. For example, in the case of the pre-completed tax return (VIA) (E5+D3) of the Tax Office, citizens check and, if necessary, complement the pre-filled information of their tax return and take responsibility for its correctness. Besides the aforementioned core elements of proactive services, several interesting additional elements can be incorporated to enable or stimulate more proactivity, such as life event orientation, predictivity, personalization or bundling and combining of services, but it must be noted that these are not essential for achieving (fully) proactive services.

Policy-makers can develop proactive services by applying the design principles. This means proactive services can be achieved by having the government lead and minimize interaction and information requested from the citizen. Moreover, for proactive services to be desired and accepted by citizens, it must be ensured that citizens can understand and be in control of these services and their personal information, which is an aspiration of the Dutch government. Personalization of services and service delivery can help in both instances. However, other strategies can be identified for stimulating the development of more proactive services. Since proactive services are heavily dependent on information exchange, enabling more information exchange or reducing the information that needs to be exchanged for public service delivery will stimulate proactive service development. This can be done by modifying existing laws and regulations to enable information exchange for proactive

purposes, enabling the citizen to consent to the required information exchange or by designing policies and services and their eligibility criteria to be solely based on the readily available and exchangeable information. Such bottom-up informational proactive policy design could contribute to a solution for existing tensions between policy-makers and service providers, where promises made by policy-makers can be delivered in an efficient, but perhaps even more important, executable and feasible way. This will require making political and ethical decisions and trade-offs at multiple levels, which are not investigated for this paper. Moreover, the dependency on information exchange means that proactive service development is subjected to developments and decisions made regarding how information exchange is or will be enabled in the Netherlands in the future. In the context of (fully) proactive services, enabling citizens to share their personal information manually only once is insufficient. The citizen should be enabled to consent or 'opt-in' to (future) information exchange for proactive purposes.

## 7 CONCLUSIONS, LIMITATIONS AND FURTHER RESEARCH

### 7.1 Conclusions

Proactive public services have the potential to raise the quality of digital public service delivery. In the near future citizens could experience more ease of use in some public services, and governmental service providers can deliver some of their services more efficiently, while still ensuring that those who need these services the most actually get them. While more and more policy-makers may recognize the benefits of a proactive government, jumping from reactive to proactive services is a significant leap. Proactive service development is a multidimensional challenge requiring expertise from various domains, including various laws (administrative, data protection, human rights), ethics, policymaking and information technologies. In an abstract sense, proactivity is about moving the initiative from the citizen to the government and can be incorporated in many different ways in public services. Our research shows that we should talk about the different levels of proactivity, instead of viewing it as a dichotomous variable. To determine a potential level of proactivity, it is essential to zoom in on the eligibility and delivery processes of public services. We found that different public services will have different desired levels of proactivity in different situations or for different citizens. No one-size-fits-all solution will

be applicable. Fully proactive services may not always be possible or desired and could even be disadvantageous for citizens. Some public services are more suitable for the incorporation of proactivity than others due to their characteristics. The amount of effort that is demanded from a citizen in the eligibility process and the delivery process will determine the level of proactivity of a public service. Finally, the presented design principles can be used to stimulate proactive service design.

## 7.2 Limitations

This research has three major limitations. First and foremost is the limited institutional and cultural context (i.e., public services in the Netherlands) in which we conducted this study. Other countries may provide different institutional and cultural contexts with different public service design and delivery cultures and methods. The second limitation lies in the reflection on the design principles synthesized in this study. We do not compare or adjust these principles with principles found in other studies. This could lead to a more comprehensive and concise set of design principles. We also do not zoom into design principles that focus on other goals, such as security, ease of use, cost, flexibility, scalability, data quality and service performance. A third limitation lies in the principle evaluation approach. We performed one evaluation session with four participants, which is too low to draw generalizable conclusions.

## 7.3 Further research

To progress the development of proactive public services, we highlight five research avenues for future research. The first is on the scope of public services. The scope of this study was limited to services provided to citizens, without investigating services provided to businesses, which could reveal different proactivity enhancement directions, as less personal information has to be exchanged. The second avenue is to evaluate and enrich design principles with practitioners and users/citizens more effectively. The before and after approach may not provide the level of detail to really understand a principle. The development of clickable prototypes may provide evaluators a better understanding of the impact of the proposed principles. Moreover, this would open the opportunity to invite actual citizens, i.e., users, to the evaluation session. As a fully proactive service would require no interaction with the citizen, a visualization from the perspective of the citizen would be limited to the complementary provision of information of that service to the citizen or the visualization of how citizens could consent to or 'opt-in' proactive service delivery. The latter would be interesting to visualize, especially government-wide. A third avenue lies in the application of the framework of design principles in practice during the actual development of a proactive public service. Such an approach could contribute to further improvements as well as could help to further identify and specify what types of services, situations or target groups are most suitable for proactive service provision. The fourth is about the lock-ins of proactive services at multiple levels. As the Dutch scandal regarding child welfare shows, proactive services can be disadvantageous for citizens if not managed properly. What mechanisms should be in place to

