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**Proactive e-services:
a paradigm shift in public service delivery**

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ABSTRACT (ENGLISH VERSION)

Proactivity is a hot topic for public service innovation, it can be defined as an anticipated service delivered to citizens based on life events and the presumable user's will. As this trend is reshaping the public administration workflow in the most innovative e-governments worldwide, the actual literature is not giving the right attention to it. This work addresses the existing literature, categorising its current knowledge and proposing a new framework to interpretate this phenomenon. The result is obtained by linking interviews of proactive service experts and several use cases using an explorative research approach. The main contribution consists in using a systemic approach to fix and expand the actual knowledge about proactivity. The newly developed framework allowed to identify: the preconditions for governments and citizens to implement proactivity, the connection between proactivity and the one-stop shop, and a categorisation of the services that are currently run proactively worldwide.

ABSTRACT (ITALIAN VERSION)

La proattività è un tema caldo per l'innovazione dei servizi pubblici e può essere definita come un servizio anticipato fornito ai cittadini sulla base degli eventi della vita e della loro volontà presunta. Questa tendenza sta rimodellando il flusso di lavoro della pubblica amministrazione negli stati più all'avanguardia per quanto riguarda l'e-government, ma la ricerca non le sta dando la giusta attenzione. Questa tesi si rivolge alla letteratura categorizzandone il sapere consolidato e proponendo un nuovo modello per interpretare questo fenomeno, ottenuto collegando interviste e casi d'uso utilizzando un metodo di ricerca esplorativa. Il contributo principale consiste nell' utilizzare un approccio sistemico per consolidare e ampliare l'attuale conoscenza della proattività. Il nuovo modello creato ha permesso di identificare: le precondizioni per i governi e i cittadini per implementare la proattività, la relazione tra la proattività e il one-stop shop e una nuova categorizzazione dei servizi che sono attualmente gestiti in modo proattivo in tutto il mondo.

EXECUTIVE SUMMARY

Introduction

“E-government” is defined as the application of ICT in the public service domain (Feng, 2002). E-government implications for strategy setting in the public administration initiated the “e-governance” study field, which investigates how the electronic delivery of public services impacts on citizens and businesses (Ndou, 2004). Starting from customer relation strategies borrowed from the private sector, the “*citizen-centric approach*” brings a new way to address service users. According to this paradigm, the citizen is seen as the centre of the service design (Sirendi *et al.*, 2016). Leveraging modern technological solutions, public electronic services can become “preventive” for what concerns citizens’ needs (Sirendi *et al.*, 2016). The capability of public institutions to anticipate the need of service makes it “*proactive*”, creating a public e-service category that consists of “*direct public services provided by an authority on its own initiative in accordance with the presumed will of persons and based on the data in the databases belonging to the state information system*” (Estonia, 2017). Since proactivity is associated with the realisation of the citizen-centricity principle (Sirendi *et al.*, 2016), its achievement entails the accomplishment of other related citizen-centric goals: the fulfilment of the once-and-only principle, in which citizens should not provide information more than once and this data should be safely stored and shared by public organisations; the realisation of the one-stop-shop portal, a technical implementation of the one-stop shop principle concretised in a single point of access for every online governmental service.

This work aims at systemizing the existing knowledge, primarily drawing from developing practices and by merging the reflections coming from the literature. An extensive analysis of real-world cases was run concurrently with interviews of government representatives having experience in proactive service delivery. Proactivity is analysed contextualising its development alongside the one-stop shop, to understand the underlying aspects of its successful implementation.

Literature review

A literature review concerning e-government, e-governance and e-service has been gathered to achieve the necessary comprehension of the topics that determine the scientific foundation of this work. The appearance of the internet, and the consequent digitalisation of processes, have had a significant impact on public administration. To understand the implications of this phenomenon, the e-government research field emerged. E-government is a “*way for governments to use the most innovative ICT, particularly web-based Internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes*” (Fang, 2002). Acknowledged that e-government brings service transactions online, it is possible to draw distinctions between: Government to Citizen (G2C), which concerns interactions between the government and its citizens (Seifert, 2003); Government to Business (G2B), which contains services exchanged between government and economic sectors (Pascual, 2003); Government to Government (G2G), a category that includes services realised between governmental agencies (Gregory, 2007); Government to Employee (G2E), which consists of the relationship between e-government and its employees (Riley, 2001). A natural implication of e-government adoption is e-governance, which determines and measures the impact of electronic service transaction in public administration; studying how the ICT use impacts at various levels of government and how it can improve governance (Okot-Uma, 2001). Being a disruptive change in the public administration domain, many governments have suffered in adopting a new governance model based on ICT (Tapscott *et al.*, 2008).

When the transactions of service are run online, the term to be used is e-service. More specifically, it refers to the set of solutions and processes that allows the electronic delivery of services to users through government and digital governance initiatives (Lindgren *et al.*, 2013). E-service can: improve service efficiency, improve communication methods, introduce workflow management systems, provide broad access to information, provide an overall superior service quality (Asgarkhani, 2005).

Since ICT plays a fundamental role in the e-government/governance/service world, the literature concerning this aspect was gathered and analysed through its evolution. ICT have produced effects, since its first implementation, mainly in four sectors (Batagan *et al.*, 2009): public administration because of e-government implementations, retail with the wide-spreading use of e-commerce, education with the development of distance learning systems, and remote work. ICT consists of “*the combination of information technology with other related technologies, in particular communication technologies*” (UNESCO, 2002). Such a relevant evolution in the technical side requires an alignment with the organisational structure. For what concerns the public administration area, many barriers that prevent ICT implementation and progress can be found (Hjouj Btoush *et al.*, 2009): external barriers such as legislative interdictions, regulatory control, lack of budget and the digital divide; or internal barriers such as lack of collaboration and coordination, public-private partnership, leadership, monitoring and evaluation. From a broader perspective, four main groups could be individuated (Ebrahim *et al.*, 2005; Hjouj Btoush *et al.*, 2009; European Commission, 2004; Vassilakis *et al.*, 2005):

- Economic barriers;
- Financial barriers;
- Technical barriers;
- Political barriers;
- Organizational Barriers.

Nowadays, Big Data (“*high-volume data that frequently combines ... with continuously and automatically collected structured and unstructured real-time data*” (Mergerl *et al.*, 2016)) and Artificial Intelligence (machines replacing human with repetitive tasks (Li *et al.*, 2017)) are re-shaping e-government. Public administrations are more and more benefitting from using data, evolving towards data-driven decision-making practices. Algorithms and AI are adopted to improve processes for delivering efficient and high-quality services to citizens. AI can take data to substitute humans into taking decisions, allowing to automate services, and assuring that a large quantity of

information is processed quickly and with accuracy (Milakovic, 2012). "Data" are categorised into (Minelli *et al.*, 2013):

- Structured data: i.e., inserted in a database based on the type;
- Semi-structured data: combination of different types of data that have a model and a structure not defined as structured data;
- Unstructured data: characteristic of the last two decades since the data source has proliferated beyond operational applications.

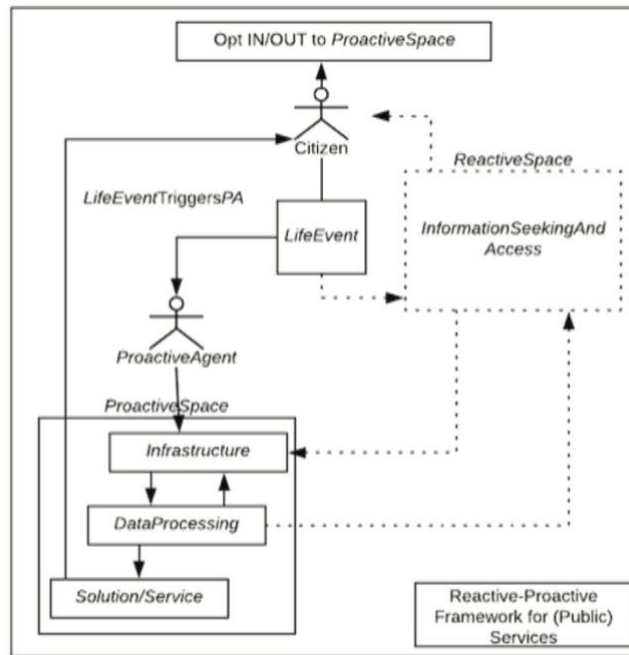
Such technologies allow a larger “personalisation” of services, both in the private and in the public sector. A trend that emerged aligned to personalisation is the “citizen-centric approach”, which aims to improve the delivery of public services to citizens via online platforms (Wang *et al.*, 2005). To measure the user-centricity of a governmental platform, an ex-post quality evaluation model can be structured to understand how the service is “centred” on the citizen (Wang *et al.*, 2005). Sirendi *et al.* (2012) develop a new approach that suggests assuming a citizen’s perspective when designing e-services, with the scope of “*anticipating their needs and wills*”. This change of perspective, which concretises the citizen-centricity principle, requires agent-oriented modelling to design the service. Hence, services need to be tailored to the ecosystem they are ingrained in to reduce citizens’ burden.

The citizen-centric approach creates the foundations for what is now considered a “*proactive e-government*”, which appears when public organisations provide “*public services on its own initiative in accordance with the presumed will of persons and based on the data in the databases belonging to the state information system*” (Estonia, 2017). Proactivity in the public administration domain contraposes itself to the traditional service paradigm, named “reactive”, where the service user explicitly requests a service to a public agency and the latter responds (Sirendi *et al.*, 2016). This category, which is an understudied field (Erlenheim *et al.*, 2020), can be considered a new branch of e-government research. The novelty of the field gave rise to various definitions of proactivity; the most comprehensive is provided by Linders *et al.* (2018): “*Proactive e-*

government shifts from the 'pull' approach of traditional e-government - whereby the citizen must first know, decide, and seek out government services - towards a 'push' model, whereby government proactively and seamlessly delivers just-in-time information and services to citizens based on their needs, circumstance, personal preferences, life events, and location". Here a list of the most significant elements to consider when dealing with proactivity (Bertot *et al.*, 2016; Linders *et al.*, 2018; Scholta *et al.*, 2019; Erlenheim *et al.*, 2020):

- "Anticipation", "demographic data", "prediction of needs";
- "From pull to push", "just-in-time information", "life-events", "presumable will";
- "No explicit request", "service trigger", "no active citizen involvement";
- "Government initiative", "automation vs consent".

Implementing proactivity, governments anticipate citizens by predicting their needs. Proactive service providers need then to look at the people's whole life cycle (Erlenheim *et al.*, 2020), paying attention to: life-events (having a child, starting education, starting a business and the related obligations, looking for a job, losing a job, relationship status, moving, health issues, crimes, retirement, death of a relative); demographic data; presumable will. A life-business event service includes all the bureaucratic steps that formerly citizens dealt with separately, merged into only one service bundle (Sirendi *et al.*, 2016). Services shall be delivered on the governmental initiative, neither triggered by an explicit request from the citizen nor requiring their active involvement. Instead, they could be proactively run by entailing citizens consent to receive an automated service. The traditional paradigm to deliver services in the public administration refers to the "reactivity spectrum", where the government only respond to citizens explicit requests (Sirendi *et al.*, 2016). An interpretation of the proactive-reactive interplay is given by Erlenheim (2019):



Kroonmäe (2017) describes a proactivity roadmap on how the government should start deploying proactive service: from offering access to service online, informing proactively about service, and finally acting proactively. An explorative research was put in place to achieve a more consistent knowledge of this new way of reaching citizens. The following elements received a special attention:

- Proactivity model maps;
- Organisational and technical change;
- Service design aspects.

So far, the degree of proactivity can be mapped into (Bruggermeier, 2010): “*Outreaching government*”, “*Attentive government*”, “*No-stop government*”. This distinction is based on the “*recipients’ interaction effort*” and moves from mobile government to pre-filled forms and, finally, to proactive services. The first theoretical integration with the one-stop-shop concept is given by Scholta *et al.* (2019). The model, differentiating integration of data collection (individual form/one form/no form), the integration of data storage (department-wide/government-wide/digital identity), and the purpose of data use (reactive/proactive/predictive), identifies three domains of public

e-services: “*No-Stop Shop*”, “*Limited No-Stop Shop*”, “*One-stop Shop*”. Hence, it is still not clear how the different domains (one-stop shop, no-stop shop, proactivity) relate to each other in their evolutionary path. Furthermore, a general literature gap appeared to be evident into having a clear understanding of how to manage the paradigm transition, from “reactive” to “proactive” delivery, in terms of technical and organisational requirements.

For what concerns the citizen-centric approach, proactivity requires service design principles to be put in place to eliminate unnecessary interactions, which are perceived as a burden by citizens (Scholta *et al.*, 2019). Service Design is a toolbox for making organisations create value for the user, with a specific focus on interactions and users’ experience (Selen *et al.*, 2001). The design principles that should be applied to the proactive service design are (Erlenheim *et al.*, 2020):

- Wholesomeness of the invisibility of the process;
- Once-and-only Principle;
- Accessibility through digital channels;
- Possibility to Opt-out;
- Personalised service based on expressed preferences;
- Intuitivity and simplicity;
- Transparency of processes, rules and obligations;
- Recent, timely, updated information;
- Reliability and security of the data treated;
- Multi-language access.

Service quality is measured through service design techniques. For what concerns the context of non-interaction, typical of the no-stop shop, proactive services not necessarily have to achieve the highest citizen satisfaction (Kuhn *et al.*, 2020). The domain of service quality, together with the other critical points that emerged in the review, determine the literature gap:

<i>Thematic</i>	<i>Limits</i>	<i>Investigation</i>
<i>Definition of Proactivity</i>	Non-shared standard definition, still it is not clear the relationship with the one-stop shop.	Literature, use cases analysis, interviews with experts.
<i>Categorisation of proactive services</i>	No clear specifications regarding requirements, recipients and constrains. Still limited use case gathering.	Literature, explorative research, interviews with experts.
<i>Road-mapping proactivity</i>	Limited research on how to manage the proactive transition.	Use cases analysis, interviews with experts.
<i>Quality in non-interaction</i>	Limited knowledge on the impact of proactivity on the perceived quality.	Interviews with experts.

The missing pieces of the literature have been addressed with the following research questions:

- *RQ1: What makes a service proactive?*
 - *Which are the requirements from the public administration side?*
 - *Which are the requirements from the citizens' side?*
 - *Which categories of services can be deployed proactively?*
- *RQ2: Is there a scale of proactivity?*
- *RQ3: Is one-stop-shop a prerequisite for proactive service delivery?*

Use case analysis

A worldwide use case analysis for what concerns one-stop-shop, proactive services, and life-event services has been run. Examining e-strategies, defined as a plan for e-government development to achieve organisational objectives (Heeks, 2006), is crucial to identify the determinants of a specific country's results. A broader perspective is

given by digital strategies, which includes the social aspect into the goal-setting phase (Hofmann *et al.*, 2020). The new proactive delivery paradigm demands “*a strategic approach that will move the public sector towards models that are more data-driven, digital by design and function based on a government as a platform paradigm*”. (OECD, 2020). Therefore, the national digital strategies were studied to better identify the underlying determinants that brought to proactivity. Proactivity has been recently incorporated into the dimensions considered for the digital benchmarking of countries by the OECD (2019), named “*Proactiveness*” and defined as the “*extent to which a government delivers data and services to the public without waiting for formal requests*”. Based on the information gathered from the literature, documents, and observatories’ databases (OPSI and SCOOP between the others), the following set of proactivity use cases was created.

<i>Nation</i>	<i>Service</i>	<i>Institution</i>
<i>Estonia</i>	E-taxation with pre-filled forms.	Tax and custom Board
	Family, retirement, disable children benefits delivered without the need of an application.	Social Insurance Board
	Facilitated registration for companies where other actors/institution are proactively involved in the process, eliminating reactive steps formerly needed.	Centre of Registers and Information Systems
	Notification about service availability and deadlines.	
<i>Austria</i>	Proactive tax return related to certain conditions; no application needed, only corrections can be asked.	FinanzOnline
	Family allowances for new-born families, without requiring an application when a child is born.	ALF

	Notification service about service availability and deadlines.	
<i>Finland</i>	Artificial intelligence program which tailors public service offer on the base of explicitly provided citizen data, contemporary allocating resources on the base of common requests.	AuroraAI
<i>UK</i>	Family Database, which helps to adopt a predictive risk modelling to anticipate the support to who need it the most.	Interagency Hub, Bristol
	Predictive identification of people at risk of knife crimes and modern slavery.	National Data Analytic solutions
<i>Taiwan</i>	Door-to-door e-services, enabling e-inclusion with in-site consultations on e-services access.	National Development Council (NDC)
	The 1-9-9-9 hotline, designed to proactively reach citizens and propose services.	National Development Council (NDC)
	E-housekeeper, a notification and support service for house owners.	National Development Council (NDC)
	The work, a job seekers recommendation engine based on AI.	Korea Employment Information Service (KEIS)
<i>Brazil</i>	Online free courses for citizens and civil servants to better use public e-service.	National Public School of Administration
<i>Australia</i>	JSCI, model used to assess the risk that citizens will become unemployed in long-term. The high-	Department of Education, Skill and Development

risk groups are thus identified and addressed with a special help in job hunting.

	AskIzzy, an open data platform where it is possible to see where people are looking for services, at what time of day people are looking for services, where are they are, and what are their needs. In this service and resource can be efficiently adjusted.	Centrelink
<i>New Zealand</i>	SmartStart, a bureaucracy reduction system which proactively deals with many governmental agencies when a baby is born.	Department of Internal Affairs, Ministry of Social Development, Inland Revenue, Ministry of Health
<i>Germany</i>	E-taxation with prefilled forms, the data are gathered from several governmental registries.	German Tax Agency
<i>Portugal</i>	E-taxation with prefilled forms, the data are gathered from several governmental registries.	Portugal tax board

Concurrently, a collection of one-stop-shop implementations has been gathered:

<i>Projects</i>	<i>Nation</i>	<i>Stage</i>	<i>Description</i>
<i>One stop shop App</i>	Singapore	Development	LifeSG, an application that aims to unify all the accesses of public services.
	Italy	Development, early stage	IO, application that aims to facilitate the relation between the public bodies and the citizen.
<i>One stop shop website</i>	Estonia	Deployed	A broad, user-friendly, life vent based one-stop portal.

Dedicated life-event portal

Sweden	Development	Skatteverket, a system which aggregates few services in semi-one-stop shop system,
Austria	Deployed	USP.gv.at, where information and services available in the e-government portal
UK	Deployed	Uk.gov, which guides the citizen through different web pages using life/business events and adopting an easy-to-use step by step navigation.
Australia	Deployed	Services Australia, which through a user-friendly and query-based navigation creates a look-like event-based service.
New Zealand	Deployed	Govt.nz, event-based citizen portal.
New Zealand	Deployed	SmartStart, an integrating information system and access to services into a new step-by step navigation to save time and effort for parents.
	Deployed	End of life, a single entry for death related services.
Australia	Development	AskIzzy, homeless platform which incorporate many different life-saving services.
Singapore	Deployed	Parents' gateway, a single entry for parents to facilitate their bureaucratic journey.

Research methodology

The novelty of the topic and the consequent lack of a robust scientific evidence required the research to be explorative. The chosen method is hence qualitative and based on three elements: a systematic literature review, a wide and detailed use cases analysis, interviews with government representatives with direct or indirect knowledge of proactive services. The flexible nature of this research approach allowed to adopt a wide initial filter for the documents, papers and use cases that were firstly analysed, permitting to discover new perspectives that were not planned in the initial research design phase. The Qualitative research includes (Cresswell *et al.*, 2007):

- Natural settings;
- Researchers as a key instrument of data collection;
- Multiple sources of data;
- Inductive data analysis;
- Emergent design;
- Theoretical lens;
- Interpretative inquiry;
- Holistic account.

An important aspect that emerged from the research activity is that qualitative research allows a deeper reflection because of the multiple sources used. The analysis of the case studies represents the primary source of empirical evidence, together with the reported cases in the literature. Scientific literature was the source to overview existing theoretical models and to understand the proactivity basics in the first place. It represented the basis for developing a model that comprehends all the aspects that emerged from the research activity. The extensive gathering and systematisation of case studies and the synthetic theoretical model represent the main contributions of this work. The initial study of the topic was based on a SCOPUS research, bearing the following results:

- Proactive public services: 30 documents.
- No-stop shop: 2 documents.
- Anticipatory services: 3 documents.

The total number of the document decreased to 13 (counting in total 173 citations), after the abstract selection. Hence, the investigation level of proactivity is proved to be low. The subsequent references analysis of the gathered documents allowed a broader literature review that gained a consistent volume. The use cases were studied according to several dimensions which helped categorise them. The analysed dimensions are:

- Trigger: what makes the service workflow start;
- Initiator: who is in charge of the initial required actions;
- Data gathering: how the required data are collected;
- Role of the recipient: what needs to be done to be eligible;
- Role of the provider: what preparation has to be put in place;
- Value delivered: which benefits are entailed in the service.

Approximately 60 use cases were analysed in total, and 21 are indicated as related to proactivity, 11 to innovative one-stop shop portals. The qualitative analysis permitted to see the use cases under different points of view, avoiding to adopt an initial over-structured approach that could bias the final result. This analysis has finally allowed to inductively create a new categorisation model of proactive service implementations. Public services experts and people directly in contact with proactivity (civil servants working for proactive public administrations) have been addressed with a formal interview request (approximately 50 requests). An interview protocol has been provided in advance, including the following open questions:

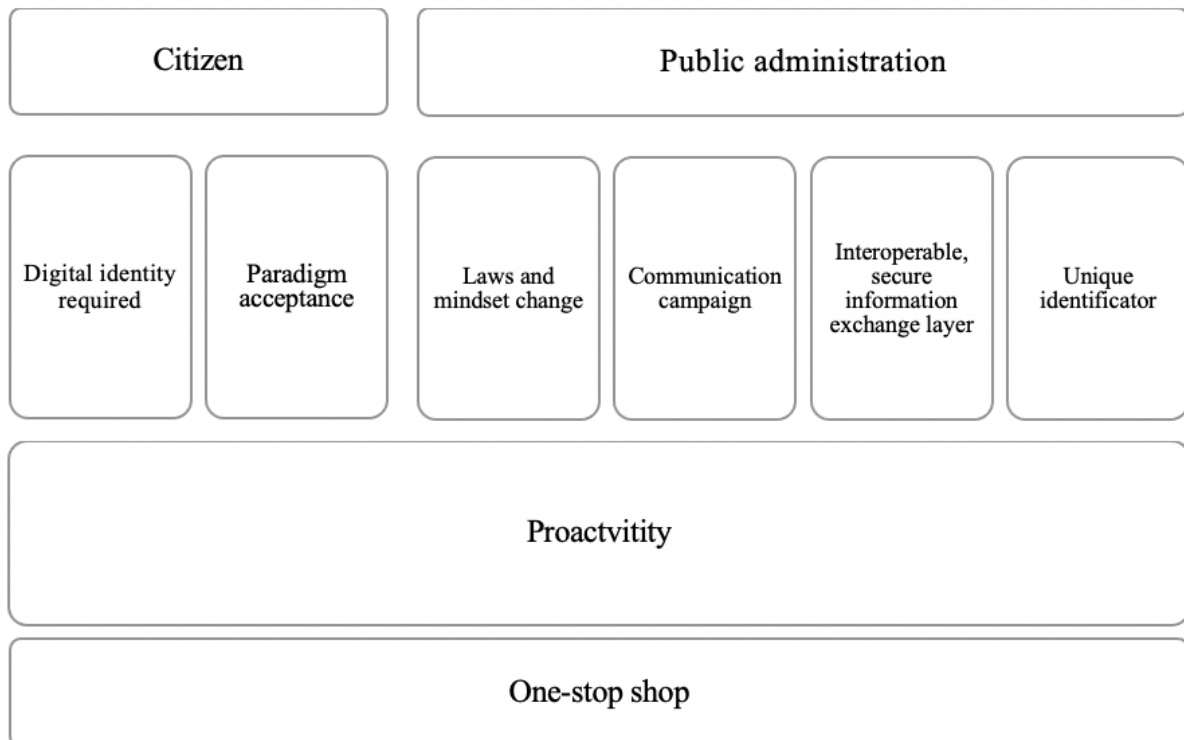
- *Role, responsibilities, personal history, main activities.*
- *Description of the service offered: domain, initial steps, evolution, future developments.*

- *How would you describe the organisational and technical shift of running proactive services based on life events?*
- *How did the relationship with the stakeholders (citizens, public employees, and other public institutions) of the service change?*
- *Which were the barriers your organisation faced into moving towards proactivity/life event service?*
- *Which were, on the other side, the most significant enablers?*
- *How do you think one-stop-shop portal, life/business events and proactive service delivery are connected?*
- *How do you think the service your institution offers could evolve and improve?*

The six interviewees that accepted the request, interviewed between April and June 2021 in approximately 30-50 minutes each, were: a public service expert, three proactive public service managers and two proactive public service assistants. A series of backup questions to tackle the relevant element of the research were asked but not shown in advance. The questions were: *How the relationship with the citizens has changed? How does he perceive the new reception of the service? How did the collaboration with the other agencies change? Was it a driver or a consequence? How much is this aspect important? Before adopting the proactive delivery, was developing a life event portal the first step? How do you think these two domains are connected? Do you think public administrations have to work around life events to become proactive? Do you believe one-stop shop is a precondition for proactivity? Is there a different degree of proactivity in the services you offer?*

Results and future research

The research activity, run by merging the use cases, the literature review, and interviews allowed to create a systemic interpretation of proactivity to finally develop the model shown below.



The presented framework, created for better understanding the requirements of proactivity and its relationship with the one-stop shop, explains the connections between the different domains. First, for what concerns the citizen side, *“if citizens don’t share data and allow to create a digital identity, a proactive delivery is impossible to be actuated”*. Therefore, digital identity is a strict precondition to enable proactive delivery. At the same time, citizens must be addressed by a *“strong communication campaign, able to ensure the acceptance and perceived value”* of the proactive service. Without the latter, citizens could repulse a service that they haven’t explicitly requested. On the other side, public administrations need to develop a *“middle layer through which public entities exchange information safely and in respect of law”*. The law sets the boundaries in which civil servants operate and the limited use of citizens’ data. Hence,

“new laws need to be issued to achieve proactivity”. Public administration needs to change their *“mindset”* because civil servants need to *“... feel empowered from this new kind of delivery in a way that they are more actively participating to solve the problems of the citizens and more likely try to find always better solution to deploy these services. The key is to let the public employees try to offer solutions before the issue becomes urgent”*. The evidence gathered from the use cases showed that not necessarily who leads in one-stop shop, leads in proactive delivery. The interviewee opinions are aligned on this concept as well. One-stop shop is, therefore, a *“convenient but not necessary”* step towards proactive service delivery.

The following categorisation, developed by the author, merges the literature and the use cases for obtaining a new framework on what can be considered a proactive service, setting the road for public administrations on where to concentrate efforts in changing their e-services delivery paradigm.

Category: *unpredictable life-event services*.

Definition (Scholta *et al.*, 2019): *“In proactive services delivery means that the government delivers a service to a citizen when a life event occurs, without the citizen having to request the service.”*

Examples: proactive social benefits, proactive tax return.

Category: *predictable life-event services*.

Definition (Erlenheim *et al.*, 2020): *Proactivity in the public sector involves providing services to the public on behalf of the government’s own initiative, based on the assumption that citizens support this and based on the data available in the government databases. Proactive services are provided automatically or with the consent of a person. “*

Examples: e-taxations with pre-filled forms.

Category: *anticipatory services*.

Definition (Bertot *et al.*, 2016): “*Anticipation can be based on demographics (e.g. age or marital status), life circumstances (e.g. change in employment, disaster recovery or movement to a new location), or some other contextual factors. Anticipatory services (or proactive services) are therefore predicated on the ability of governments and citizens to seamlessly share information and data that enable the prediction of citizen needs.*”

Examples: job seeking support, e-inclusion, pre-emptive risk assessments.

Category: *tailored services*.

Definition (Linders *et al.*, 2018): “*Proactive e-government shifts from the ‘pull’ approach of traditional e-government - whereby the citizen must first know, decide, and seek out government services - towards a ‘push’ model, whereby government proactively and seamlessly delivers just-in-time information and services to citizens based on their needs, circumstance, personal preferences, life events, and location.*”

Examples: recommendation systems, personalised citizens’ apps.

Category: *simplification services*.

Definition (Estonia, 2017): “*Proactive services are the direct public services provided by an authority on its own initiative in accordance with the presumed will of persons and based on the data in the databases belonging to the state information system.*”

Examples: notifications, proactive one-stop shop, e-inclusion.

A subsequent categorisation is made based on the trigger nature, identifying two sub-groups in proactive service delivery. The first refers to proactive services closely related to life events:

<i>Life-event proactive services</i>	<i>Unpredictable life-event service</i>	<i>Predictable life-event service</i>
<i>Trigger</i>	Life event	Life event
<i>Initiator</i>	Public organisation	Public organisation
<i>Role of the recipient</i>	Opt in/opt out	None
<i>Role of the provider</i>	Assure eligibility, data protection and correction	Assure eligibility, data protection and correction
<i>Value delivered</i>	Benefits and grants	Proactive data gathering
<i>Maturity level</i>	High	High

The second category refers, instead, to the proactive support services, in which the government takes a less evident, but still significant, proactive position into delivering assistance, information and simplification of procedures to citizens:

<i>Proactive support services</i>	<i>Anticipatory services</i>	<i>Tailored services</i>	<i>Simplification services</i>
<i>Trigger</i>	Data mining	Data provision	Incoming life event
<i>Initiator</i>	Public organisation	Citizen	Citizen
<i>Role of the recipient</i>	Opt in	Provide data	Active

<i>Role of the provider</i>	Assure eligibility and data protection and correction	Facilitate the service research process	Rather Inform proactively or run a part of the service procedure proactively
<i>Value delivered</i>	Pre-emptive assistance	Service recommendation	Information and simplification of procedures
<i>Maturity level</i>	High	Medium-low	Medium

The extensive gathering and systematisation of the use cases into a new categorisation of proactive services, alongside the synthetic theoretical model to better understand the requirements and the relation with the one-stop shop, represent the main contributions of this work. The knowledge about proactive services was systemized using various sources and methods, but some elements deserve to be still deepened in future research. The first aspect that needs more attention is the relationship between service quality and non-interaction, because of the issues that could appear by adopting the new proactive delivery paradigm (Khun *et al.*, 2020). How to effectively communicate proactivity and the digital identity is another crucial aspect to be considered, possibly including the citizen perspective in the research. Other investigations should bring up the ethical issues related to proactivity and automation of procedures, because AI or similar tools could strongly impact into this field soon. To conclude, this new approach to public e-service delivery still deserve a great attention to assure a brighter future for public e-service delivery.

INTRODUCTION

E-government practices are now widespread in the world of public organisations, modifying the expectation of the citizens towards the delivery (Silok, 2001). E-government is normally associated with many concepts, still the most comprehensive definition refers to the application of ICT by the public administration to improve citizens' access to services (Feng, 2002). Like e-government, e-governance definition is also characterized by the impact of ICT on the public administration, but referring to the new traits of leadership, management, democracy, education that the ICT shapes and redefines. E-governance allows governments to be more transparent, to reduce corruption, and to improve the relationship with citizens in terms of participation (Ndou, 2004). E-government activity fields can be divided into four areas of interest: Government-to-Citizens (G2C), Government-to-Businesses (G2B), Government-to-Government (G2G) and Government-to-Employees (G2E). Belonging to this domain, e-service refers to solutions that enable the electronic delivery of services to users through government and digital governance initiatives (Lindgren *et al.* 2013).

For what concerns the evolution of e-services in the G2C and G2B field, not many radical innovations, outside the transposition of a former physical service into the digital/internet world, have implemented so far (Gasova, 2017). An ongoing trend which is reshaping the G2C/GB2 field is the “*citizen-centric approach*”, where the citizen becomes the centre of the public service design process (Sirendi *et al.*, 2016). Building public e-services is becoming a “*socio-technical design*”, bringing service design principle in the public sector that formerly didn't belong to it (Schuppan *et al.*, 2017). The application of service design in the public sector takes inspiration from the private sector, where strong innovation efforts have been put in place to find always better ways to reach the customers. One of the key tools used by the private sector is the personalisation of the product/service. Nowadays, the whole purchase/service experience is extremely personalised. The final goal of adopting citizen-centric approach in the public administration is to facilitate the use of online government services. As suggested by Sirendi *et al.* (2016), the modern technological solutions

(cloud storage, cloud computing, AI, data mining, etc.), merged with the citizen-centric approach, enable to proactively assist citizens, redesigning services to anticipate citizens' needs. The enhanced data processing techniques and the automation of operations could then ensure quality, personalisation and temptingness of public service delivery.

Starting from this principle, grounded in the G2C, and extending it to the G2B and G2G, here comes proactivity. According to this definition, proactive services are “*direct public services provided by an authority on its own initiative in accordance with the presumed will of persons and based on the data in the databases belonging to the state information system*” (Estonia, 2017).

Proactivity in its essence means “*preventative*” or “*forward-looking*” when delivering public e-services, instead reactivity consists in responding to something that has already happened (Sirendi *et al.*, 2018). Therefore, proactivity is about eliminating the burdens that citizens meet when dealing with the public. The main goal of this master thesis is to categorise, enlarge and deepen the knowledge regarding proactivity in the public administration domain. To achieve this outcome, other elements belonging to the e-government innovation field have been investigated. The most correlated element, for what concerns eliminating the burdens of citizens accessing public services, is “*one-stop-shop*”. The one-stop-shop is a single point of entry for all e-government services (Fath-Allah *et al.*, 2014). This principle aims at eliminating the administrative burden when citizens are required to deal with public administrations. The value of a one-stop shop lies in eliminating the need for practitioners to navigate multiple websites and formats to find the help or information they need, and that it can be arranged according to life/business events. Instead, public administrations should have the means to re-use information already supplied by citizens in a transparent and secure way. Related to this concept, the “*one-stop shop portal*” consists of a “*single gateway offering access to multiple public procurement support services to contracting authorities and economic operators*” (SCOOP, 2020). Connecting the last dot, the “*one-and-only principle*” is a principle that ensure that citizens and businesses supply the same information only once

to a public administration (SCOOP, 2020). Public administration offices can act if permitted to internally re-use data, in due respect of data protection rules, so that no additional burden falls on citizens and businesses.

The aim of this study is to investigate the proactivity in such a way that could categorise and expand the knowledge of this emerging category of public service. To categorise means to research and to report the most significant literature, papers, reports and governments legislations; using all the tools that modern studies allow (systemic literature review, wide desk analysis, use cases database interrogation). On the other side, to expand consists in building around the existing theoretical models a new framework where a set of new definitions is proposed, connecting the literature to real world examples. A strong relevance is given to interview to experts belonging to public administration observatories and members of proactive public organisations. More in details, the research activity is focused on identifying a shared definition of proactive service first, and then understanding the underlying determinants of its implementation. Contemporary, possible connections with other study domains are investigated. The main research questions that guided the work are:

- *RQ1: What makes a service proactive?*
 - *Which are the requirements from the public administration side?*
 - *Which are the requirements from the citizens' side?*
 - *Which categories of services can be deployed proactively?*
- *RQ2: Is there a scale of proactivity?*
- *RQ3: Is one-stop shop a prerequisite for proactive service delivery?*

As presented in the methodology chapter, there is a large literature gap in the field of proactive e-services. This gap is covered by gathering all the present and relevant documentation, consequently enlarging it with a vast use case analysis merged with expert opinions. A final theoretical framework is then presented as the result. The master thesis is organized as follows. In chapter 2 the literature review of the e-government, e-services, and related topics is presented, while chapter 3 contains an exhaustive

literature review of proactive services. The two were divided with the purpose of highlighting the disruption that proactive is bringing to the public administration. Chapter 4 reports a long-range use case analysis, in which e-governments are studied world-wide to gather the most innovative projects connected to proactive delivery and one-stop-shop implementation. To conclude the work, chapter 5 describes the methodology used for the study and the results obtained, alongside to future possible research possibilities and personal considerations.

CHAPTER ONE

1.1. E-government, e-service and e-governance: a comprehensive definition

The widespread of technologies and the Internet, in general, has caused significant changes, first of all in people's everyday lives. It is enough to think of the large number of actions that we carry out every day quickly and easily thanks to the use of technologies.

The Internet has changed not only our daily lives but also public administration and its organisation, we have gone from the simple digitalisation of some tasks to an extensive rethinking of the methods of providing services. When introducing new technologies is accompanied by a clear vision of integrating information tools into community life, networks become an irreplaceable element for the modernisation and greater public administration transparency (Caretto, 2002).

E-government is also known by different terms such as “electronic governance”, “electronic government”, “digital government”, “online government” and “e-gov” (Grönlund, 2004). In literature, there are many opinions concerning the moment in which e-government emerged but, in general, it dates to the early 90s, precisely 1993, with the Clinton administration that tried to reinvent the public sector by applying the ICT to government operations and services marking the beginning of e-government (Lee *et al.*, 2001). There are many definitions for the term e-government, and the differences reflect the priorities in the government strategies (Fang, 2002).

E-government's definitions are largely provided by grey literature:

“The use of ICT in Public Administrations, combined with organizational changes and the acquisition of new aim to improve public services and democratic processes and to strengthen support for public policies”

(European Commission, 2003).

"E- government refers to the use by government agencies for information technologies (such as the Wide Area Network, the Internet and mobile computing devices) that have the ability to transform relationships with citizens, businesses and other branches of government. These technologies can serve a variety of different purposes: improving services to citizens, improving interactions with business and industry, empowering citizens through access to information, or more efficient government management. Resulting advantages can be greater transparency, greater practicality, revenue growth and / or cost reduction" (World Bank, 2001).

"The use of the Internet and the World Wide Web to provide information and government services to citizens"
(United Nations, 2014).

E-government was also defined as *"a way for governments to use the most innovative ICT, particularly web-based Internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes"* (Fang, 2002).

According to the given definitions, some elements in common arise: using ICT to provide services to citizens, businesses and government agencies for obtaining qualitative improvements and ensure a greater transparency. E-government allows citizens to receive services from the government 24 hours a day, seven days a week (Shailendra *et al.*, 2013).

E-government offers services allowing electronic transactions with the public administration. The type of services can be different according to the needs of users, and for this reason, different types of e-government are defined (Alshehri *et al.*, 2010). With this aim, four different categories can be recognised:

1. Government to citizen (G2C): it is the largest category of services because it concerns interactions between the government and its citizens. The G2C allows users easy access to information and public administration services. The G2C also enables to overcome geographical and temporal barriers by connecting citizens who otherwise could not come into contact and facilitates citizen participation in government (Seifert, 2003).
2. Government to Business (G2B): a category that includes interactions between government and businesses. It contains services exchanged between government and economic sectors such as the distribution of rules, regulations, commercial information, renewal of licenses, obtaining permits and more. G2B plays a significant role in developing small and medium-sized enterprises (Pascual, 2003). Finally, it allows, as the previous G2C category, to improve the quality, efficiency and transparency in communication and transactions (Moon, 2002).
3. Government to Government (G2G): a category that includes services realised between governmental agencies, i.e., sharing databases between government departments and agencies. The use of digital technologies has resulted in significant improvements. Indeed, G2G makes information on training, learning opportunities and laws accessible (Ndou, 2004). It has produced cases of time, cost and service improvements (Gregory, 2007).
4. Government to Employee (G2E): is the relationship between e-government and its employees. In literature, some argue that this category is part of the G2C, and others consider it a separate category (Riley, 2001). The G2E allows employees to take advantage of online services such as annual leave requests, vacation balance checks, and review of payment records (Seifert, 2003). The G2E also allows access to training, learning opportunities, online benefits but also to manage human resources and deal with citizens (Ndou, 2004).

The OECD (2007) examined e-government initiatives such as improving the efficiency of processing large amounts of data, improving services through a better understanding

of user needs. It helps to improve transparency and facilitate the sharing of information. All these elements are connected to the improvement of trust between citizens and government. A Deloitte study (2003) states that e-government reduces the amount of time, money, and effort that businesses and citizens had to spend in complying with rules and regulations.

However, e-government is also a challenge. The application of e-government involves:

- The overcoming of technological barriers: the possession of adequate ICT is fundamental to implement e-government; its success is linked to this. Technical infrastructure, in general, is the first prerequisite, and the government has the task of developing it (Sharma et al., 2003).
- Privacy: the government has the task of ensuring that e-government does not harm the citizens' privacy. The data must be collected only for specific purposes for the use of services and must not be disclosed. Citizens are often concerned about the issue of privacy. In the past, emerging countries tended to renounce the application of e-government on matters related to privacy and confidentiality (Basu, 2004).
- Security: i.e., the protection of information against disclosure of data or unauthorised access to it. This element is also fundamental with the aim of building trust between citizens and the government. Security can be classified into two elements: network security and security documents. This means to maintain and protect the electronic infrastructure using firewalls and data access limits. The use of security technology, including digital signature, encryption to protect user ID and password is essential to meet the security elements (Feng, 2003).
- Policy and Regulation Issues: implementing e-government requires rules, policies, laws to address electronic activities, including electronic archiving, electronic signature, data protection, intellectual property rights, copyright issues.

- Human resources: lack of ICT skilled personnel is another major barrier to e-government implementation. In emerging countries, this is one of the biggest e-government problems together with the lack of adequate infrastructure. It requires qualified personnel for the undertaking, maintenance, design and installation of ICT infrastructures.
- Partnership and collaboration: collaboration and cooperation at regional, local and national level and between public and private is fundamental in the development of e-government. The collaboration between public and private is aimed at ensuring that the private provides resources and skills that the public (i.e., the government) lacks. Governments often show resistance to openness and prefer to preserve their hierarchical and authoritative power (Ndou, 2004).

Electronic e-government web portals transform the relationship between government and its citizens by providing the ability to obtain services without visiting a government agency (Moon, 2002). It makes it possible to access useful services for citizens that are provided in electronic form. The success of an e-government portal depends on its design, implementation and the services provided by users (Fath-Allah et al., 2014).

From the analysis of some studies concerning the quality of websites (Aladwani and Palvia, 2002) it is clear that great importance is covered by the site structure, its design, the web aspect but also the technical one. All these elements constitute the best-practices of electronic portals. E-government portals must necessarily have the following characteristics:

- Be customer-centric: services must be designed according to the needs of citizens (World Bank, 2005; United Nations, 2012; Forfàs, 2008). The centrality of customer is particular expressed by the fact that the services are designed for the citizen and not for the organisation (Al-Khourri, 2011).
- Be interoperable: interoperability refers to the integration between systems and government, to the exchange of information (Layne et al. 2001; Forfàs, 2008; Posch et al., 2008).
- Modularity: i.e., being built with a modular design (United Nations, 2012).

- Security and privacy: which allow citizens to carry out transactions in a secure way (Kumar et al. 2007; Forfàs, 2008; Sandoval-Almazan et al., 2017). Privacy is considered one of the primary aspects of the success of an electronic government portal (Choudrie et al. 2004).
- Electronic participation: i.e., citizen involvement in e-government processes with the possibility of making petitions and participating in surveys (Kumar et al. 2007).

Many authors agree on a common idea: the correct use of e-governance allows governments to be more transparent, to reduce corruption, to improve the relationship with citizens in terms of participation. In developing countries, for example, it has been shown that improvements in transparency, corruption control and poverty reduction can be achieved through e-governance (Bhuiyan *et al.*, 2011; Ndou, 2004; Feng, 2003; Basu, 2004).

E-government is not developed equally in all parts of the world. Every year, the United Nations Department of Economic and Social Affairs publishes a report on the state of e-government spread across the globe (E-government Survey, 2020). According to the ranking, in 2020 the most developed countries are Denmark, Republic of Korea and Estonia, Finland, Australia, Sweden, United Kingdom, New Zealand, United States, Netherlands, Singapore, Iceland, Norway and Japan. Among the least developed countries Bhutan, Bangladesh, Cambodia, Mauritius, Seychelles and South Africa have recently made great strides in e-government.

In the literature, e-government is often compared with a relatively similar but conceptually different term: e-governance. E-governance means, in fact, electronic governance, such as the use of ICT at various levels of government and the public sector and beyond, to improve governance (Okot-Uma, 2001).