prevent this from happening, and how do these relate to the levels of proactivity? Finally, future research may help to understand the currently implicit relations between proactivity and inclusivity. In the broadest sense, inclusivity refers to an array of variables such as citizen participation in service design and decision making, digital skills, equally accessible IT services, and assistive technologies. Since both proactivity and inclusion are multidimensional concepts the development of a theoretical framework that conceptualises the multiple dimensions may ultimately help to advance research in both areas.

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## REFERENCES

- [1] Scholta and I. Lindgren, "The Long and Winding Road of Digital Public Services—One Next Step: Proactivity.," 2019
- [2] Linders, C. Z.-P. Liao, and C.-M. Wang, "Proactive e-Governance: Flipping the service delivery model from pull to push in Taiwan," *Government Information Quarterly*, vol. 35, no. 4, Oct. 2018, doi: 10.1016/j.giq.2015.08.004
- [3] Korge, R. Erlenheim, and D. Draheim, "Designing Proactive Business Event Services," 2019
- [4] Erlenheim, "Designing Proactive Public Services. Doctoral Dissertation," Tallinn, 2019
- [5] Ayachi, I. Boukhris, S. Mellouli, N. ben Amor, and Z. Elouedi, "Proactive and reactive e-government services recommendation," *Universal Access in the Information Society*, vol. 15, no. 4, Nov. 2016, doi: 10.1007/s10209-015-0442-z
- [6] Erlenheim, D. Draheim, and K. Taveter, "Identifying design principles for proactive services through systematically understanding the reactivity-proactivity spectrum," Sep. 2020, doi: 10.1145/3428502.3428572
- [7] Androustopoulos, N. Karacapilidis, E. Loukis, and Y. Charalabidis, "Transforming the communication between citizens and government through AI-guided chatbots," *Government Information Quarterly*, 2019, doi: 10.1016/j.giq.2018.10.001
- [8] Hardy and A. Maurushat, "Opening up government data for Big Data analysis and public benefit," *Computer Law and Security Review*, vol. 33, no. 1, pp. 30–37, Feb. 2017, doi: 10.1016/j.clsr.2016.11.003
- [9] N. Bharosa, S. Lips, and D. Draheim, "Making e-Government Work: Learning from the Netherlands and Estonia," 2020, doi: 10.1007/978-3-030-58141-1\_4
- [10] B. Lee and G. A. Porumbescu, "Engendering inclusive e-government use through citizen IT training programs," *Government Information Quarterly*, vol. 36, no. 1, pp. 69–76, Jan. 2019, doi: 10.1016/j.giq.2018.11.007
- [11] J. P. A. Hsieh, A. Rai, and M. Keil, "Understanding digital inequality: Comparing continued use behavioral models of the socio-economically advantaged and disadvantaged," *MIS Quarterly: Management Information Systems*, vol. 32, no. 1, pp. 97–126, 2008, doi: 10.2307/25148830.
- [12] March, Park, and Ram, "Design Science in Information Systems Research," *MIS Quarterly*, vol. 28, no. 1, 2004, doi: 10.2307/25148625.
- [13] S. K. Boell, D. Cecez-Kecmanovic, "On being 'systematic' in literature reviews in IS," *Journal of Information Technology*, vol. 30, Nov. 2014, doi:10.1057/jit.2014.26.
- [14] Bharosa and M. Janssen, "Principle-Based Design: A Methodology and Principles for Capitalizing Design Experiences for Information Quality Assurance," *Journal of Homeland Security and Emergency Management*, vol. 12, no. 3, Jan. 2015, doi: 10.1515/jhsem-2014-0073.
- [15] M. Brüggemeier, "Auf Dem Weg Zur No-Stop-Verwaltung". *Verwaltung & Management*, vol. 16, no. 2, Mar. 2010, doi:10.5771/0947-9856-2010-2-93.
- [16] Lindgren and U. Melin, "Time to Refuel the Conceptual Discussion on Public e-Services – Revisiting How e-Services Are Manifested in Practice," 2017.
- [17] Scholta, W. Mertens, M. Kowalkiewicz, and J. Becker, "From one-stop shop to no-stop shop: An e-government stage model," *Government Information Quarterly*, vol. 36, no. 1, Jan. 2019, doi: 10.1016/j.giq.2018.11.010.
- [18] Voigt and A. von dem Bussche, *The Eu General Data Protection Regulation (gdpr): A Practical Guide*. Springer, 2017.