UNESCO¹ defines e-governance as:

¹ www.unesco.org

“Use of information by the public sector and communication technologies with the aim of improving information and the provision of services, encouraging citizen participation in decision-making, and increasing government accountability, transparent and effective. E- governance involves new leadership styles, new ways of discussing and deciding on policies and investments, new ways of accessing education, new ways of listening to citizens, and new ways of organizing and providing information and services. E- governance is generally regarded as a broader concept of e-government, since it can lead to a change in the way citizens relate governments and each other. E- governance can bring to light new concepts of citizenship, both in terms of citizens' needs and responsibilities. Its goal is to involve, enable and empower the citizen”.

There is often a tendency to confuse the concept of e-governance and the concept of e-government. Literature often tries to compare those two different ideas.

A first distinction clarifies that e-government is concerned with improving access to government functions, vices or information while e-governance refers to the use of the Internet by politicians or political parties to elicit opinions from their constituencies (Bhatnagar, 2003).

E-governance has been also defined as a mode in which governments interact with democratically with citizens, highlighting the results of transparency and participation (Calista *et al.*, 2007). It can be understood that e- governance is more of a mode of governance and administration while e- government simply refers to the use of ICT to improve government activities and processes.

Like e-government and e-governance, e-service has also been the subject of many academic studies and different terminologies have been used as synonyms: e-public service, public electronic service, digital service. The term “e-service” can be divided and analysed. "E" refers to something that comes electronically while "service" refers to something intangible and the creation of value for someone. It in general, refers to

the set of solutions and processes that allow the electronic delivery of services to users through government and digital governance initiatives (Lindgren *et al.* 2013). Like e-government, e-governance is also characterized by the presence of barriers that have limited and limit the development of forms of citizen involvement. Most governments have experienced slowdowns in adopting new governance technologies (Milakovic, 2012; Tapscott *et al.*, 2008).

The barriers to the adoption of e-governance consist in the real or perceived characteristics of legal, social, technological contexts contrary to developing e-governance:

- Characteristics of government organisations: staff capacity, technical capacity, financial capacity, lack of leadership and support (Moon, 2002; Margetts and Dunleavy, 2002). From a technical point of view they also concern the availability of hardware and software (Enyon and Margetts, 2007) and the reluctance of agencies.
- Cultural barriers: reluctance to change routines and value orientations (Kling, 1996; Sorensen *et al.*, 2011), threats to privacy and autonomy (Meijer, 2015). Resistance is linked to the fact that it is feared that technology could replace people and therefore, jobs (Schwester, 2009).

Many initiatives in the public sector that refer to e-service are aimed at (Asgarkhani, 2005):

- Improve efficiency of services through the application of ICT (Information and Communication Technologies);
- Improve communication methods and introduce workflow management systems;
- Provide access to information with attention to democratic aspects and the quality of services;
- Provide an overall timely, accurate, superior quality and free of local barriers service.

E-service can have various purposes (Panzardi *et al.* 2002):

- Improve the provision of government services to citizens;
- Improve interactions with businesses;
- Empower citizens with more efficient access to information.

There are advantages to this (Ostašius *et al.* 2010; Asgarkhani, 2003):

- Less corruption;
- Greater transparency;
- Greater convenience;
- Revenue growth and/or cost reduction.

1.2. The improvement of services through ICT: historical and evolutionary considerations

Recent decades have been characterised by giant steps forward in ICT, an acronym for Information and Communication Technology. Effects of these advances have significantly revolutionised many areas, including services one. ICT has often been considered the primary enabler and facilitator of innovation in the context of services (Sheehan, 2006; Bitner *et al.*, 2010).

Services are generally characterised by (Parasuraman *et al.*, 1985):

- Intangibility: since they do not have the characteristic of materiality, they are performances and not objects;
- Inseparability: production and consumption of services are extremely correlated and cannot be separated;
- Heterogeneity: services often vary according to the manufacturer and the customer over time.

In this context, however, development still encounters significant obstacles and barriers that often prevent the full use of technologies. Therefore, in the following paragraph, after framing the evolution of services following the application of ICT, the most significant barriers are analysed. Subsequently, the various positive effects deriving from the provision of services through ITC are defined. By analysing the historical and evolutionary aspects, a comparison is also made between developed and developing countries. Finally, there is a further aspect connected to ICT development and its application to services, namely the transformation of the public administration due to the growing use of technology.

The first decade of the 21st century was characterised by a transition from a commodity-based economy to a service-based economy and ICT expansion (Rust et al., 2002). ICT has been the subject of significant development and modernisation since the beginning of the 21st century, but its first applications dated back thirty years ago. Following the enormous progress in ICT, alternative methodologies to traditional service provision have been introduced. These new methodologies have concerned various areas (Batagan *et al.*, 2009):

- Public administration: with the spread of e-government and in general the electronic provision of services to citizens;
- Retail: with the introduction of e-commerce which has become an alternative to classic retail;
- Education: with the introduction of e-education systems for students who cannot traditionally attend courses for reasons of time or geographic location;
- Work: with the introduction of systems that allow you to work remotely, even from home.

ICT can be defined as "the combination of information technology with other related technologies, in particular communication technologies" (UNESCO, 2002).

In general, by implementing ICT in services, it is possible to extend the positive aspects of ICT to the services on which these technologies are applied.

The ICT have many positive characteristics (Yoginder *et al.*, 2019):

- Flexibility;
- Speed;
- Traceability;
- Accuracy.

Citizens and businesses have requested an increasingly effective and efficient provision of services but also an improvement in the quality of the information received (Ongaro, 2004). ICT improvement in recent decades contributed to improve industrial development, social progress, national economies and have also accelerated the integration of e-government systems (Lee *et al.*, 2018).

First cases of ICT applications in the field of services connected to the Public Administration date back to about thirty years ago. In fact, since the 1990s, ICT have been adopted by Public Administrations all over the world (Liu *et al.*, 2015).

Innovation in services to citizens has acquired increasing importance in the economic literature only in recent years, after a long period of indifference (Djellal *et al.*, 2013). The "computerization" process is considered a result of the implementation of ICT in all sectors of citizens' daily life, leading to an overall qualitative improvement. (Gasova *et al.*, 2017).

Technological development, and progress in ICT, by themselves do not guarantee an efficient implementation of electronic services as it is influenced by the coexistence of various factors. The transformation from traditional to electronic services faces many obstacles and barriers (Hjouj Btoush *et al.*, 2009):

- External barriers: legislative, regulatory, budget and digital divide.
- Internal barriers: organizational, lack of collaboration and coordination, public-private partnership, leadership, monitoring and evaluation.

Specifically, the most significant barriers are:

- Economic barriers: which hinder progress on both the demand and the supply sides. Financial barrier hinders both suppliers and users. The transformation from traditional to electronic services is extensive and requires substantial financial resources and fixed costs. The types of expenses concern: hardware and software equipment, training for public officials, ICT centres and infrastructures (Ebrahim *et al.*, 2005). Very often the lack of a clear picture of the possible benefits (especially in the long term) deriving from the investment in systems and equipment reduces the incentive to invest in this sense (Hjouj Btoush *et al.*, 2009).
- Technical barriers: lack of interoperability between government agencies. Interoperability is the ability to share information and technologies using common policies and standards (European Commission, 2004). Lack of technical infrastructure is also a major obstacle.
- Political barriers: implementation of online services must be accompanied by the preparation of laws, regulations, directives. In literature has been repeatedly stressed that security in identification and authentication systems, privacy and management of sensitive information are fundamental to increase trust with users (Vassilakis *et al.*, 2005; Ebrahim *et al.*, 2005; Meijer *et al.*, 2015). Many users are discouraged from using online services because they do not trust this innovative form of use.
- Organizational Barriers: Concerning public employees' distrust of change, fear of job loss as result of automating services and diminishing privileges (Hjouj Btoush *et al.*, 2009).

In developing countries, barriers are related to the political and socio-economic environment. Developing countries are unfortunately associated with: low economy, corruption, bureaucracy, illiteracy, elements that hinder the development of electronic services. In these countries, the lack of adequate ICT infrastructure is the first major

obstacle, followed by illiteracy, lack of education, lack of desire to access electronic information and services (Hjouj Btoush *et al.*, 2009). Organisational barriers also have a different impact between developed and developing countries. In developed countries, government officials are more familiar with IT and the benefits of applying it in the public sector. In developing countries, there is a lack of propensity for change (Chen *et al.*, 2006).

However, development did not take place uniformly as the rate of adoption and success of the operations varied from country to country, developing countries have always been behind in e-government and ICT adoption. This development is also closely related to civil servants' training and the technological progress of citizens (Ifinedo, 2012). Overall, the intention has matured to improve the public sector by offering services efficiently.

Across the world, over the years, governments have expressed a desire to revitalise the Public Administration to facilitate the provision of services to citizens with these characteristics: centred, cost-effective, and easy to use.

Growing diffusion of ICT is at the base of the digital transformation that has happened and is still happening more and more (Digital Transformation, “*A framework for ICT literacy*”, 2019). Digital transformation is a rapid and radical change that society has faced following the maturation of digital technologies and their penetration in multiple contexts and markets (Reis *et al.*, 2018).

In the last two decades there has been a real progressive process of “digitalisation” of public administration whose positive effects are (European Commission, 2004):

- The overcoming of the negative effects of "procedural fragmentation";
- The exhaustive elaboration of bureaucratic issues and overcoming of the delays, typical of the inefficiency of the public administration;
- Improvements in terms of openness and transparency due to the approach between citizens and ICT users to the administrative source;

- The cost reduction of administrative procedures and in general of the entire network of administrative institutions and of the supply of services;
- The greater efficiency in the management of requests and complaints from citizens due to standardization.

The United Nations has formulated Sustainable Development Goals (SDGs) to be achieved in the coming years up to 2025. The first of these goals is the "*digitization of society*", followed by "*country innovation*" and "*ethical-sustainable development of society as a whole*".

1.3. The importance of Big Data and artificial intelligence in changing the way public administrations act

Among the most important events of the last decade, the development of technologies related to Artificial Intelligence (AI) and Big Data plays a crucial role.

The combination of algorithms, digital data, AI, Big Data Analytics has gone to revolutionise not only the business but also the ways of functioning of governments that are increasingly "*data-driven government*". The goal of creating artificial intelligence has existed for a long time but only recently technology has allowed its application to be developed. Data-driven government means using artificial intelligence, Big Data, algorithms, and data analysis for the public administration's decision-making process. One of the challenges of this type of government is represented by the efficient delivery of services accompanied by public employees' autonomy, citizens, privacy, and the responsibility of algorithmic systems (The European Liberal Forum, 2011). Despite the numerous positive aspects deriving from the application of new technologies in services, this issue has always been the protagonist of debates in which the countless criticalities were highlighted. The concept of "Artificial Intelligence" dates back to the last century's fifties, even if in merely theoretical ways.

A possible precise definition of this concept is²:

“Both a scientific and engineering discipline that deals with the creation of thinking machines, i.e. machines and programs that can solve various problems with reasoning in a completely autonomous way”.

Technologies related to Artificial Intelligence offer essential opportunities to use human resources more significantly, for more critical and less repetitive tasks, obtaining improvements in terms of efficiency and reduction of costs and errors (Li *et al.*, 2017). Artificial Intelligence (AI) can also concretely produce value for the Public Administration by automating financial processes and reducing fraud. Leveraging on AI, it is possible to scan large quantities of documents, record financial information, detect anomalies. In this sense, AI makes information management quicker and ensures greater accuracy in detecting errors or potential fraud. In theory, there are two types of Artificial Intelligence, defined as "*Weak Artificial Intelligence*" and "*Strong Artificial Intelligence*" that is (Mikalef *et al.*, 2019):

- Weak Artificial Intelligence aims to create systems that can effectively perform tasks traditionally performed by human beings. These systems do not think autonomously but are strictly connected to human beings activity.
- Strong Artificial Intelligence provides machines with cognitive abilities that can reproduce human performance.

Nowadays, many applications that refer to artificial intelligence have become parts of our daily life, such as of the automatic translations of texts, voice recognition, image recognition and much more. The application of AI in the commercial, healthcare and production sectors already allowed us to achieve excellent results by offering extremely good support. The same result was achieved in the context of Public Administrations and related services, enabling “intelligent” analytical skills, and understanding of

² www.intelligenzaartificiale.it

processes in real-time. The term "Big Data", referring to a large volume of data, can be structured (relational database), semi-structured and unstructured that flood every day an organisation or company; significant is not the amount of data but the organisation of them (Raheem *et al.*, 2019).

A precise definition of Big Data can be:

"High-volume data that frequently combines highly structured administrative data actively collected by public sector organizations with continuously and automatically collected structured and unstructured real-time data that are often passively created by public and private entities through their internet interactions" (Mergerl *et al.*, 2016).

The "data" in general are divided into (Minelli *et al.*, 2013):

- Structured data: i.e. inserted in a database based on the type;
- Semi-structured data: combination of different types of data that have a model and a structure not defined as structured data;
- Unstructured data: characteristic of the last two decades since the data source has proliferated beyond operational applications.

Services connected to the Public Administration are characterized by the simultaneous presence of the three categories of data. The five constitutive characteristics of big data are (McKinsey, 2011):

- Huge amount of data;
- Fast processing;
- Set of structured, semi-structured and unstructured data;
- Extraction of useful data from very large amounts of data;
- High value of the extracted data.

If used correctly, they lead to surprisingly positive results for the public administration regarding effectiveness, efficiency, and overall customer satisfaction. These benefits are the result of a significant increase in the accuracy of the decision-making process and a substantial reduction in the costs associated with the decision-making process (Maciejewski *et al.*, 2017). Although Big Data can be applied efficiently in services, there is discomfort on citizens due to the perception of loss of privacy. Therefore, limits are created for governments. China is a leader in Big Data employment at the Public Administration level and a platform for data exchange between agencies has been developed since 2017 (Polyakova *et al.*, 2019).

Artificial Intelligence in Public Administration can optimise the flow of data and information available to administrations and quickly solve problems that previously required multiple steps, more procedures and more phases or could not be solved at all. The use, for example, of voice assistants to file complaints allows the citizen not to have to cross many web pages to find the solution to their problem (Corvalán *et al.*, 2018). The European Commission has equipped itself with a permanent observatory on AI and this year published a report entitled “*AI Watch – Artificial Intelligence in Public Services*” aimed at assessing the development adoption and the impact of artificial intelligence in Europe, launched in December 2018.

The “*Declaration on cooperation in the field of AI*” (European Union, 2018) expressed the will to cooperate and join forces to invest in AI profitably. As also emerged in the literature, there is a growing interest in the use of AI to support the redesign of service delivery projects and policy-making mechanisms, to improve the quality of services and the involvement of citizens. From the combination of Big Data and advanced learning algorithms, the “*operational*” method of the public sector can radically improve, giving life to proactive public service delivery models and at the same time easing trivial and repetitive tasks beyond digitisation. The premise of the report specifies that the scope, objectives, practices of the use of AI in the public sector are very different. AI is related to innumerable advantages, but some risks must be governed considering democratic values and respect for human rights. The European Union has focused on a “*Reliable AI*” based on ethical and social values borrowed from the European court of fundamental rights. The European Union also intends to drive and become a world-

leading area for the development and dissemination of cutting-edge technologies, ethical and safe AI, citizen-centred approach. In the report, as in the literature, it was recognised that although significant progress has been made, there are still substantial barriers and constraints both in the e-government sphere and ICT applications to services.

The plan for future shared by member states which is based on:

- Stimulate awareness and potential of AI through awareness campaigns for public employees or public sector workers. It is intended to organise regular meetings between public employees and specialised innovation centres.
- Improve data management for AI through initiatives focused on the quality, availability, and accessibility of public sector data. These data will therefore have to be included in management programs, their literacy, governance, and quality will have to be improved.
- Develop internal AI skills as any technology, if not fully exploited, will have minimal value, particularly if people have no intentions and ability to use it. It is, therefore, necessary to improve internal capacities by training specialised AI personnel.
- Working with large data sets and focusing on developing AI for the public sector. Some strategies then focus on the creation of new positions as Chief Data Officer and specialised AI teams to develop this technology within the services of the Public Administration.
- Learning by doing already implemented by many countries that have formulated valid projects that can be replicated in the future.
- Improving ethical and legal AI frameworks as the moral issue represents one of the most significant barriers to implementing this technology. In most countries there is an intention to develop an ethical framework to guide the use of AI in the public sector.
- Award funding and procurement to stimulate the development and adoption of AI by providing financing and mechanisms for adopting technological

innovation in the public sector. A significant set of actions is based on pushing the private sector to deliver AI solutions to the public sector.

1.4. The impact of service design on public services: the citizen-centric approach

The implementation of a technological infrastructure to provide services to citizens is a costly investment. Therefore, governments must ensure that new infrastructures are easily usable by citizens to encourage the use of online services instead of traditional methods. It seems trivial to point out that the more people use these new systems, the higher the state's savings will be in the long term. The new systems focus on a decentralised, online, fast, efficient service delivery. Citizens will no longer need to go to a specific office for a particular instance, but they will do it directly from their smartphone or at their own home. The more citizens will use this system, the less physical infrastructure, and employees the government will have to make available to its citizens, thus triggering a virtuous circle. Therefore, the government's job must be to provide a platform with an excellent user experience, intuitive and easy to use. Only in this way, citizens will leave the old physical systems and bear the cost of change.

Historically, governments have underestimated the importance of offering technological solutions, in line with the times, compared to the private sector. The private sector has already understood the potential of facilitating and personalising the online journey of potential customers, making the process of purchasing goods or services intuitive and straightforward.

To achieve profit, private business activities must manage their activities according to the principles of efficiency and effectiveness. These concepts, taken from business theory, are the cornerstones of proper business management, regardless business ownership's goals. Whether it is profit-oriented or not, a company must operate in economic equilibrium; otherwise, it is doomed to fail. Assumed an organisation as mean of human resources, constituted to produce goods and services; it incurs costs of fixed and variable operating hours that must be balanced by revenues generated from the sale

of those products and services to survive (Potito, 2017). For revenues to be generated, each company must operate efficiently, i.e., the costs of the inputs necessary for production must not exceed the revenues obtained (Brusa, 2013). As far as the concept of effectiveness is concerned, here it is meant as the ability to produce the desired effects based on an initial project. In the business case, according to the strategy implemented to generate revenues.

Having clarified these concepts, the personalisation and simplification of the processes of using content and online purchase of products and services represent a privileged sales channel for all companies that are profit-oriented, because the use of ICT has taken precedence over the traditional supply channels for all those reasons already listed, speed of use of contents, absence of spatial and temporal limits for access to services, practicality and convenience of interaction (Deloitte, 2016; Lee *et al.*, 2018; Bertot *et al.*, 2010). By extension, public administrations are similar to enterprises in terms of organisation and structure. Even if they are not profit-oriented, public administrations can generate profit from providing public services to citizens, because they are still economic organisations made up of means, structures and human resources that must operate in financial balance.

An efficient provision of services to citizens on government online platforms could be achieved by adopting a citizen-centred approach (Wang *et al.*, 2005). The authors try to find an evaluation model to analyse the drivers of success or failure in the delivery of online services. The aim of this research is to understand how to obtain better performance in the provision of online services to citizens. The authors have developed an evaluation model useful for studying and identifying the criticalities of technological infrastructures in order to be able to make the necessary improvements and reduce inefficiencies. The second work, emphasizes, instead, how the solution to the problem is a better design of the infrastructure that delivers services, keeping as its centre of gravity, not only the citizen, but all the stakeholders involved in the process.

By analysing previous contributions on the topic, Wang *et al.* (2005), have avoided setting errors in the analysis already made by other researchers. For example, Wood (2003) uses KPIs typical of e-commerce to evaluate the effectiveness of public

administration electronic services. However, it is impossible to assess private companies and public bodies with the same criteria: private companies operate in a competitive market, public bodies under monopoly regime. Therefore, every consideration should be appropriately contextualised when dealing with governmental e-services with the typical tools of commercial business evaluation. The provision of government services does not require the same effort required to provide the same service by a private company. If a private company is inefficient in providing services, potential customers can quickly turn to competitors. On the other hand, government services have a single supplier and citizens have no choice. In the private sector, competitors must devise new strategies and unique innovations to grab potential customers' attention; they must continuously create and maintain a competitive advantage. In the public sector, this need does not exist, the service provider is unique, so there will be other and different drivers for evaluating web services' efficiency.

West's contribution, on the other hand, suggests an efficiency evaluation model centred and built on the characteristics of the site, such as the presence of (e.g.) phone contact information, addresses, publications, databases, foreign language access, privacy policies, security policies, an index, disability access, services, email contact information, and search capabilities. Although this information facilitates the use of generic web services, they say nothing about how citizens interact with specific government web services. Information alone is not enough. How easy is it to find them on the infrastructures made available by the entity that provides the desired service?

Furthermore, let's us not forget that the users of online government services are different from the users of services provided by private companies: the former are citizens, a heterogeneous mass of people of different gender, age and culture, for whom it is difficult to customize the use of content and for which a standardized user experience of content is preferred. The aim is to offer an "average" good experience for all citizens. The latter are customers, individuals carefully targeted by private companies and for whom ad hoc strategies are studied to lead them to finalize the use of a service designed just for them. Private companies will spend large budgets to ensure that potential

customers spend as much time as possible on their service platform and will purchase services through a comfortable and intuitive experience.

At this point, is crucial to define the characteristics that a government site must have to efficiently provide services to citizens. Wang *et al.* (2005) suggest that the first task to be done must be defined to solve the problem of “*how to go about getting what I want*”. Then they formulate an original evaluation model to identify the criticalities of the infrastructure that prevent a satisfactory result. According to these researchers, it is necessary to understand how citizens solve a problem when browsing government sites:

- Submit a document;
- Download forms;
- Access database;
- ...

In order to solve the problem, the right information is needed. The solution to these tasks can only be achieved if this information is easy to find. The easier the information is found, the faster the problem is solved. The ease of access to information is, therefore, one of the most important KPIs for evaluating the efficiency of a government site. It is determined by a pool of factors that contribute in various ways to determine the general performance (P) of the government site:

$$P = f(C, T, S, CxT, CxS, TxS, CxTxS)$$

Where:

- P is the measure of the website's information search performance
- C stands for citizen characteristics
- T stands for characteristics of the problem and the type of information search to be performed
- S stands for technical features of the website

Therefore, the performance of a website, a concept that could be expressed as the easiest way to access services, is based on: First, the characteristics of the citizen (gender, age, problem-solving skills, cognitive styles, etc.). Second, the type of research to be carried out (clarity of the contents to be searched, the possibility of retrieving the necessary information on the government site rather than externally, etc.). Third, technical performance of the website (clear user interface, intuitive user experience, speed of navigation on the site, etc.). This model makes it possible to objectively assess whether the services offered on government sites are provided with quality. It simultaneously considers the critical factors for citizens (C and T) with those of the website (T and S), thus determining a final score that holds in due account all the elements.

The evaluation model, as suggested by the authors, does not have the ambition to be universally used in all situations. It needs to be adapted from time to time, according to the government site and to the type of services and users. Previously a distinction between citizens and customers was made. Still, citizens are a genus within which infinite species of citizens can be distinguished according to the institution and the service provided. The civil motorisation site distinguishes between citizens with a driving license, those with a special license and those without a license. A school will offer services for students, teachers, and parents. The tax site instead offers services for companies, self-employed workers, employees, and retirees. There are many cases, and the model must be implemented, re-adapting the factors (C, T and S) that determine the performance (P) of the supplying site.

Beyond the results of the model given by its experimentation in the field, it is interesting to note how Wang *et al.* (2005) have identified the question's point with this research: adopting a citizen-centred approach to improve the use of online government services. This was possible by identifying critical factors and the relationships between them that determine the government website's overall performance. Identifying critical factors is essential to understand the problem of the lack of efficiency of government web services and to know which levers must be used to improve the online service system. This

element is the solution this model offers to the problem of evaluating online government services.

Another contribution to creating efficient online public services for citizens, contemporary analysing the development of software platforms designed to facilitate the use of the content for users, comes from Sirendi (2012). While Wang *et al.* (2005) developed an ex-post evaluation model to make improvements to the system that provides the services. In this case, the authors intervene at a previous step, the design of the service and infrastructure which will have to provide it efficiently and considering all the relevant aspects.

The goal of their work was to propose a methodology for the design of proactive online government services. Websites must be designed to offer all possible information based on the type of application that the citizen must do. This aspect is not necessarily negative, it is instead a sign that the criticalities underlying the problem of providing efficient online services by government institutions are recurrent even with different approaches.

The study by Sirendi *et al.* (2016) is carried out on a sample of Estonian citizens who request access to the institution that provides family benefits (family allowances, adoption allowances, etc.). Through interviews, they are asked to express how online services can be improved to allow for more efficient delivery (processing of applications and subsidies delivery). The starting hypothesis of Sirendi *et al.* (2016) is that a better understanding of the problem to be solved (types of services to be provided) leads to a better design of the system that must solve that problem (online infrastructures). Confident of this principle, the authors decide to adopt an *Agent-Oriented Modeling* (AOM) approach to create proactive public infrastructures and services (this topic will be further deepened in chapter 2).

Considering that today ICTs provide significant technological solutions (cloud storage, cloud computing, AI, data mining, etc.), they can be used to proactively assist citizens, anticipating the needs and tasks necessary to obtain the desired output: online public

services should be designed in this direction. Technological systems equipped with this computing power could support intelligent data processing and the automation of operations for the citizen in real-time, proactively, and intelligently modelling the user experience according to the user himself, to offer a tailor-made and high-quality service. To obtain these results, the authors suggest using a service-design thinking approach, a way of thinking and designing services in a dynamic and interdisciplinary practice, trying to create value for all the stakeholders involved in the process, institutions (*service provider*) and citizens (*users*). In essence, we need to design the services thinking about the entire ecosystem that revolves around them to minimise inefficiencies in favour of the quality of the services provided. Using this design methodology is essential in a modern context, such as the one in which we nowadays live. More and more people are approaching public services through digital infrastructures, and more and more public services will be available online. With an initial investment in ICT, there will be significant savings over time. The speed with which the public administration will process the requests will lead to an efficiency of the public machine and the savings for the state budgets will be considerable.

Furthermore, designing from the point of view of a single country e-government system becomes almost an imperative if we think of the possibility of *vertical integration*, which refers to the connection at the local, state, and federal level of the various institutions, and *horizontal integration*, in which integration takes place through heterogeneous functions and services (Layne and Lee, 2001). To conclude, the issue of building online services with a citizen-centric approach leads to different solutions: intervening on existing structures through evaluation models or designing the necessary technological structures from scratch. At the centre, there is always the citizen who uses the services and acts as a barometer for the goodness of the technological infrastructures. The direction to take for institutions is undoubtedly the design of personalised services through proactive technological systems. When public institutions forget that the ultimate goal is to provide a quality service, the entities that provide the services perform poorly.

CHAPTER TWO

2.1 Proactivity: definitions and considerations

The pervasiveness of ICT in public service delivery started to question the ‘usual’ way adopted for service delivery. So far, the service delivery process begins with the user, who has a specific need and therefore activates a service. The user typically reaches an agency when he requires a service, which is kept active to answer the demand. ICTs, especially for what concerns data integration and management across multiple agencies, is pushing organisations to move towards a new way to deliver services, where the organisation is becoming proactive: it recognises the user’s need before him and acts consequently. This new category of public services has been addressed as proactivity. Proactive services must be considered as an evolution of traditional electronic public services, still rooting in the potentials offered by ICTs, but shifting the focus from the agency itself to the service recipient.

Due to the innovative character of this kind of services, the scientific literature is not vast and exhaustive yet. However, the number of studies regarding this typology of services started increasing since last decade, as it is presented in Tab. 1.

<i>Main Author</i>	<i>Definition</i>	<i>Key words</i>
<i>Bertot et al. (2016)</i>	<i>“Anticipation can be based on demographics (e.g. age or marital status), life circumstances (e.g. change in employment, disaster recovery or movement to a new location), or some other contextual factors. Anticipatory services (or proactive services) are therefore predicated on the ability of governments and citizens to seamlessly share information and data that enable the prediction of citizen needs.”</i>	<i>Anticipation, demographic data, prediction of needs</i>

<i>Linders et al. (2018)</i>	<i>“Proactive e-government shifts from the ‘pull’ approach of traditional e-government - whereby the citizen must first know, decide, and seek out government services - towards a ‘push’ model, whereby government proactively and seamlessly delivers just-in-time information and services to citizens based on their needs, circumstance, personal preferences, life events, and location.”</i>	From pull to push, just-in-time information, life-events
<i>Scholta et al. (2019)</i>	<i>“In proactive services delivery means that the government delivers a service to a citizen when a life event occurs, without the citizen having to request the service” or “proactive service delivery is being triggered by the government and finalized without the citizen’s active involvement.”</i>	No request, service trigger, no citizen involvement
<i>Erlenheim et al.(2020)</i>	<i>Proactivity in the public sector involves providing services to the public on behalf of the government’s own initiative, based on the assumption that citizens support this and based on the data available in the government databases. Proactive services are provided automatically or with the consent of a person.</i>	Government initiative, citizen support, automation vs consent

Table 1: proactivity in scientific literature.

Governmental reporting contributes to fuel the discussion on proactive service, highlighting the necessity of spreading its use along public administrations. The most significant definitions are reported in Tab. 2.

<i>Nation</i>	<i>Definition</i>	<i>Key Words</i>
<i>Taiwan (2011)</i>	<i>“Proactive One-stop Service: We are simplifying service processes and integrating interagency services from a life cycle and overall service perspective, which let us provide the public with one-stop end-to-end government services.”</i>	One-stop-shop, end-to-end, interagency services
<i>OECD (2017)</i>	<i>“The shift from reactive to proactive service delivery mechanisms, enabled by a transition from e-government to digital government, where the use of digital technologies is assumed as an integrated part of governments’ modernisation and innovation strategies, creating public value through the engagement of a broad ecosystem of stakeholders, offers the chance to better respond to user demand.”</i>	From reactive to proactive, from electric to digital government
<i>New Zealand (2017)</i>	<i>“Proactive delivering seamless services to customers that they are entitled to without needing to apply. In this future, services will be seamless, integrated and proactive. People will not need to navigate multiple government departments or apply for something they are entitled to.”</i>	Seamless and integrated, no need to apply
<i>Estonia (2017)</i>	<i>Proactive services are the direct public services provided by an authority on its own initiative in accordance with the presumed will of persons and based on the data in the databases belonging to the state information system. Proactive services are provided automatically or with the consent of a person.</i>	Presumed will, automation vs consent, direct services
<i>OPSI (2020)</i>	<i>The evolution of invisible government is based on the development of proactive public services that require little to no action by the user.</i>	Invisible government, eliminate burden,

OECD (2020)	<i>Proactiveness represents the ability of governments and civil servants to anticipate people's needs and respond to them rapidly, so that users do not have to engage with the cumbersome process of data and service delivery.</i>	Respond rapidly to needs, eliminate cumbersome processes
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Table 2: proactivity in grey literature.

The keywords in Tab. 1 and 2 are highlighted by the author to have a first understanding of what proactivity means. The term “*citizen*” is here used trivially: the definition doesn’t consider the diversity of possible recipients (ordinary citizens, businesses, and other public administrations). Citizens and firms have different legal status, but, above all, they have different needs. Although its relevance from a legal point of view, this diversity can be overlooked dealing with proactive services. The term “*user*” or “*final user*” is the more inclusive, also considering other possible actors: social partners (trade associations, associative forms on the territory), third parties (ex. NGO), other public organisations. Anyway, to comply with the literature examined, the term citizens will be used to label all the possible users.

2.1.1. The paradigm shift: from push to pull service delivery

The most comprehensive definition of proactive services is given by Linders *et al.* (2018). It describes the main feature of a proactive service as moving the paradigm from “*pull*” to “*push*”, considering the citizen as, in the first case, the origin of the request, and, in the second one, the object of the claim. The position taken by a proactive public administration is a *predictive* one (Bertot *et al.*, 2016), rather than react to a situation after it has occurred. The “*push*” concept is described by a situation where a public organisation takes the initiative in providing public services to a person based on the presumed will and on its initiative, instead of being “*pulled*” from the request of the citizen. Proactive service provision regards a peculiar and innovative development of some strongly digitalise countries in deploying specific categories of public services

that must possess certain characteristics. Offering proactive services results in “*a seamless experience for users of service, while the presence of government becomes progressively invisible*” (OECD 2020). Proactivity in essence means “*preventative*” or “*forward-looking*”, instead reactivity consists in responding to something that is already happened (Sirendi *et al.*, 2018).

“Such services eliminate burden and confusion for citizens and businesses, who can now obtain services without dealing with bureaucracy, as well as for governments, who can shift from processing applications and handling customer service inquiries to higher-value work.” (OPSI 2020)

The literature addressing proactivity comprehends descriptive and, mostly, normative studies. The first approach describes existing proactive use cases. At the same time, the latter investigates how this category of services should evolve and also include different principles (both aspects are considered in the work). Sirendi *et al.* (2016) focus their research on how design principles should be integrated into the definition of proactivity, investigating citizens’ needs and how to fulfil them proactively. Proactive services must be considered the next step for e-government development (Sirendi *et al.*, 2016). Traditional approach of public service delivery is a pull method; therefore, proactively delivering services is a push method, meaning that the government pushes services to the citizen:

“Proactive public electronic services should be designed in a way that supports the automation and intelligent processing of already available information to reflect the purpose of meeting the needs of different stakeholders yet maintaining a people-first policy”. (Sirendi *et al.*, 2016)

According to the extract reported, proactivity relies significantly on data utilisation and automation. The automation issue in public administration has already been disclosed by Milakovic (2012), whose study indicates that there have been numerous data mining and information sharing infrastructure in various public sector segments. Still, few

valued-added applications have been developed on top of that. Instead, private companies have already investigated advanced analytical systems aimed at customer relationship management (CRM). Similarly, governments should begin to realise that services should also be oriented toward meeting citizens' needs, rather than reinforcing existing administrative and bureaucratic (Milankovic *et al.*, 2012). In other words, public organisations should manage their database with the purpose of designing proactive services (Erlenheim, 2020). Bertot *et al.* (2016), while developing an innovation framework for e-government, emphasises the potential of private business practices that could be transferable to an e-government:

“Based on identified patterns of daily activities, a mobile app proactively offers information about the time it may take for a user to commute to the place that he or she usually goes. The service anticipates what the user will do and based on such prediction it provides useful information. Digital technology enables the collection of geo-data about the user's commuting patterns and combines the collected data with other contextual data such as the day of the week, weather conditions, and traffic to provide an informational service. Using consumption trends like, e.g. books bought online or courses selected online the service provider suggests new items that might be of interest to the user. Examples of such services are provided by Amazon and Coursera respectively. Digital technology is used to anticipate possible future users' choices based on historical data, identification of behavioural patterns, and data mining techniques.”

Therefore, the citizen's side becomes the centre of the design process, assuming the citizen-centric approach as a best practice for e-government service design (Fath-Allah *et al.*, 2014). According to the citizen-centric principle, technical artefacts' design is less important and must include social aspects. “*E-government design has to be a socio-technical design, because humans are working with the artifacts and in the re-designed organisational structures*” (Schuppan *et al.*, 2017). IT elements are not anymore at the centre of the e-government design process, replaced by values and non-technical aspects. The critical point of proactivity is that citizens should not navigate through

complicated bureaucratic systems, but should rather be passive and only react in precise steps: for example, in confirming the actual need of a specific service (Linders *et al.*, 2018). Ideally, Proactiveness “*aims to offer a seamless and convenient service delivery experience to citizens, shaped around their needs, preferences, circumstances and location, on the basis that governments are equipped to anticipate and address problems end-to-end rather than through a fractured and reactive approach*”. (OECD 2020)

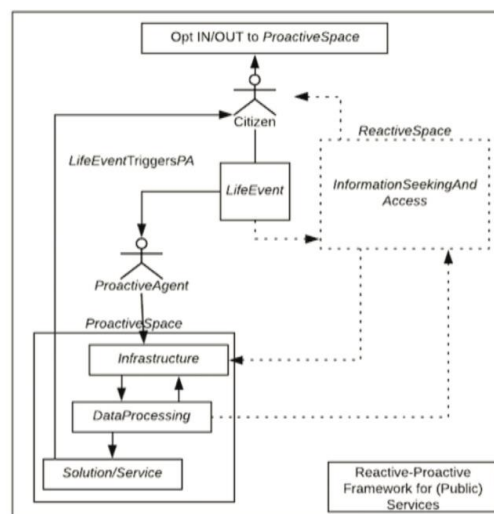


Figure 1: proactive-reactive dichotomy, Erlenheim (2019).

It is clear here that automation will take a prominent position in proactive services (Erlenheim, 2019). Furthermore, thanks to data aggregation, the once-and-only principle would be applied (Wimmer, 2017; Erlenheim *et al.*, 2020), as the citizen should not have to submit data repeatedly. What is traditionally indicated as public e-service should be considered reactive. Reactiveness consists of doing something in response to a situation rather than creating or controlling it (Sirendi *et al.*, 2016). Erlenheim (2019) defined a framework to understand the dichotomy of proactive and reactive services, shown in Fig. 2.

When a public organisation merely informs citizens about which services they may call on, the service delivery itself remains reactive as citizens have still to trigger the service.

Because the citizens have to claim that they want to receive a service, recommendations in proactive information are not sufficient for proactive service delivery (Scholta *et al.*, 2019).

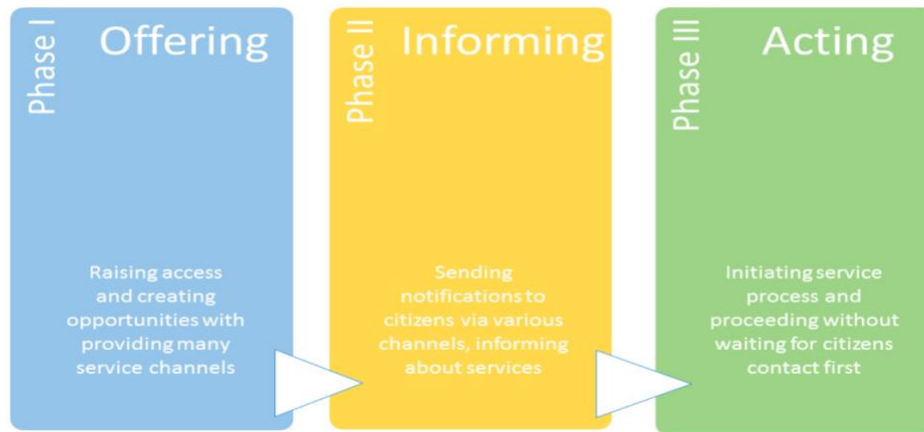


Figure 2: proactivity roadmap, Kroonmäe (2017).

Callen and Hasanain (2011), focus their work on the Punjab Government initiative to gather feedbacks from citizens to prevent corruption. Punjab’s approach, which consists of monitoring officials through service beneficiary feedback asked proactively, is defined by the authors as proactive e-government, as its purpose is to ask the citizen through asking feedback via SMS messages, rather than waiting for problems to arise. But is it enough to ask for feedback to deliver proactive services? An answer could be that it is possible to distinguish different degrees of proactivity, an aspect that will be deeply investigated in this work. An intermediary step could be the proactive delivery of information that governments can send about available services to citizens after a life event has occurred, without the citizen requesting it (Scholta *et al.*, 2019).

The first phase aims to provide different service channels to citizens, self-service portals, and other solutions. The second phase is illustrated by the government’s initiative of sending out notifications to citizens about road conditions, threats, expiry of permits and documentation, etc. The third phase includes providing full services to

citizens on the government's initiative and without any input or expressed will from the citizen.

Fundamentally, the shift to a proactive approach requires citizen-centred service design (Erlenheim, 2020). This citizen-centric approach requires a change in the thinking of governments from seeing themselves as approvers to seeing themselves as suppliers (Schuppan *et al.*, 2017). The method requires a solid understanding of the needs and the interplay of stakeholders in proactive e-government services. To gain that knowledge and incorporate it into service design, Sirendi *et al.* (2016) suggest agent-oriented modelling (AOM). Designing services with the service receiver at the centre of the process. Sterling and Taveter (2009) gave their proper definition of AOM:

“Agent is known as an entity that can act in the environment, perceive events occurring in the environment, communicate with other agents, and reason. Agent is by definition reactive, proactive, and social. An agent is reactive if it is able to perceive its environment and respond in a timely fashion to changes occurring in it. A proactive agent does not simply act in response to its environment but is able to exhibit goal-directed behaviour and take the initiative where appropriate. A social agent interacts, when appropriate, with other agents in order to complete their own problem solving and to help others with their activities.”

Designing proactive and personalised services requires including techniques for modelling socio-technical systems (Sirendi *et al.*, 2016). The AOM allows to include the needs of a multi-agent system into the design phase: goals and roles of stakeholders, specific domain knowledge, all the possible interactions and behaviours are considered. Fig. 3 shows an example of the use of AOM. Standard components of the agent-oriented design of proactive services are recommender engines, systems that suggest suitable services based on an analysis of citizens' need and conditions. Ayachi *et al.* (2016) differentiate between reactive and proactive recommender engines for e-government

services: the reactive one offers e-government services based on a set of formulated questions and their answers, asked during the registration to a government portal.

In contrast, the proactive one suggests that a service should be activated (without citizen input) when changes in a citizen's social media profile occur. Automation enables this process by analysing social media data and mixing them with the information already held by the government. Proactivity has many scenarios of implementation: it can range from scenarios where the public sector organisation performs an initiating action and still requires recipient input to complete the delivery process, to ones where a recipient does not need to perform any action to receive a service.

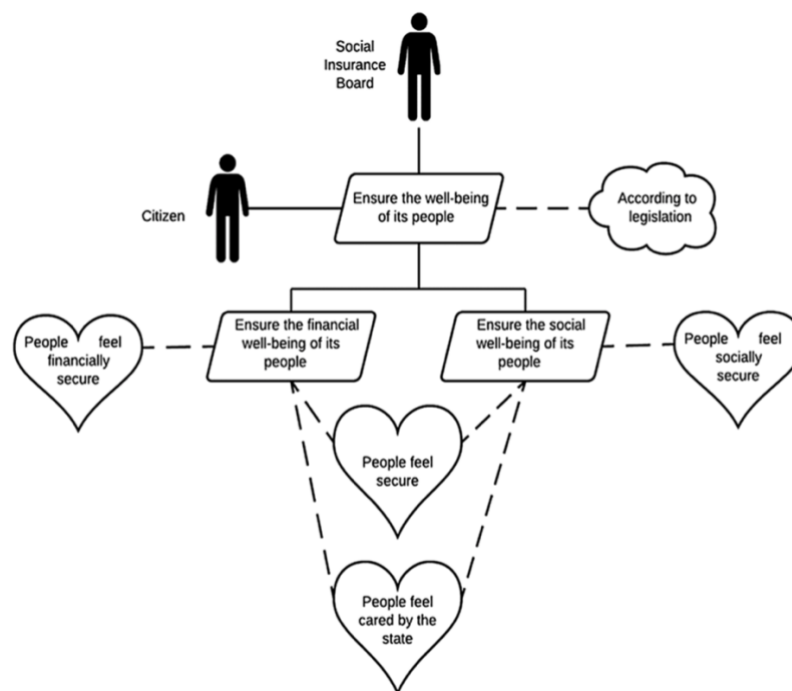


Figure 3: AOM model for family allowances, Sirendi *et al.* (2016).

However, proactivity does not necessarily require the public sector organisation to initiate the delivery process, since a third party could also trigger the process; such as for family allowance in Austria, where the hospital informs the government about newborns (Scholta *et al.*, 2019). The Austrian case will be deeper analysed over the next chapters, but it is already possible to identify the complexity of the proactive service

delivery: there are many potential service triggers, the recipient could refuse the delivery, third parties are involved (private or public), interoperability is necessary, privacy must be respected.

2.1.2. “From one-stop shop to no-stop shop”: a path towards proactivity

Proactivity, intended as a new paradigm of e-service delivery, could be achieved solely if public administrations meet several requirements (Scholta *et al.*, 2019). It is possible to consider the one-stop-shop as an effort towards reducing the bureaucratic effort of citizens, similarly to proactivity. One-stop-shop is a single point of entry for all e-government services (Fath-Allah *et al.*, 2014), and it is recognised as a best practice in e-government applications by many government organisations. The one-stop-shop dialogues with another principle which is driving the modernisation of the public institutions, the once-only principle for citizens (SCOOP, 2020):

“The once-only principle aims at eliminating the administrative burden when citizens are required to provide the same information again and again to public administrations. Instead, public administrations should have the means to re-use information already supplied by citizens in a transparent and secure way.”

Benefits of the once-only principle implementation for public administrations are (SCOOP, 2020):

- Increased efficiency and effectiveness of public administration obtained by sharing and re-using knowledge and resources;
- Sharing and re-using of data enables legal obligations to be fulfilled faster;
- Public administrations can retrieve the data from the sources where these data are approved and quality-assured;
- Governments receive better quality of data.

According to Fath-Allah et al. (2014), the one-stop-shop brings the following benefits:

1. It helps achieve citizen centricity: therefore, citizens should be able to go to one point of entry to access all e-government services;
2. One-stop-shop increases the usability and ease of use.

Brüggemeier (2010) identifies a path which starts from level-specific one-stop shops and ending in no-stop proactive government. Therefore, one-stop-shop can be identified as the starting point towards adopting a citizen-centric approach.

Therefore, a citizen-centric approach likely brings public organisations to adopt proactive service delivery. Brüggemeier (2010) proposes three types of government with an increasing degree of proactivity. The first is “*outreaching government*”, where the government moves closer to the recipient: the outreaching government can act reactively but also proactively. In contrast, the “*attentive government*” always acts proactively by delivering the recipient with recommendations. The final type, “*no-stop government*”, provides only proactive services. In the latter, services are provided in a way that recipients do not have to transmit data, but give only their consent and, if the legal and privacy conditions allow it, even without the administration request.

Even one-stop shops keep citizens frustrated, because of their reactivity and repetitiveness (Scholta *et al.*, 2019). Therefore, institutions need to aim to no-stop shops. Fig. 5 shows a framework from Scholta *et al.* (2019).

The framework describes e-government stages according to three dimensions:

1. The first dimension, integration of data collection, indicates to what extent government forms and interfaces to recipients are integrated or eliminated from service delivery;
2. The second dimension, integration of data storage, depicts the extent to which the government accesses a consolidated data basis;
3. The third dimension, purpose of data use, indicates whether a government delivers services reactively, proactively or predictively.

Whereas proactive public service delivery means that a government performs a service to a recipient without the recipient doing any action after a life event occurred, a government delivers a service predictively even before a life event takes place. An example of proactive delivery is a family allowances system where the money is given seamlessly after a child's birth, without requiring any submission of an application form. An example of predictive service delivery is providing a seniority card a few days before a citizen reaches 60.

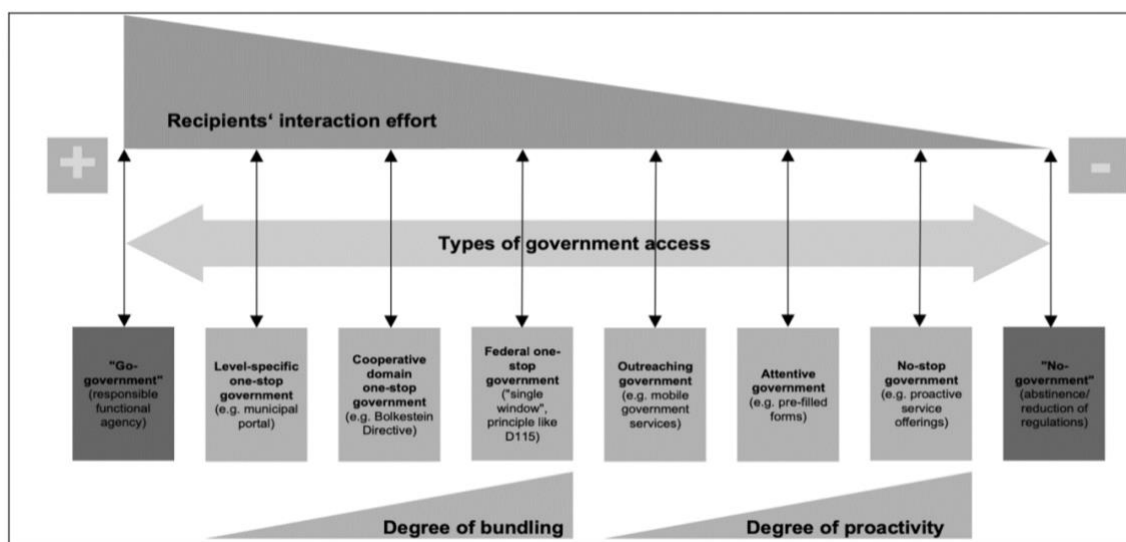


Figure 4: proactivity's framework, Bruggemeier (2010).

In their framework, Scholta *et al.* (2019) indicate three stages. The one-stop-shop stage uses a single digital location to interact with service recipients, but still relies on reactive service delivery. The limited no-stop shop stage delivers services proactively, and it still requires additional data to be asked to the recipient.

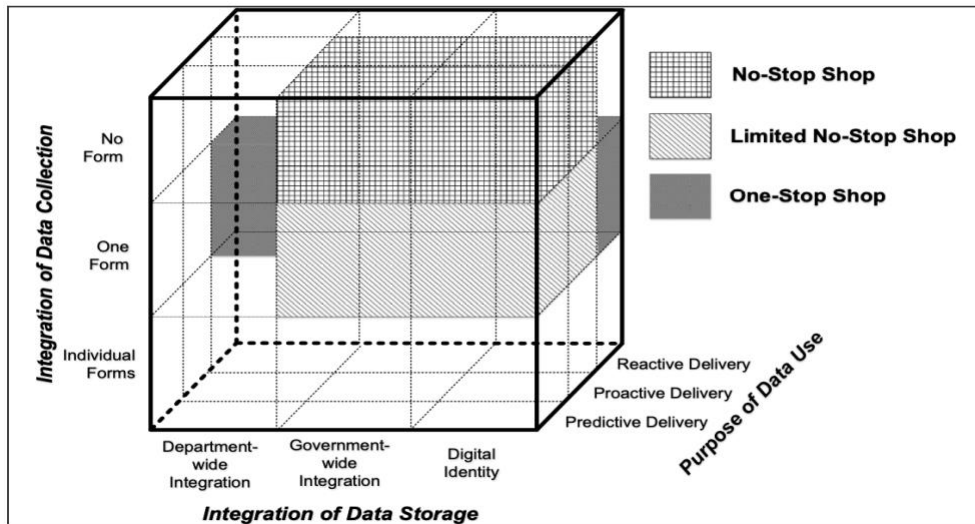


Figure 5: proactive delivery model, Scholta (2019).

Scholta and Lindgren (2019) identify how proactivity changes digital services' meaning, as shown in Fig. 5. In the rows, the three dimensions proposed by Lindgren and Jansson (2013). The columns are defined according to the Brügge-meier framework: attentive government and no-stop government.

The fundamental difference between the two is that in the attentive government, the recipient can opt-out and still has to act. In contrast, the no-stop government delivers services without any action performed by the recipient. According to the Scholta (2019) framework, the no-stop government offers *proactive delivery* and *predictive delivery*. The first element refers to the already defined proactive service delivery, while the second refers to the possibility of anticipating citizens-needs and predict the delivery of the service. An example of the latter can be the registration service to elementary school, where just the knowledge of the birth date of the citizen could enable the anticipation

of the service. Khun et al. (2020) evaluated its implications of quality in the context of non-interaction, which contradicts the reported “no change” in the quality domain.

Dim.	No.	Attentive Government	No-Stop Government (Proactive Delivery and Predictive Delivery)
Public	A	The public ethos	
	A1	- No change.	- Need to ensure comprehensive legal framework <i>that allows for no discretion and needs to be adapted to enable proactivity.</i>
	A2	- Supports democratic and economic values with a special focus on principles of equality, responsiveness, availability and social inclusion, as well as cost-efficiency.	- Ensures democratic and economic values with a special focus on principles of equality, responsiveness, availability and social inclusion, as well as cost-efficiency.
	A3	- Need to ensure legitimacy and accountability through rule of law (especially privacy regulations) and efficient out-put.	- Need to ensure legitimacy and accountability through rule of law (especially privacy regulations) and <i>effective and efficient</i> out-put.
	B	Lack of exit	
	B1	- No change.	- <i>Only possible in</i> monopolized or compulsory situations (legitimacy not based on choice).
	C	Users as citizens, rather than consumers	
	C1	- Supports to ensure individual and political rights and obligations of citizenship.	- Ensures individual and political rights and obligations of citizenship.
	C2	- Supports to ensure access to services for all citizens (accommodate heterogeneity).	- Ensures access to services for all citizens (accommodate heterogeneity).
	e	D	A technical artifact, constituted of
D1		- No change.	- Internet-based technology <i>necessary for the government, not for the citizen.</i>
D2		- No change.	- <i>No interaction.</i>
D3		- No change.	- <i>No change.</i>
E		Should be evaluated in relation to its intended use and users, which implies that	
E1		- No change.	- A focus on users of technology <i>and non-technology users</i> is necessary.
E2	- No change.	- <i>Accessibility is ensured by implementation and the government does not have to care about usability.</i>	
Service	F	Service as a process	
	F1	- No change.	- Must be perceived as a process in which value is <i>created by the supplier.</i>
	G	Service quality	
G1	- No change.	- <i>No change.</i>	

Table 3: proactive government formats, Scholta *et al.* (2019).

An essential aspect of public service delivery is the importance of respecting legal constraints. The reactive and attentive government allows for services with some degrees of discretion, because their IT systems typically only mediate information that is later handled by a public official still making the formal decision (Lindgren and Jansson, 2013). No-stop government, however, allows for no discretion. In proactive and predictive service delivery, the IT system, with public employees’ supervision, decides whether a recipient is eligible for a service and the service is then pushed to the recipient without prior contact. Therefore, the no-stop government requires comprehensive adaptations of the citizens’ political and legal rights.

2.2. Integrating service design principles and proactivity: how non-interaction impacts on service performance

Proactive services are initiated and delivered by governments without an explicit request coming from the citizens, resulting in a reduction or complete elimination of interactions to obtain a service. Interactions such as filling and filing forms are considered an obstacle by users (Scholta *et al.*, 2019). So, their reduction or complete absence potentially has positive effects on service quality. Arguably, non-interaction can be considered a significant factor determining the success of the public e-service and should be a focus of government efforts to increase service quality (Kuhn *et al.*, 2020). Investigating how interaction impact on performance belongs to the domain of service design:

“Governments should introduce and implement the concept of service design thinking in the public sector in order to create public electronic services that would truly and purposefully meet the needs of citizens, businesses and non-governmental organisations” (Sirendi et al., 2016).

Service Design is defined as *“an emerging field focused on the creation of well thought through experiences using a combination of intangible and tangible mediums. It provides numerous benefits to the end user experience when applied to sectors such as retail, banking, transportation and healthcare. As a practice it generally results in the design of systems and processes aimed at providing a holistic service to the user”*³. The impact of Service Design is *“all about making the service you deliver useful, usable, efficient, effective and desirable”*⁴.

Therefore, Service Design is a set of methodologies and tools for helping the organisations to make sure they are creating value for the user. It is a terminology coined by Lynn Shostack (1987). Nowadays, its definition has become broader, as this method is also used for managing many operational aspects of day-by-day operations (Goldstein

³ The Copenhagen Institute of Interaction Design, 2008.

⁴ UK Design Council, 2010.

et al., 2002). The original focus of Service Design has been the design of better service interactions and experiences, applying tools and concepts coming from Interaction and Experience Design (Selen *et al.*, 2001). The essence of Service Design is user-orientation, which is crucial in developing proactive services. Service design techniques are focused on users, investigating their needs and problems. It is essential to leverage on service design in developing users' requirements, especially when discussing proactive services (Sirendi *et al.*, 2016). In this sense, it is translated into a systematic approach that links a proactive service delivery with a comprehensive set of customer needs, the translation of these needs into various service attributes, and the development of a properly designed service process.

The design principles that have to be put in place to assure a proactive delivery are (Erlenheim *et al.*, 2020):

- Wholesomeness of the invisibility of the process;
- Once-and-only Principle;
- Accessibility through digital channels;
- Possibility to Opt-out;
- Personalised service based on expressed preferences;
- Intuitivity and simplicity;
- Transparency of processes, rules and obligations;
- Recent, timely, updated information;
- Reliability and security of the data treated;
- Multi-language access.

After all the dimensions considered, another aspect is needed for the analysis of proactive services: service quality. Service quality is measured by the extension wherewith the service meets customer expectations. For what concerns quality itself, it is not only the service outcome that matters, but also the service process (Ghobadian *et al.*, 1994)

Non-interaction	Service quality dimensions			
	Trust	Efficiency	Reliability	User Support
Data provisions				
Non-interactive Specification	Best specification for user?	Effort for corrections necessary?	Specification correct?	What if specification wrong?
Non-interactive eligibility	Benevolent or strict?	Can be automated?	Assessment correct?	How to object?
Non-interactive identification	Privacy protection met?	Minimal possible amount of ID data?	Identification immediate?	What if not considered?
Support functions				
Non-interactive trigger	False trigger possible?	Extra effort to enable proactive trigger?	Trigger immediate?	How to manually trigger?
Non-interactive authentication	Privacy protection met?	New technology necessary?	Authentication correct?	How to object?
Non-interactive payment	Unexpected costs possible?	How big is verification effort?	Payment immediate?	Possibility to know payments in advance?
Non-interactive logistics	Confidentiality?	Lost resources due to erroneous service delivery?	Address correct?	Support information available from logistic 3 rd parties?

Table 4: quality in non-interaction, Kuhn *et al.* (2020).

In this context, service design techniques could help better understand the interplay of non-interaction and service quality. This aspect is especially relevant because fewer interactions not necessarily result in better service quality (Kuhn *et al.*, 2020). Kuhn *et al.* (2020) identify the need for investigating the relation between non-interaction and service quality, trying to create a qualitative framework through which better design proactive services.

Applying the model in the municipality of Munich, the authors found out that:

“Non-interaction interplays with service quality in a non-trivial way. While less interaction effort can have benefits for the user, the reduction of interactions might also have downsides such as trust or reliability aspects. Consequently, simply understanding non-interactivity as reducing interaction efforts for the user might not allow for a comprehensive understanding.”

A possible the application of the framework, is presented in Tab. 5.

Non-interaction	Service Quality Dimensions			
	Trust	Efficiency	Reliability	User support
Data provisions				
Non-interactive Specification	Same ticket for all pupils	–	Same ticket for all pupils	–
Non-interactive eligibility	–	Communication of danger zones among authorities might take time	Immediacy has to be ensured	Fast help in case of wrong refusal necessary
Non-interactive identification	Access to state school data base necessary	–	–	–
Support functions				
Non-interactive trigger	–	No application necessary	Provision at first day of school	–
Non-interactive authentication	–	No authentication necessary	–	–
Non-interactive payment	–	–	–	–
Non-interactive logistics	–	No pick up in school	Need to send tickets to right parent	–

Table 5: application to school transportation, Kuhn *et al.* (2020).

According to the findings presented by the Kuhn *et al.* (2020), proactive government also not necessarily has the highest maturity, as it has been suggested by Scholta *et al.* (2019), but the precise effects of proactive government on service quality should be better considered.

2.3. Issues that public administrations need to face when adopting a proactive approach: a challenge or an opportunity?

Considering the innovative nature of proactive e-service, comprehensive studies on which barriers this new service domain could encounter don't exist yet, although it is still possible to question whenever classical e-government barriers could be harmful in

detering proactive delivery. According to Meijer (2015), every phase shows different issues that an e-government innovation must face:

1. Idea generation: the idea of transforming government through the use of new technologies is developed. Interpretative barriers can play a vital role in this barrier: many actors will not be prepared to change how they have been viewing themselves, others and the world;
2. Idea selection: out of all the ideas developed within an organisation, some are selected for further development. Organisational attention and resources are scarce, and consequently, a choice is needed;
3. Idea testing: the idea is developed and tested on a small scale to see whether it 'works' in practice;
4. Idea promotion: a successful test will be followed by promoting the idea to get it implemented on a larger scale. In this phase, financial and capacity barriers may prevent the process of innovation from moving forward;
5. Idea roll-out.

The validity of the previous model is general and vastly applicable; therefore, it should be considered when dealing with the introduction of proactive services.

Barriers to standard e-government innovations differ in domains: government barriers and citizen barriers (Meijer, 2015). Proactivity challenge many governmental barriers that the model lists, but creates new citizen barriers that were not present before. Privacy issues, consent are only few examples.

Meijer (2015) differentiates between government and citizens barriers: the first set refers to legal constraints, lack of finances, shortage of personnel, limited political support, lack of coordination, technological constraints ("*Structural barriers*"); resistance to change, fear that innovation undermines robustness of government, interference with the bureaucratic structures ("*Cultural barriers*"). The second set, instead, refers to lack of technological facilities, limited competences, time shortage, and lack of integration in daily routines ("*Structural barriers*"); lack of interest, little

faith in government, no usefulness, resistance to the technological transformation (“*Cultural barriers*”).

Legal constraints, limited management support, technological constraints are traditional structural barriers that could be identified as major issues in the introduction of proactivity in the public administration.

Scholta *et al.* (2019), examined three proactive case studies, presenting a set of barriers and enablers of proactive services:

	Austria	Estonia	Australia
Model dimensions:			
- Integration of data collection	One form: high integration of data collection; no-form delivery for some services	One form: centralized data collection; ambitions to selectively move to no form (e.g., pensions)	Individual forms: very limited integration of data collection
- Integration of data storage	Government-wide integration: high interoperability of data repositories; plans for digital identity	Government-wide integration: high interoperability of data repositories; no further integration by design for power distribution reasons	Department-wide integration: decentralised storage of data with no consistent sharing
- Purpose of data use	Reactive delivery	Reactive delivery	Reactive delivery
Overall classification	One-stop shop; progressing quickly toward limited no-stop shop; past and planned future growth path in line with stage model	One-stop shop; past growth path in line with model, planned future growth path partly in accordance but also somewhat at odds with stage model	Classical unintegrated model; planned future growth path in line with stage model
Barriers	The legal need to have citizens trigger service Technological path dependency and incompatible legacy systems Privacy concerns: will citizens want to share data?	The legal need for citizen consent and therefore triggering of service Lack of integration in back-end processes Citizen behaviour: use of search engines	Distributed/unintegrated structure and power Technical fragmentation and incompatible legacy systems Lack of resource allocation to integration and digitisation Citizen pride Privacy Legal requirement of documentation
Enablers	Citizen trust in government Process optimisation and management Top management/political support	Top management/political support and coherent strategy Mutual trust between government, citizens and systems engineers Competencies in software development and operations and information security	Increasing focus on citizen experience Process optimisation and management Top management support Fast development and uptake of smart devices

Table 6: barrier and enablers, Scholta *et al.* (2019).

This use cases analysis (that will be deepened in the following chapter) highlights the presence of recurrent barriers, aligned with the one determined by Meijer (2015). Integration and technology legacy issues are the most recurrent, along with the privacy and legal issue in deploying a service with a reduced (or zeroed) interaction with the service recipient.

Schuppan *et al.* (2017) focus their analysis on the public administration staff negative attitude towards one-stop government solutions, identifiable as a possible proxy of the barriers that a proactive evolution could encounter. The research run through focus groups using the ADR (Action Design Research) methodology, which explains the different attitudes of citizens towards proactive services. It reveals that the reasons for the increased administrative burden are “*silo structures*” of public bodies, unclear responsibilities, and a lack of coordination between the actors involved in the supply of services. Hung *et al.* (2012) researched which were the central problematics in developing a citizen-centric system in Taiwan. According to his work, the top-down approach is not the right solution for incorporating citizens’ demands into e-government. To build a citizen-centric e-government need is crucial to adopt a bottom-up approach, enabling greater citizen participation and involvement.

His observation could help understand how a country, in an ongoing process towards proactivity, could face and overcome the same issues. Hung identifies two main problems:

1. The role of IT personnel in charge of designing and implementing e-government. Their lack of knowledge of citizens’ needs and preferences may bring to government’s failure in adopting the paradigm shift;
2. The value of public servants involved in e-government matters. Public servants are more likely to put great effort into improving services online if they have a strong belief that information technologies can and should be used to promote equity, transparency, and participation;

Hung (2012) also suggests that technology-focused IT personnel and risk-adverse bureaucrats can be an obstacle to e-government moving forward and devising new ways to serve citizens. Such a radical change needs to be guided by trustable and motivated public employees.

2.4. From cradle to grave: how proactivity brings value

Looking at a person's lifecycle, "*it is possible to assume that a person goes through a number of life events (e.g. birth, starting school, getting married, becoming unemployed, or death) that often, but not always follow a similar logical path. In essence, we are talking about a person's whole life*" (Erlenheim et al., 2020).

The introduction of the concept of life events is necessary when dealing with proactive services, as it is necessary to identify the triggers which will drive the requests of the public e-services. A possible set of life event guiding proactivity could be⁵:

- Having a child;
- Becoming a (social) caretaker;
- Starting education;
- Looking for a new job;
- Losing/quitting a job;
- Looking for a place to live;
- Changing relationship status;
- Driving a vehicle;
- Travelling abroad;
- Moving to/from the country;
- Going into military service;
- Facing an emergency / health problem;
- Facing a crime;
- Retirement;
- Death of a relative.

The Quality of Public Administration "*Toolbox*" (2017) define "*life events*" as "*common, crucial moments or stages in the lives of citizens or the lifespan of a business*". The focus of the study is on the "*fragmentation*" of the service that the citizen-user must face when dealing with a "*life-business event*", aiming to untangle the complexity of dealing with multiple government agencies when an event occurs by further distinguishing "*citizens users*" and "*business users*".

⁵ Estonia's proactive services Webinar (2018)

Citizen users life events:

- Having a baby;
- Attending hospital;
- Arranging for childcare;
- Studying;
- Using a public library;
- Looking for a job;
- Starting a job;
- Paying income taxes;
- Becoming unemployed;
- Marrying;
- Travelling abroad;
- Changing marital status;
- Buying, building, renting or renovating properties;
- Travelling to another country;
- Moving within one country;
- Applying for a driver's license;
- Owning a car;
- Reporting a crime;
- Starting a small claim procedure;
- Applying for a disability allowance;
- Retiring;
- Death of a relative.

Business users life events:

- Business users;
- Starting a business;
- Applying for licences and permits;
- Buying, building, renting property;
- Hiring an employee;
- Running a business;
- Paying taxes;
- Trading across borders;
- Closing a business.

The essence of life events is identified through two main goals:

1. Understanding all the individual steps involved in achieving the desired outcome;
2. Identifying all the institutions and their units or agencies that are involved along the way.

Is essential to appoint interoperability as a crucial prerequisite between different entities that receive, process, and deliver services.

Acting on life-business events system, with the final goal of achieving better service quality and performances, must be considered the basis for designing e-services (Quality of Public Administration Toolbox, 2017). Customer journey mapping is deemed to be useful to develop this kind of systems, translating the analysis of life events into concrete action towards the citizen.

“Life and business event service is a service provided jointly by several agencies to allow a person, enterprise, or NGO to perform all the obligations and exercise all the rights conferred on it due to an event or situation. A life or business event service compiles several services related to the same event into a single service for the user.” (Sirendi et al., 2018)

Körge *et al.* (2018) investigate life events concept and its link to proactivity. Estonian regulations distinguish between proactive services and event services⁶. Ayachi *et al.* (2016) identified the possibility of implementing a life event proactive system, developing a recommendation system created on the top of the Quebec registration e-portal. The greatest challenge of the web portals regards their content: published without any consideration that users should easily navigate and interact with the portals. In their work, they suggest designing and adjusting e-portal to users' needs and capabilities. In this sense, two different recommendation systems are proposed, respectively the reactive system and the proactive system: the first engine provides services depending on the citizen's needs formulated via a set of interactive questions and answers. The proactive engine offers services without any request: it introduces e-government personalisation techniques that exploit information captured from social media. This system relies on data extracted from user's profiles and social interactions

⁶ “Event services are the direct public services provided jointly by several authorities so that a person would be able to perform all the obligations and exercise all the rights conferred on the person due to an event or situation. An event service compiles several services (hereinafter component service) related to the same event into a single service for the user.” (Estonia, 2017)

and on machine learning techniques aiming to predict user needs. This citizen-based approach considers citizen characteristics involving demographic, geographic and psychographic/lifestyle variables (Ayachi *et al.*, 2016):

“The idea is to notify citizens that a new set of personalized services are offered whenever their profiles are updated in their social media accounts. Updates his status (e.g., relocation, retirement, birth), in this case the proactive recommendation engine broadens citizen’s preferences and informs him that a new set of governmental services can be offered according to his status”.

This tool can be appointed only as a first step towards proactive e-government service delivery: recommendation systems should not consider proactive services (Scholta *et al.* 2019). Korge *et al.* (2018) define a list of the possible benefit coming from a life event system:

- Improved business environment, obtained by a reduction of time spent by entrepreneurs into dealing with bureaucracy;
- Better user experience, obtained by a cooperation between state agencies;
- Once-only principle, because data are asked few times;
- Better data quality, being the automatic gathering more accurate then the manual one;
- Improved awareness of service provision, because service can be found in one place;
- Better overview of companies, by letting entrepreneurs dealing with data in one place only.

The benefits highlighted by Korge *et al.* (2018) and represented in practice by the tool developed by Ayachi *et al.* (2016) are counterbalanced by one serious issue: data privacy and security. Governments need to better face the threats of big data analysis and collection, similarly to what happens in social media companies, with the aim of minimizing the possible threats the citizens could suffer from an unsecure and

inefficient data management (Milakovich, 2012). The authors suggest improving service transparency and to develop policies helping to establish public trust: privacy policy for personal and proprietary information, information misuse safeguards and online security, stringent regulations for financial transactions and online payments. To ensure the restoration of public trust in government and increase the rate of adoption of data-driven methodologies. (Milakovich, 2012). Hence, a data-driven government is the basis for proactive service delivery. Data analysis creates insights that must be properly managed and shared by public institutions, respecting the data protection, ethics and readability (OECD, 2020).

2.5. E-maturity models and proactivity

E-maturity stage models help indicate the progress of e-government regarding government managers' effort to develop and transform their organisations. These models usually position e-governments at certain stages and identify upcoming actions (Lee, 2010). The one-stop-shop is considered the last step by several traditional models (Layne & Lee, 2001; Andersen & Henriksen, 2006; West, 2004; Moon, 2002). Nowadays, advanced governments are close to this final milestone with the implementation of comprehensive and increasingly mature e-government portals, so that should be considered something not to strive for anymore. However, "*the traditional maturity models no longer provide extensive or sufficient guidance for what is next*" (Linders *et al.*, 2018).

Layne and Lee model (2001) is taken as a reference model in literature:

- Website providing information about the agency and its services;
- Website providing interactive information about the agency and its services, or providing the possibility to contact people and get further information through Communication;

- Website providing functions allowing the visitors to hand in and retrieve personal information;
- Website with network functions for proactive and joined-up services involving several agencies and institutions, for handling complete service transactions.

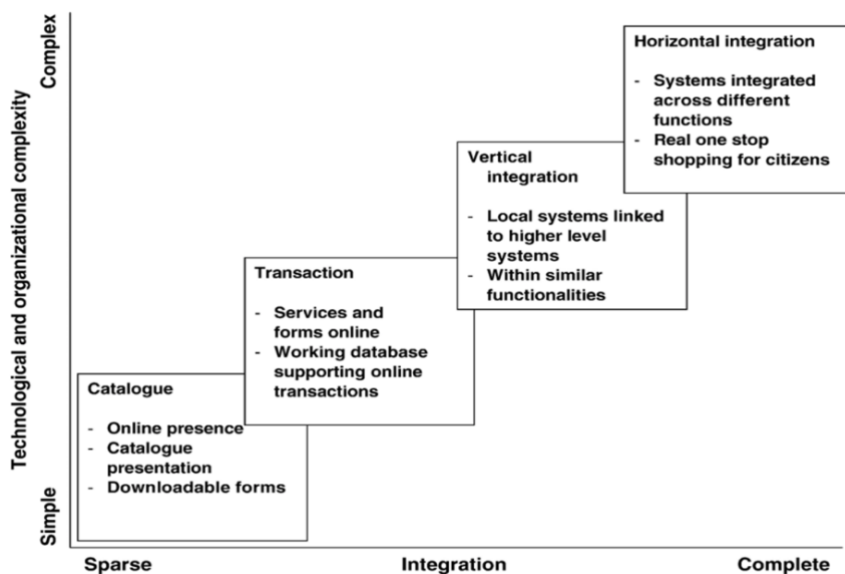


Figure 6: e-maturity, Layne and Lee (2001).

Fath-Allah *et al.* (2014) investigated differences and commonalities of the most known 25 e-maturity models: the most important maturity stages are presence, interaction, transaction and integration.

- Presence means providing information online;
- Interaction enables citizens to interact with the government;
- Transaction allows full-service process online;
- Integration refers to connected services and integration between organisations (mentioned 20 times).

Only a few maturity models have considered the importance of data sharing and interoperability between government agencies and organisations (Fath-Allah *et al.*,

2014). Integration and data sharing could be one of the most crucial requirements of proactive e-government, then its presence in many models can be considered a good starting point.

Almuftah *et al.* (2016) further researched the domain of e-maturity models. His work, summarised in Tab. 7, identifies two main variables that must be considered: level of interaction and level of complexity. Some common issues arise consisting of mainly a step-based evolution path which does not consider possible strategies and requirements to improve and step on another level. A strong critic concerns the absence of a mechanism to address critics, including non-digitalised members of society and the capability of e-government of dealing with complex services like education and healthcare. Analysing the last stages of the studied maturity models, the final milestones seem to be in integrated and personalised services. If the last phase of development is integration and data sharing, how this integration must be adequately exploited should be the next step of the e-maturity models (Erlenheim, 2019).

An extension to the model proposed was realised by Andersen and Eriksen (2006), including a wider variety of concepts and avoiding sticking with the website terminology. The significant difference between the former version is the activity and customer-centric approach rather than the technological capability. Customer centricity is then identified as the main discriminant for e-maturity. Continued advances in consumer ICT and their successful adoption into the way citizens live, work, and play have also significantly shifted the expectations of connected citizens, presenting both a challenge and opportunity for e-government efforts. Emerging innovations from cloud to big data similarly promise to reshape citizen expectations and technological possibilities (Linders *et al.*, 2018).

Model	Year	Presence stage	Communication stage	Full integration stage
Layne and Lee	2001	1) Catalogue	2) Transaction	3) Vertical integration 4) Horizontal integration
Hiller and Belanger	2001	1) Information	2) 2-way communication 3) Transactions	4) Integration 5) Participation
UN e-government Maturity	2001	1) Emerging presence 2) Enhanced presence	3) Interactive presence 4) Transactional presence	5) Fully Integrated Presence
IBM	2003	1) Information	2) Transaction	3) Internal integration 4) External integration
CISCO	2007	1) Information	2) Transaction	3) Transformation
Accenture	2003	1) Online presence 2) Basic capability	3) Service availability 4) Mature delivery	5) Service transformation
PWC	2002	1) Customer service	2) Service organization 3) Customization 4) Diversity management	5) Legitimacy
Ernst & young	2003	1) Information	2) One way interaction 3) 2-way interaction 4) Transaction	
Moon	2002	1) Information	2) 2-way communication 3) Service and financial transaction	4) Vertical and horizontal integration 5) Political functions
World bank model	2003	1) Publish	2) Interact 3) Transact	
The UK national Audit	2002	1) Basic site	2) E-publishing	3) Holistic e-govt
The Modified UN model	2012	1) Emerging information services	2) Enhanced information services 3) Transactional services	4) Connected services
Chen	2011	1) Catalogue	2) Transaction	3) Vertical integration
Alhomod	2012	1) Presence on the web	2) Interaction between the citizens and the government 3) Complete transaction over the web	4) Integration of services
Kim & Grant	2010	1) Web presence	2) Interaction 3) Transaction	4) Integration Continues improvement
Lee & Kwak	2012	1) Initial conditions	2) Data transparency 3) Open participation 4) Open collaboration	5) Ubiquitous engagement
Wescott	2001	1) Setting up an email system and internal network 2) Enabling inter-organizational and public access to information	3) Allowing 2-way communication	4) Exchange of values 5) Digital democracy 6) Joined up government

Table 7: e-maturity models analysis, Almuftha *et al.* (2016).

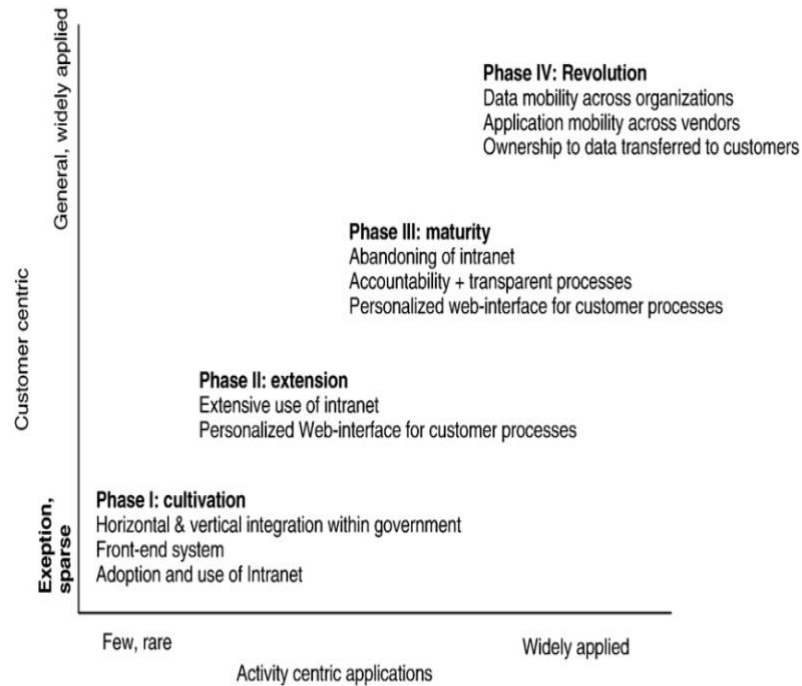


Figure 7: extension of the e-maturity model, Andersen *et al.* (2006).

The author insists that “*web 2.0 interactivity and big data analytics created an opportunity to take personalisation by enabling it to proactively embed tailored public services into the everyday lives of citizens*”. Most e-maturity models have taken service portals to their focus and reach personalised services within the portal. Still, they do not get further from the government service portal and consider many other channels in citizens’ everyday lives (Fath-Allah *et al.*, 2014).

Citizen-orientation and personalised services seem to be the limit of existing maturity models. Nevertheless, many maturity models’ highest stages provide a good foundation for proactiveness. Proactivity should be the next level of public e-service (Sirendi *et al.*, 2016). According to existing maturity models that proactive governing is not something to achieve. Maturity models do not define the future, but they need some updating according to current technological possibilities and innovations that occurred in the public sector. Therefore, it would be interesting to see whether and how proactiveness would shape them and move them to a new definition an e-maturity (Erlenheim, 2019).

2.6. Research questions

Having acknowledged the low exploration level of proactive services in literature, this dissertation must be considered as a work fuelling the discussion and deepening the knowledge of this relative new concept. A comprehensive list of use cases has been gathered in the following chapter. The knowledge, acquired from the latter and from the literature, creates the basis of the research activity. The first element to be addressed in the research phase is the literature gap, having already mentioned how this topic has not received the necessary attention so far (the research interest to proactivity is quantitatively analysed in the methodology section).

The literature gap must be intended as a guide which will drive the research activity, and the concrete activity of the latter is explained through the research question. The method that is going to be applied for this purpose is qualitative use case approach. The method is designed by structured plan made to implement the research. A literature gap is defined, research questions are made, and an answer to those questions will be considered a conclusion. The study proposition is, therefore, addressing the literature gap, adopting a qualitative inductive method by analysing uses cases to formulate general considerations. A series of investigation propositions are made, starting from the literature overview, and then the data gathered through a qualitative analysis of the use cases will be linked to the propositions to achieve a deeper comprehension of proactivity.

<i>Thematic</i>	<i>Limits</i>	<i>Investigation</i>
<i>Definition of Proactivity</i>	Non-shared standard definition, still it is not clear the relationship with the one-stop shop.	Literature, use cases analysis, interviews with experts.
<i>Categorisation of proactive services</i>	No clear specifications regarding requirements, recipients and constrains. Still limited use case gathering.	Literature, explorative research, interviews with experts.

<i>Road-mapping proactivity</i>	Limited research on how to manage the proactive transition.	Use cases analysis, interviews with experts.
<i>Quality in non-interaction</i>	Limited knowledge on the impact of proactivity on the perceived quality.	Interviews with experts.

Table 8: literature gap.

The choice of the research question is a crucial aspect of the study. Having acknowledged the gap presented in the literature, the research questions, listed below, will guide the attempt to reinforce the information and studies about proactive public e-service delivery. Here the list of the research questions:

- *RQ1: What makes a service proactive?*
 - *Which are the requirements from the public administration side?*
 - *Which are the requirements from the citizens' side?*
 - *Which categories of services can be deployed proactively?*
- *RQ2: Is there a scale of proactivity?*
- *RQ3: Is one-stop-shop a prerequisite for proactive service delivery?*

A first limitation in defining the boundaries of the inquiry consists in the novelty of the research argument, which determines a limited potential number of public service delivery expert around the globe. Therefore, the research has its strong foundation in the explorative research tool and a wide desk analysis has been implemented to address this purpose. To widen and valid the new theoretical framework proposed, determined by the literature gap and the research question, public services experts and member of public institutions have been interviewed.

CHAPTER THREE

3.1. Proactivity and e-strategies: connecting the dots

In this chapter, several use cases which entail examples of proactive service delivery are going to be analysed. To ensure a full understanding of how e-government can reach a certain e-maturity, an analysis of the strategic documents concerning e-government is necessary. Strategic documents include the strategies, plans and mission announced by governments and published to promulgate their intentions.

An e-government strategy is a *“plan for e-government systems and their supporting infrastructure which maximises the ability of management to achieve organisational objectives”* (Heeks, 2006). Strategies offer a framework for dealing with challenges between public and private sector stakeholders. On the other hand, digital strategies promote a vision based on utilising digital technologies to reach the goals set in different domains (Hofmann *et al.*, 2020). The World Bank (2005) defines a digital strategy as *“a set of coordinated actions and policies that seek to accelerate the social, economic, and political development of a given country or region through the use of telecommunications, information networks, and the technologies associated with them”*. Sandoval-Almazán *et al.* (2017) distinguish two different levels of e-government strategy in a government: *“a national digital strategy as a way to promote social and economic development of a society as a whole by using information technology and enterprise digital strategy, which focuses on developing plans to facilitate the creation of technology infrastructure and systems that support the substantive work of government.”* Digital strategies are linked to societal aspects, such as gender equality and literacy, while e-government strategy deals with applying IT in the public sector. The latter concerns *“the internal use of information technologies aimed at creating a more efficient government and improved delivery of government services”* (Sandoval-Almazán *et al.*, 2017). From now on, only the term “e-government strategy” will be used comprehending all the elements included in the definitions reported. Comparing e-government strategies defined by different countries is useful

to find out which are the underlying aspects of countries' achievements in the e-government domain (Hoffman *et al.*, 2020). The author contributes defining several categories through which describing strategies:

- Contextualisation (authors, audience, role);
- Goals and actions (strategic goals, smart goals, explicit/implicit tasks);
- Stakeholders, public service, technology;
- National context;
- Condition and consequences (risk, societal challenges, positive/negative consequences).

These dimensions can be used to better understand the strategy determinants that will be discussed in the use cases. An e-government strategy must focus on government priorities in ICT development and evolve, along with its development needs and implementation capacities (World Bank, 2005). These strategic priorities should be determined and applied differently according to the economy's scale (Yoon *et al.*, 2009). To understand the connection between priorities of critical success factors is necessary to align the goals with the development level of the country. Yoon *et al.* (2009) identify how the essential elements of success should change according to "development degree" of a particular country, stating the importance of identifying strategic priorities in effectively establishing national e-strategies.

E-government strategy should leverage on technology to establish a digital government (OECD Recommendation of the Council on Digital Government Strategies 2014):

"A digital government emphasises the crucial contribution of technology as a strategic driver to create open, innovative, participatory and trustworthy public sectors, to improve social inclusiveness and government accountability, and to bring together government and non-government actors to contribute to national development and long-term sustainable growth."

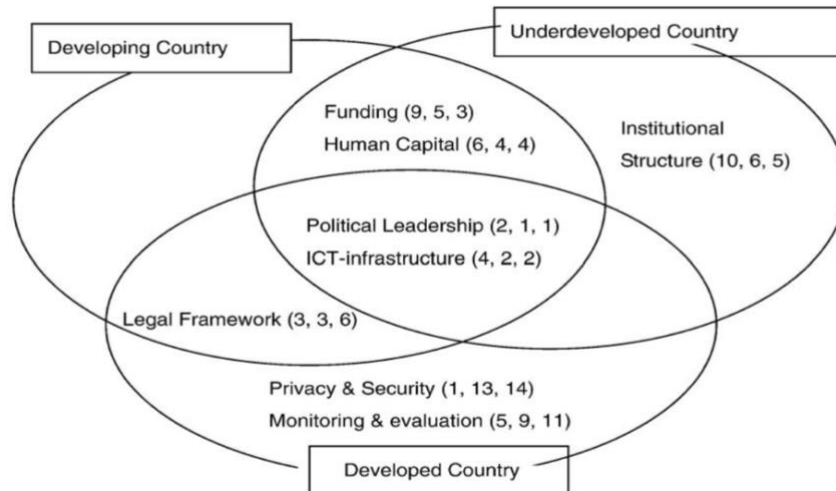


Figure 8: linking strategy to economic development, Yoon (2009).

Digital strategic attempt to a long-term transformation. The activity to drive the shift towards a digital government are (OECD, 2014):

1. From an information-centred government to a data-driven public sector;
2. From closed processes and data to open by default;
3. From a government-led to a user-driven administration, that is focused on users' needs and citizens' expectations;
4. From government as a service provider to government as a platform for public value co-creation;
5. From reactive to proactive policy making and service delivery.

The evolution towards digital government passes through two phases: first, analogue government, in which operations are closed, the focus is internal, and the processes are analogical. Second, e-government, in which greater transparency is implemented, the user-centric approach is used, and procedures are ICT-based (OECD, 2014). A more comprehensive description of how digital government evolves is given by Janowski *et al.* (2015). Their work divides the evolution stages in “*Digitalization*”, with the development of electronic forms and online interfaces, “*Transformation*”, where the organisational and process structure changes, “*Engagement*”, where a cultural change

appears and creates the basis for more citizen participation, “*Contextualization*”, when e-government drives policy-making.

A practical example on digital government implementation is given by (Milakovich, 2012), who identifies a use case in which the digital technologies enable the collection of “*geo-data*” and match them with “*contextual data*” (such as weather conditions, time, traffic) to build a database on which individuating “*behavioural patterns*” and anticipate their need using data mining techniques.

We have seen here how literature separates e-government strategies with digital strategies. The first domain refers to the organisation and internal goals of public organisation, which generally aim to increase internal efficiency, empower communication, reduce costs. Contrarily, the digital strategies have, as the main focus, societal issues and finally people. The best practices in strategy definitions have moved the focus on striving to achieve both goals, that have been unified by the user-centred approach, described in the previous chapter. Therefore, the critical element that will be addressed as the main driver of the national strategies’ goodness is the capability to include the citizen-centric approach in their content to implement it exhaustively.

A possible way to describe and summarised the best practices for what concerns strategy definition is given by the EU eGovernment Action Plan 2016-2020:

“ public administrations and public institutions in the European Union should be open, efficient, and inclusive, providing borderless, personalised, user-friendly, end-to-end digital public services to all citizens and businesses in the EU. Innovative approaches are used to design and deliver better services in line with the needs and demands of citizens and businesses.”

Getting back to proactivity, this new delivery paradigm demands “*a strategic approach that will move the public sector towards models that are more data-driven, digital by design and function based on a government as a platform paradigm*”. (OECD, 2020). To conclude, these elements must be in clear sight of policy maker for current and future digital strategies developments. This strategic approach requires investment in interoperability frameworks, standards adoption, and guidelines.

3.2. E-government development and proactivity in Europe

"You need to know the past to understand the present and orient the future" (Thucydides 431 404 A.C.).

The success of e-government strategies is measured and reported by the digital development indexes, such as the DESI index. To understand how the European nations in top positions of the DESI have managed to reach them, evaluating the national strategies which leads them is necessary. Furthermore, highlighting which elements that most states adopt in the strategic documents can help shape a clear picture of the evolution of e-government in Europe.

Parisopoulos *et al.* (2007) investigated e-government development strategies in Europe, adopting both a qualitative and quantitative method. The work analyses the strategies extrapolating 29 main goals, belonging both to the Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Government (G2G) domains. The analysis includes countries which now lead the digital development: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Malta, Netherlands, Sweden, United Kingdom. Consequently, the best strategies should emerge and help understanding which are the best practices. The 10 most common goals addressed by e-strategies are:

- Set-up of a single access point (portal) to deliver eGovernment services;
- The enhancement of ICT skills both for the employees and the society in general;
- The guaranteed trust, transparency and accountability of the government;
- Privacy and security for the transactions with the government;
- 24x7 borderless access to government information, alignment with the European strategy;
- The use of common standards by all government entities;
- The development of the appropriate infrastructure for the implementation of eGovernment;

- Efficiency of the public sector & competitiveness of the national economy;
- Improvement of the services delivered to citizens and businesses in terms of quality, quantity, cost and access.

On the other hand, the ten least common eGovernment objectives refer to the avoidance of external barriers which could encumber further progress, the flexibility of achieving targets with a variety of means, decentralisation, electronic legislation, harmonisation of legislation, eCommerce, use of ICT's to enhance democracy, promotion of the economic development of the country, reduction of connection costs and broadband deployment and transformation of the bureaucratic, process-oriented public sector into a proactive and citizen-centric one.

Having a single point of entry for e-services is central in successful e-governments. This aspect is nowadays implemented only by few governments, as the reported use cases of this chapter represent the sample of the ones who are heading towards this direction. Assuming that the numerous interactions between citizens and e-governments have been identified as a burden to eliminate, the goal of a single point of entry facilitates this simplification. A single point of entry is the one-stop-shop (Fath-Allah *et al.* 2014), and it is used as a primary reference in the literature.

The once-only principle is defined as (EU eGovernment Action Plan 2016-2020): *“public administrations should ensure that citizens and businesses supply the same information only once to a public administration. Public administration offices take action if permitted to internally re-use this data, in due respect of data protection rules, so that no additional burden falls on citizens and businesses”*. The relevance of this approach is given by its strict connection with the user-centred approach, assuming the needs of citizens as the core of the public e-service design. Matching the once-only principle with the one-stop-shop, a “Life-Business Event System” can be obtained. The achievement of this system is now considered the best practice that European countries have to achieve and should be at the core of the e-government strategies.

The European Commission (Country Factsheet 2020) defines a detailed framework of life-business events already implemented by EU members:

- Regular Business Operations, it includes regular business operations, such as administrative and tax requirements, human resources and refund of VAT;
- Business Start-up and Early Trading Operations, it includes orientation, administrative and register requirements, and tax and insurance-related matters. Early trading operations refers to activities concerning hiring employees and requesting an environmental permit;
- Losing and Finding a Job, it includes immediate actions for unemployed applications for additional benefits and allowances, it also includes various services concerning job search and participation in training programs, supporting people to find a job;
- Family life, including services typical for young families, such as marriage, birth and related financial rights, renovating a house and looking forward to your financial situation at a later age;
- Moving, including deregistering to register address in the new town, also considering notifications to other public organisations and utilities;
- Owning and Driving a Car, buying and selling a car and driving fines, and related to car taxes, parking permits and other administrative requirements;
- Starting a Small Claims Procedure, it captures the journey of someone willing to start a small claims procedure, from orientation and initiation to retrieving verdict and appeal;
- Studying, it includes all the education procedures that could be done online, also considering the orientation phase.

The EU benchmark (2020) individuates and scores further several measurable dimensions to address the goodness of the life business event implementation:

- User Centricity indicates to what extent (information about) a service is provided online, how the online journey is supported and if public websites are mobile friendly;
- Online Availability: indicates if a service is online. Ranging from offline (0%), only information online (50%), fully online (100%);

- Usability: indicates if support, help and (interactive) feedback functionalities are online (range: 0 - 100%);
- Mobile Friendliness: indicates if the website provides a service through a mobile-friendly interface; an interface that is 'adopted' to the mobile device (range: 0 - 100%).

On a broader perspective, alongside e-government, the European Union promoted e-democracy and e-inclusion, which include the initiatives aimed to enable the vast majority of the population of using IT services. Including the e-inclusion in the strategic guidelines, the final output of European Union work into setting and aligning the strategies of e-governments that can be found in proactivity. In its definition and implementation, it combines all the elements previously observed: a user-centred practice which drives internal re-organisation and meets the societal needs of the citizen, who are finally included in the e-government procedures without specific training allowing e-inclusion. Proactive use cases are still a few in the e-government domain. Anyway, all the countries reporting an alignment to the strategies that, accorded to the elements brought up in this paragraph, end up in proactivity will be examined.

“Proactiveness measures the extent to which a government delivers data and services to the public without waiting for formal requests. It implies a capacity to anticipate societal and economic developments as well as users’ needs, by capturing real-time information and applying them to the re-design of services. The dimension encompasses requested provisions for delivery of services to users, proactive requests for feedback from users and enabling citizens to access real-time information on service delivery (e.g. through smartphones apps and dashboards)”. (OECD 2020)

The proactive determinant is linked to the user driven dimension, encompassing communication efficacy as well regarding existing services, once-and-only principle implementation, policy strategies (OECD 2020).

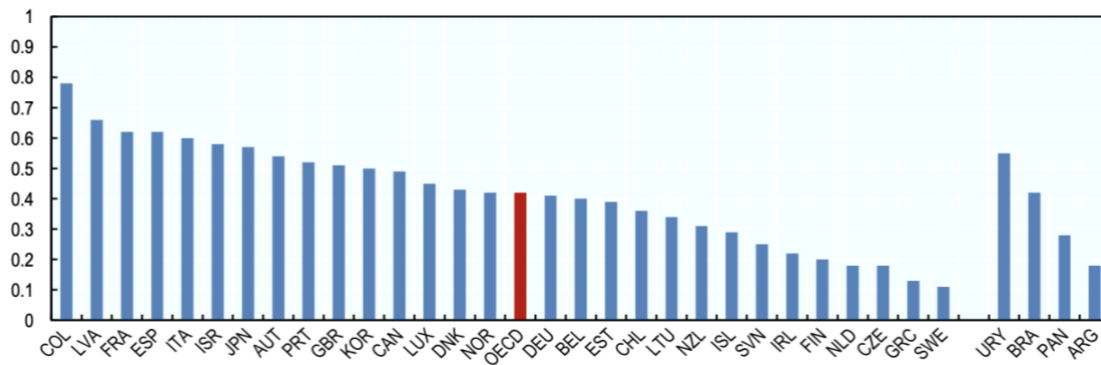


Figure 9: proactiveness in Europe, OECD (2020).

3.2.1. Estonia: a role model for proactive delivery

Estonia has ranked in the 7th position of Desi 2020, 5th of Desi 2019 and 5th Desi 2018. It is now one of the countries leading the digital transformation in Europe and the world. The United Nations index offers a comprehensive picture of Estonia’s e-government globally: in 2012 it was 20th, 15th in 2014, 13th in 2016, 16th in 2018 and in 2020 Estonia reached the 3rd position. According to the EU benchmark (2020), Estonia has reached a favourable position for what concerns user-centricity, especially in the domains of regular business operation (100%), moving (100%), owning and driving a car (98%), small claims and procedures (100%), losing and finding a job (98%).

Understanding which e-government strategy is crucial to allow the comprehension of such success, Kitsing (2011) considered local government agencies role in IT use as extremely important:

“The role of the local IT community—a loose network of government officials, IT specialists, and scientists—is singled out, as it became crucial in shaping government policies on IT spending, procurement, and use in the early 1990s. The existence of such a community stemmed from Estonia’s fairly advanced human capital in IT. Estonia began investing in its Institute of Cybernetics as early as the 1960s and while similar institutes in other Soviet republics focused

on math and engineering, the Estonian institute concentrated on computer programming”.

In 1993, the Department of State Information Systems (RISO) was established under the Government Office. From then on, all ministries IT development plans had to go through RISO for approval, enabling the IT expenditures to be tracked. In 1994, a small IT community of government officials, IT specialists, and academics developed the strategy paper *The Estonian Way to the Information Society* with the aim of establishing principles for the management of modern, efficient state information systems. Four years later, in 1998, the Estonian parliament approved the Principles of Estonian Information Policy, which had been developed by the Ministry of Economic Affairs and Communications.

These efforts culminated in the launch of the government-wide backbone network EEBone in 1998: all government departments were connected with secure access to the internet and intranet. In 2001, the X-Tee (Road) system was implemented, enabling the various government databases to communicate with one another. X-Road includes both public and private database to exchange information in a secure manner, its realization allowed the public e-services to be delivered proactively (Sirendi *et al.*, 2016).

The IT community’s early initiatives were supported by some political leaders because these initiatives were consistent with their goals of creating a minimal and efficient state in the 1990s. Anyway, its promotion was not identified as a primary goal by the political leadership. Estonia has then overemphasized agency and has deliberated policy design (Kitsing, 2011):

“The impact of government officials has been much more limited, and the evolution of e-government has been quite heterogeneous. In order to gain better understanding of the e-government evolution, the institutional context must be taken into account.”

Estonia IT community was formed to foster the innovation ICT and it created the basis for X-Road implementation, which, in the end of 2017, counted more than 230 databases and 950 institutions offering services via the data exchange layer. As mentioned before, X-road is a data exchange layer for information systems enabling a secure Internet-based data exchange between information systems.

“X-tee has a versatile security solution: authentication, multi-level authorisation, high-level system for processing logs, and data traffic that is encrypted and signed. X-tee is based on an interoperable ecosystem and a technical ability to exchange data. To exchange data, one member of X-tee describes the shared data and other members are able to use this data based on an agreement. Due to the large number of systems that have joined X-tee, all members of X-tee can use the services and data of other members to improve their own business processes. One example is a solution by the police for controlling driving licenses. A driver no longer has to carry a physical driver’s licence with them, as a police officer can, via X-tee, make an operative inquiry from the database of the Republic of Estonia Road Administration using an identification document to control driving licenses. The Tax and Customs Board has a somewhat similar data service that enables controlling tax arrears of private or legal persons.” (EISA, 2020)

Estonia officially started dealing with proactive services in 2017. The essence of proactive services would include the following data regulation (MEAC, 2017):

- There will be specified knowledge about who needs a specific service;
- Only the relevant data will be collected, and the existing data will be re-used;
- Data will be stored and preserved only until the allowed preservation limit;
- Data exchange is preferred to document exchange, electronic documents are preferred to paper documents;
- Abandoning what is no longer needed, such as signatures or double exemplars of documents;

- Guaranteeing the security of the data and data exchange methods;
- To assure the transparency of data.

Hence, X-Road allows secure data transfers between government departments and non-government institutions and facilitates searches across several databases. At the heart of this system there is digital identity, and many other services. It is the underline tool through which proactive services can be implemented. Thus, Estonia has reached government-wide data integration through cross-department interoperability thanks to X-Road (Scholta *et al.*, 2019).

Interoperability is defined as *“the ability of two or more software components to cooperate despite differences in language, interface, and execution platform. It is a scalable form of reusability, being concerned with the reuse of server resources by clients whose accessing mechanisms may be plug-incompatible with sockets of the server”* (Wegner, 1996). Exchanging sensitive information between different IT systems makes the secure data transfer a crucial aspect for modern e-governments. Furthermore, any interoperable system access could let to significant data dispersion or abuse by third parties (data leaks are nowadays significant issues for private and public organisation). In this sense, adopting practices to ensure safe access to the system is a prerequisite for interoperable systems. Estonia government aims to reach the once-only principle (Chambers, 2016). Thus, Estonia e-government is striving to reduce the amount of data gathered to deliver different services. This reduction is achievable with cooperation between departments. If a photo is required for the driving license, the agency could have the authority to access the citizen's image from the police and border guard or passport database. On the other hand, with the goal of creating a single point of entry for every service, the www.eesti.ee portal directs citizens to the right government departments for the services they require, where many different forms are still present. This centralisation, combined with minimal duplication of data collection, classifies Estonia as requiring one-stop-shop (Scholta *et al.* 2019).

On top of the single point of entry portal, a life event system has been implemented in an efficient, easily interactable way. The navigation through it is intuitive, and almost the majority of events are included:

- COVID-19 crisis;
- Republic of Estonia;
- Health and care;
- Pensions, social services and allowances;
- Family;
- Work and labour relations;
- Doing business;
- Licences and Notices of Economic Activity;
- Disabled people;
- Citizenship and documents;
- Traffic;
- Education and Research;
- Consumer protection;
- Money and property;
- Legal advice;
- Culture and Leisure;
- Housing and Environment;
- Security and defence.

Birth event related activities such as registering the birth, assigning a name for the baby, or enlisting for kindergartens can be done quickly. The process is upfront and relatively seamless when the parents are in a registered marriage. (Eesti.ee, 2020). Almost every service reminds to a different sub-portal, belonging to the organisation which is dealing with the issue.

As Estonia has reached the one-stop-shop stage, however, its progress from the one-stop-shop toward the no-stop-shop is still ongoing (Scholta *et al.* 2019). Estonia government is pushing towards a proactive delivery of service, aiming to amplify this delivery soon (Toivo, 2019):

- 2018: starting a business;
- 2019: driving license, buying a car, childbirth, start of school, school change, unemployment, crime victim, military service;
- 2020: name change, change of residence, death succession, building houses, disability.

3.2.1.1. Estonian e-taxation

Each year, around 98 per cent of all tax declarations in Estonia are filed electronically. It takes 3 minutes to file taxes online: this is the time declared⁷ for submitting tax declaration, but how is that possible? The proactive data collection by Tax and Custom board allows this process to be quick and effective.

“A taxpayer logs onto the system, reviews their data in pre-filled forms, makes any necessary changes, and approves the declaration form. The process typically takes three to five minutes. Even one-click tax returns have been possible since 2015 – the data that is already in the system is displayed for the user along with the calculated result, then all the users have to do is click on the confirmation button. All this can take less than a minute.” (Tax and Custom Board, 2020)

The same system is applied to the following activities:

- An enterprise’s declarations for income tax, social tax, unemployment insurance and contributions to the mandatory pension fund;
- Value-added tax returns;
- Alcohol excise, tobacco excise, fuel excise and packaging excise duty returns;
- INF declarations;
- Customs declarations.

Therefore, the citizen has still a limited role. Anyway, the final form is probably going to see changes since several modifications can occur during one financial year. Citizens must be responsible for filling themselves information concerning their financial situation, which determines their legally required tax payments.

⁷<https://e-estonia.com/>

All the data exchange related to Estonian Tax and Customs Board is regulated by the Register of Taxable Persons.⁸ The tax and Custom board proactively collects data from various sources to fill their database and to offer the pre-filled form. For example, when employers enter data to employment register the data is shared with⁹:

- The Estonian Health Insurance Fund uses the data of the employment register for granting the health insurance benefits;
- the Estonian Unemployment Insurance Fund uses the data of the employment register for registration of persons as unemployed, termination of the persons' registration as unemployed, for granting unemployment allowances and other unemployment insurance benefits prescribed by the Unemployment Insurance Act;
- the Social Insurance Board uses the data of the employment register for verification of the employment status;
- the Police and Border Guard Board uses the data of the employment register for exercising supervisory control over the working conditions of foreigners;
- the Estonian Tax and Customs Board uses the data of the employment register for monitoring the performance of the tax liabilities of taxable persons.

Besides, when a father enters paternity leave, an employer won't have to register it by hand as it is already considered. When an employer makes changes in the employment register, the citizens are noted and can overview them.

A notification service is also provided to citizens, when their payment date is closing or is due by e-mail, SMS or note in e-MTA. In personal income tax services and in land tax services, the Tax and Custom board prefills as many data as possible. Data are collected from other public authorities and from private company (i.e., service sharing platforms, who ask permission to send the data from their customers). In land tax it is also possible to have a contract in bank to automatically pay the bill.

⁸ <https://www.riigiteataja.ee/akt/112032019012?leiaKehtiv>

⁹ <https://www.emta.ee/eng/business-client/registration-business/registration-employment>

In tax behaviour, ratings show an indication for customers to better understand the expectations from Tax and customs board, and customers can fix their ratings by declaring and paying their taxes on time.

3.2.1.2. Starting a business

The state portal is a guide for the citizen; it links to comprehensive sub-one-stop shop for businesses registration: the e-Business Register's Company Registration Portal (which remains under the RIK portal, “*Centre of Registers and Information Systems*”), a single point of contact for entrepreneurs to communicate with the government. The portal is designed to make the life of existing and future entrepreneurs easier and to save time spent communicating with the Commercial Register.

“The portal enables fast, convenient and easy registration of a company over the internet, to change data in the business register, compile, file and submit annual reports, administrate members list of political parties and make detailed inquiries about other companies. It is a secure and fast tool for administrating your company. The Company Registration Portal was launched in 2007. Today over 85% of the new private limited companies are registered through the Company Registration Portal. About 99% of all annual reports are submitted through the portal reducing the amount of paperwork both for the companies and the state.” (RKI 2019)

“3 hours to start a company”, this is the time claimed by the Estonian portal to register a business, and comprehend the following preliminary phases (Eesti.com):

- Choose a name for your business and check that it is available. To check the availability, use the free tool on the website of the e-Business register.

- If you do not have an Estonian address, contact a business service provider to obtain a legal address.

Then, it will be possible registering the company online at the company registration portal (RIK). The following phases are included in the registration:

- Submission of registration application in Company Registration Portal consists of five steps: preparation, signing, payment of share capital and state fee, and submission. Share capital and state fee can be paid through portal during submission of application.
- Submitted application will be reviewed within one working day and notification about registration will be sent via email.
- Receive confirmation. Your submitted application will be reviewed in up to one working day and any notifications will be sent by e-mail.

However, the overall process is not as simple as it appears on first sight - and this deserves some remarks. Before the introduction of the new system, in addition to the e-business registration, companies need to fulfil more obligations for other agencies and portals such as registering in the e-taxation portal, getting a VAT number, or registering their employees. If the business area is subjected to specific regulations as, e.g., in the construction industry or in the food industry, a business needs also to submit a notice or apply for a license in the register of economic activities. Otherwise, the registration must be done with the notary¹⁰. The Fig. 11 shows the evolution of the process, highlighting how the involvement of the different parts has changed, adopting an increasingly proactive approach to avoid unnecessary interaction formerly needed.

¹⁰ See www.eesti.com for more information

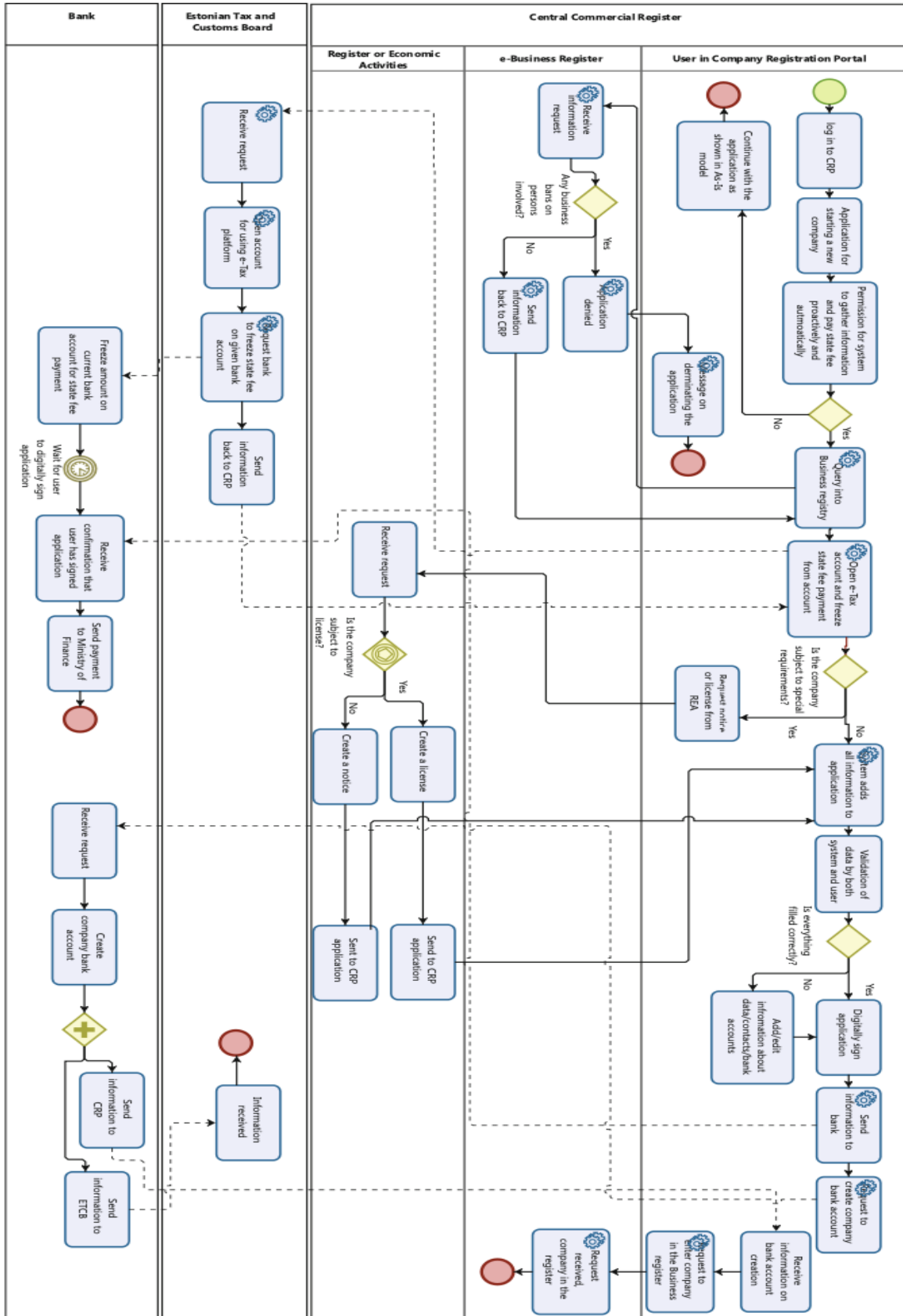


Figure 10: proactive service blueprint, Kõrge *et al.* (2018).

An evolution of this process towards a proactive delivery was designed by Körge *et al.* (2018), formalized in a theoretical service blueprint (Fig. 10). Former steps that used to burden the citizen, such as applying for a VAT number and other similar bureaucratic formalities, are now executed proactively by the technological infrastructure created with the purpose of registering companies.

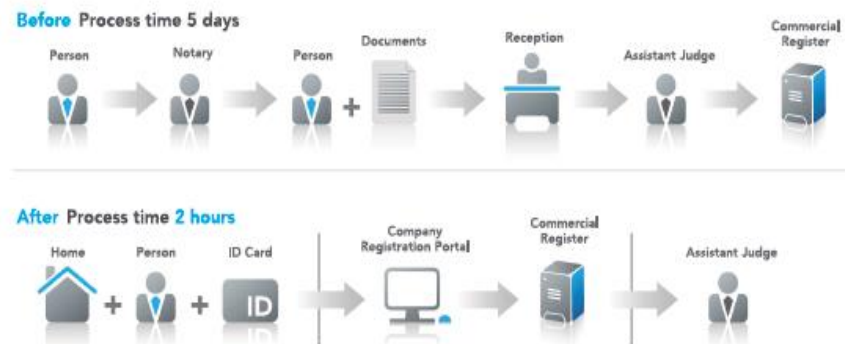


Figure 11: proactive business registration, eesti.com (2020).

The model proposed by Körge *et al.* (2018) identifies a possible process for proactive company registration:

“As the first step, the user needs to provide basic information (company name, area of activity etc.). Then, the system asks whether it may gather information from other state databases ... Such opt-out from proactive service provision is important – at least if the system is in its early phases. In case that a foreigner wants to start a company, such opt-out is essential. Otherwise, i.e., if the user agrees, the system queries multiple other databases and registries. The system checks whether any company stakeholders have any business bans. If not, the system automatically makes a request to the Estonian Tax and Customs Board’s (ETCB) system to open an e-taxation account and freeze state fee payment from the bank account provided to the ETCB. The payment will not be made immediately, i.e., not before the user digitally signs the application. As

the next step, the system checks whether the company operates in a field that is subject to special requirements and must be registered in the Register of Economic Activities (REA). If so, it provides a possibility for making the necessary amendments. The system moves on to a validation and, possibly, correction of the data. Then, the system asks the user to digitally sign. Then, the system sends a notification to the bank to unfreeze the state fee. Then, it sends another request to create a company bank account. After the company bank account is created, the system sends a request to the e-business register for entering a new company. Here, it is necessary to agree with the private sector, i.e., the banks, to keep the system as functional as possible.”

The degree of proactivity in this use case does not emerge at a first sight. Anyway, looking at backend operation and considering the complexity of involving all the actors by the service provider, proactivity is the reason why this service is now deployed in such an efficient way.

3.2.1.3. Social benefits and allowances

The categories of state benefits that belong to proactive delivery are:

- Family benefits;
- Retirement benefits.
- Parents with disabled children benefits (work in progress).

The parents of a new-born no longer need to apply for benefits but can now receive a proactive proposal from the government for the benefits they are entitled to: they only need to confirm. Social Insurance Board seeks to offer simple, proactive, and user-friendly services to residents. The Social Insurance Board of Estonia disburses €44 million in family and parental benefits monthly (Nortal, 2019):

“In developing new services, we act based on the principle that if government organizations already possess the necessary information, we do not ask for it over and over again from the residents. We call new services proactive because, when a child is born, the entry made in the population register will activate all following services without the parents having to apply. To provide truly seamless services for the Social Insurance Board’s customers, an automated system based on complex algorithms operates in the background. This system repeatedly validates data via different registers necessary to approve the benefits and the entitled sums.”

Family benefits have been the first (life) event-based service in Estonia, but other similar services have been later implemented. As mentioned, family benefit services are widely used and are available to permanent residents and foreigners who have a temporary residence permit or the right for residence (Social Insurance Board, 2018).

The list of family benefits includes:

- Childbirth allowance;
- Adoption benefit;
- Child allowance;
- Childcare benefit;
- Single parent’s child allowance;
- Conscript’s child allowance (or child allowance to person in alternative service);
- Foster care allowance;
- Parent’s allowance for families with three or more children.

Social insurance board (2019):

“No application is required for receiving family benefits – if you have registered the birth of your child in the Population Register, you will find a benefits offer in the self service portal of Social Insurance Board within a week. Please check that your e-

mail address the self-service portal of Social Insurance Board is correct – a notification of an offer will be sent to your e-mail address.”

The eligibility assessment to receive benefits is done according to many requirements¹¹, the most significant condition is that, to get family benefits, families must first give their child a name and register him in population register.

The service recipients will receive a notification via official email, then he will be able to choose which kind of parental benefit each one of the parents will receive and, finally, approve the offer.

Pensioners are also receiving benefits proactively:

“Old-age pensioners living alone are entitled to a benefit of 115 euros once a year. The payment of the benefit is not linked to whether the recipient of old-age pension is employed or not, or whether they receive other social benefits or income. Pensioners do not need to apply for the benefit, as the Social Insurance Board shall disburse the benefit after checking the respective data.” (Social Insurance Board 2019).

To receive the benefit, the pensioner must meet all the following criteria:

- Be of the retirement age;
- Live alone according to the Population Register;
- Receive pension, the monthly net amount of which is less than 1.2 of the average old-age pensions in Estonia; in 2019, this amount is 540 euros. The net amount means the amount of pension, from which income tax has been deducted.

¹¹ See Family Benefit Act (2016) for more information

The Social Insurance Board receives data on the age of pensioners and the size of their pensions from the social protection information system. The Social Insurance Board receives data on whether a pensioner lives alone from the Population Register.

The first family benefit was implemented in 2019, the next developments of proactive services are related to the death of a relative, getting married, retiring and entering military service (OECD, 2020). It is now under study the benefit for family with disabled children. This life-event need to be addressed as a complex one (Erlenheim *et al.*, 2020). This terminology refers to the difficulty to address the target of the benefit and to the sensitivity for the subject treated (similarly for homeless, victims of family violence).

3.2.2. Austria: a leading country for e-development

According to the European Commission's e-government benchmark (2020), Austria placed itself in the first positions in comparison to the other European countries. The benchmark individuates and scores several dimensions:

- User Centricity (Overall Score 96%, Eu average: 86,5%);
- Online Availability: (Score: 97%, EU average: 96%);
- Usability: (Score: 95%, EU average: 90%);
- Mobile Friendliness: (Score: 92%, EU average: 76).

Austria has also ranked in the 13th position of Desi 2020, 14th of Desi 2019 and 13th Desi 2018. Performance at life-event services is crucial in identifying the source of the success of the user-centred approach. Austria performs importantly in many of the business events mentioned before, such as regular business operation (100%), moving (100%), business start-up (98%),

How Austria reached these outstanding results is explained by Scholta *et al.* (2019), which summarise the main elements of the success in:

- Austrian government makes information and services available in the e-government portal¹².
- Austrian government also offers *HELP.gv.at*, a correlated platform for natural persons.
- Austrian government proposes platforms for single areas of interest (FinanzOnline, for financial services).
- Austria has platforms that integrate data collection and various portals serving as one-stop shops for different scenarios. Another example of integration between various government jurisdictions is the electronic file system (ElektronischerAkt, ELAK) in Austria (Posch et al., 2011). ELAK is a workflow-enabled system that allows the processing of electronic records, where all the ministries are connected.

Austria has no single unique identifier for each citizen. Instead, there is an identifier for each of around 30 to 35 functional areas (government departments). These identifiers are derived from the central resident registration number; public institutions can only access encrypted citizen identifiers from other departments when they need to exchange data. Austria currently applies government-wide integration through interoperability (Scholta *et al.* 2019). Austrian federal government wants to promote proactivity through “*family allowance and payroll taxes ... and an additional analysis of proactivity*” (Scholta *et al.* 2019).

¹² www.usp.gv.at

3.2.2.1. Family allowances

The family allowance is provided as a no-stop proactive service by the Austrian government. If all data are available, a citizen does not have to complete a form or perform any action to receive this service.

“Automatic Family Allowances without Application” (ALF) is a no-stop-shop solution for parents of a new-born child. The parents must go only once to the civil registry office to register the baby, then the family allowance will come automatically, as long as all information are available. (SCOOP, 2020):

“In the once-only process the public services are integrated so that the parents have to visit only the civil registry office and have to bring along (in a standard-case) no evidences except their personal identification (passport or personal ID card). In some cases (for example in larger local authorities), registry offices have even subsidiaries in hospitals so that the parents can do the whole procedure in the hospital. The data of the citizens are stored in a couple of interacting registers, such as, central civil register (ZPR), central citizenship register (ZSR) and central residence register (ZMR), where the government, in permission of the citizens, are allowed to use them. The Civil Registry Office forwards the parents’ and child’s data to the social insurance and tax authority and these agencies deliver their respective services to the parents automatically.”

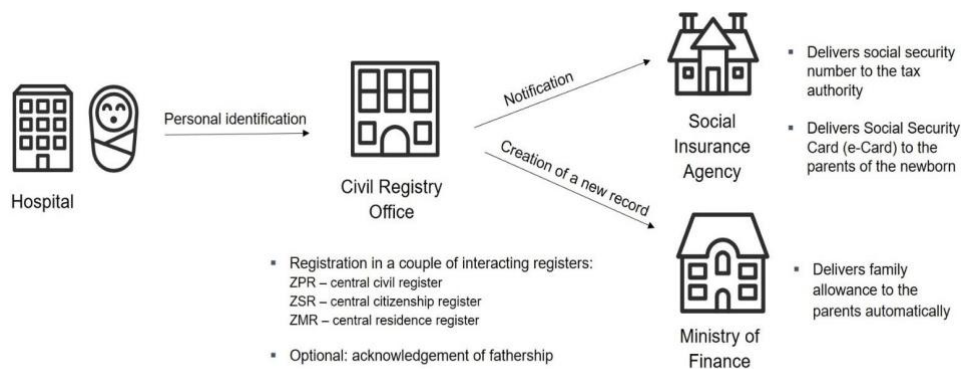


Figure 12: proactive allowances infrastructure, SCOOP (2020).

The elements on which the system is built are (SCOOP, 2020):

- Technical interoperability;
- Data quality;
- Stakeholders relations, in this case Ministry of the Interior and Ministry of Families and Youth Affairs;
- System architecture, connecting the hospital, the civil registry office, the social insurance and finally the tax authority that issues the payment.

3.2.2.2. Tax Returns: FinanzOnline

Using FinanzOnline, Austrian citizens can, for instance, file their tax return electronically from home. Processing tax returns online saves times because there is no travel time or queuing. Data from the previous year can be transferred automatically. Possible changes that may occur during the year still have to be filled in manually.

The whole process – from filling in the form to the delivery of the notice is fulfilled electronically. Notification service for the tax statement delivery is available in the electronic DataBox. The tax account, as well as all process steps, can be traced online. Furthermore, the online management of personal data and the immediate online tax assessment (also as an anonym calculation), are possible.

To extend the proactiveness intent of the government, also tax returns are delivered through a no-stop approach using a dedicated platform, which is FinanzOnline. Several conditions need to be encountered to be eligible for this typology of services¹³. The process is described as follow (Ministry of Finance, 2018):

“The citizen has not submitted a tax return himself or herself, the citizen only had income sources that were liable for payroll tax, the government does not

¹³ Legal provision for the FinanzOnline Declaration Ordinance, 2020.

expect the citizen to claim income-related expenses, and the tax return leads to a positive tax credit. If the conditions are valid, the citizen receives an information letter, and can consent to receiving the proactive tax return and provide banking information if necessary.”

In coming years, the government will unlikely deliver the service through a complete no-stop, without any interaction. A citizen will proactively receive a tax return and will have to complete a form afterwards only if she or he wants to make a correction.

The main advantages of the service are (SCOOP 2020):

- Data protection and privacy, assured by adopting advance security technologies;
- Time and queuing saving;
- Cost reduction and high adoption rate.

Scholta *et al.* (2019) summarized the evolution of the Austrian situation as follows:

“The Austrian path of development may be summarized as follows: First, the Austrian government provided these services in a one-stop shop, launching the one-stop shop for financial administration services, FinanzOnline, in 2003 (Federal Ministry of Finance, 2018b). Then the government started to share information between its various departments through interoperable systems, leading to the publication of the Austrian Interoperability Framework in 2014 (Office of the Styrian State Government, 2015). Due to increased data storage integration, the quality and comprehensiveness of the databases increased, enabling proactive service delivery, which finally led to delivery without any form in a no-stop shop. The no-stop shop implementation for family allowance was launched in 2015 (Federal Chancellery of Austria, 2016) and for payroll tax in 2017 (Federal Ministry of Finance, 2018a).”

3.2.3. The success of the UK's portal

The UK e-government portal¹⁴ brings many of central government websites into one and was started in 2014 (OPSI, 2020).

The portal can be a useful tool to face important and complex life-event which citizens face on a daily base. It Includes the following sections:

- Benefits;
- Birth, death, marriage and care;
- Business and self-employed;
- Childcare and parenting;
- Citizenship and living in the UK;
- Crime, justice and the law;
- Disabled people;
- Driving and transport;
- Education and learning;
- Employing people;
- Environment and countryside;
- Housing and local services;
- Money and tax;
- Passport, travels and living abroad;
- Visa and immigration;
- Working, job and pensions.

Ministerial departments (23) and other public agencies (409) collaborate sharing information and they all have been merged on the platform.

The website is also used as a tool “*to communicate all news, communications, statistics and consultations*”(SCOOP, 2020).

The website has been created with the aim of reducing the effort and reduce the barriers to complete task, which sometimes can be crucial for the citizens' life.

“These content items, forms and transactions might have been owned by separate and siloed parts of government. Users were often left to figure out for themselves the right time and order to complete them. Because these content items and transactions were all hosted on GOV.UK, we were able to bring together all of the separate pages and present them as simple, clear services.

¹⁴ www.gov.uk

These services are broken down into easy manageable steps. We call this step-by-step navigation. The process might sound simple but it required unprecedented collaboration between multiple government departments. Facilitated by the GOV.UK team, these departments worked together using service design methods to map end-to-end user journeys.” (OPSI 2020)

Step-by-step navigation makes the services easily interactable and enhance the inclusion of citizens which are not literate in computers. Every page asks for a feedback, remarking here the application of the citizen centric approach mentioned in the previous chapters.

3.2.3.1. Bristol’s interagency hub

Insight Bristol is a data analytics team (OPSI 2020). The team employs data scientists, developers, and analysts, who leverage data analytical techniques and processes to create a better understanding of the social and financial issues that vulnerable families face in Bristol.

“The work carried out by the team has helped to develop a significantly more effective early intervention strategy and has also created a number of state of the art analytical tools for a whole range of public sector workers. These tools are currently in daily use across the city, and are allowing for the creation of real and sustained outcomes for hundreds of vulnerable families”¹⁵.

The core element on which the team works is the Family Database; a pioneering database which unifies data from 30 different public databases to create a rich and diverse dataset. The database aims to assist public sector staff, helping them in facing several different cases. The data gathered by the database are (OPSI 2020):

¹⁵ For more information refer to www.oecd-opsi.org

- Parents and young people involved in crime or antisocial behaviour
- Children who have not been attending school regularly
- Children who need help
- Adults out of work or at risk of financial exclusion, and young people at risk of worklessness
- Families affected by domestic violence and abuse
- Parents and children with a range of health problems

Thanks to a rapid and efficient data processing, a more effective allocation of resources enables “*predictive risk modelling*” to anticipate the support to who needs it more. The innovative database gathers data from police, council, and a number of governmental departments.

“In addition to the Think Family Database, the Insight team creates a whole host of predictive risk models. Using state of the art analytics, these take a cohort of individuals (for example victims of sexual abuse), identify what common factors they share and then use a number of complex algorithms to understand the similarity between the control group and others the city. By doing this key workers are better equipped to tailor their approach to manage cases and it enables a strategic understanding of vulnerability. The team has so far collaboratively developed a number of predictive risk models which have impacted organisational change, with the Child at Risk of Sexual Exploitation model (CSE) is being actively used by the Police to identify and help hundreds of vulnerable young people across the city, and has led to the nomination of a number of national awards for the team.”

A similar application has been implemented with the “National Data Analytics Solution”, which uses a combination of AI and statistics to assess the risk of someone committing or becoming a victim to gun or knife crime, or modern slavery (OECD, 2020).

3.2.4. Further examples of proactivity in Europe

It is now clear that the one-stop-shop has now emerged as a recognized best practice. Many countries have already implemented projects in this direction (United Kingdom “Tell-us once”, France “Dites-les-nous une fois”, Sweden “Skatteverket”) or are working to enable the technical implementation (Spain “Spanish Network System Record (SIR)”, Netherlands “Dutch System of Base Registries (Basisregistraties)”, Denmark “Danish Basic Data Program”), or even at European level (EMREX students data exchange program). Therefore, the one-stop-shop is assumable as an already emerged practice.

3.2.4.1. The Skatteverket platform in Sweden

Skatteverket¹⁶ is an “*autonomous public authority*” where Swedish citizens can claim for several public e-services. Skatteverket's main functions:

- Taxes;
- Population registration;
- Estate inventories.

For what concerns taxes, in Sweden, people pay tax on all types of income, such as wages and salaries, sickness benefit and pensions. Skatteverket manage value added taxes (VAT), social fees, taxes on business and income taxes. The income is declared once a year via a tax return, mostly by the Internet as the e-inclusion is extremely high in the country. Income tax receipts go mainly to municipalities and county councils, but also to central government. For income tax returns, Sweden is providing a prefilled form to the citizen. Furthermore, Skatteverket deals with population registration and estate inventories, aggregating all the citizen and businesses in the country. It presents itself as life-business event portal in which still few points of contact are highlighted for

¹⁶ www.skatteverket.se

citizens (“Moving to Sweden”, “Apply for identity Card”, “Do I need to pay tax”, “Recover value added tax on goods bought in Sweden”) and for businesses (“Registering a business”, “Declaring taxes”, “Employing for work”, “Paying Taxes”).

Skatteverket also deals with population registration in Sweden. Everyone who lives in Sweden is registered. In the process, details of those who are living in Sweden, and where they live, are recorded. Everyone who is registered is issued with a personal identity number, which is used in contacts with government agencies etc. Each personal identity number is unique, and it is made up of the person's date of birth and a four-digit number. Despite the low proactive level of the system offered, mainly based in the pre-filled form, it is possible that the effort to centralize the information will naturally turn in easier data exchange resulting in a similar to the one offered by the Estonian tax and custom board.

3.2.4.2. Tax returns in Germany

The German tax authorities re-use the data provided to them from other relevant parties, insurance companies, employers etc (OPSI 2020).

“Taxpayers do not have to re-enter data but can simply check the data provided through the pre-filled tax return”

The pre-filled tax return is an option that the citizen can undertake at the moment the taxes process begins, but a legal authorization is needed to ensure the exchange of the data between the governmental agencies. Citizens can then complete the tax return and submit it digitally. Currently, the following data can be automatically retrieved by citizens (OPSI, 2020):

- Personal information (name, religious affiliation, address, bank information);
- Information from the employment tax statement;

- Information on wage replacement benefits (e.g. unemployment assistance and social welfare);
- Information on retirement benefits;
- Information on basic health insurance and statutory nursing care insurance dues;
- Information on pension plan dues.

A similar service, in terms of methodologies and application, is offered by the Portugal e-government (OPSI, 2020).

3.2.4.3. Finland's AuroraAI program

An Artificial Intelligence Programme was created in Finland starting from 2017, and that it will be released to public by 2020¹⁷. The program started with the goal of understanding how AI will affect society and the public sector. The work brought 11 points to be addressed by the Finnish government to fully address the AI issue and how this tool can be used in the public sector at best (OECD, 2019):

1. Enhance business competitiveness using AI.
2. Effectively utilise data in all sectors
3. Ensure AI can be adopted more quickly and easily.
4. Ensure top-level expertise and attract top experts.
5. Make bold decisions and investments.
6. Build the world's best public services.
7. Establish new models for collaboration.
8. Make Finland a front runner in the age of AI.
9. Prepare for Artificial Intelligence to change the nature of work.
10. Steer AI development in a trust-based, human-centred direction.
11. Prepare for security challenges.

¹⁷ <https://vm.fi/en/national-artificial-intelligence-programme-auroraai>

Another element that came out from the research is the necessity for governments to establish *“a network of different smart services and applications to allow public administration to better anticipate and provide resources for future service needs”* (Finland, 2017).

The project, named AuroraAI, aims to provide a holistic set of personalised AI-driven services for citizens and businesses in a way. The goal of the program is creating a human-centric system which creates personalised services for businesses and citizens based on their presumable will. The key aspect is that AuroraAI provide a wide variety of services in a seamless way, dealing with different sectors and without the need of an explicit request.

“The way that governments tend to operate – and how Finland operated in the past – is by separating functions and services into distinct domains, or ministries, which results in siloed approaches. The AuroraAI programme sees this as antithetical to a human-centric approach and efforts to improve the holistic wellbeing of its citizens, as wellbeing is multi-dimensional and, thus, dependent upon multiple domains. The AuroraAI programme seeks to re-orient the provision of services around citizens and businesses by combining data from multiple domains and building a network of AI citizen-focused applications that provide services when they are needed – around various business activities or life stages and events such as childbirth, buying a home or At present.” (OECD, 2019)

The ultimate base on which the system operates is the digital identity system built up in Finland. It consists of a digital representation of citizen’s data, managed by citizens themselves in order to get personalized services. *“DigiMe”*, the name given to the digital identity, is very important for Aurora system because it can interpolate data and find patterns to better allocate resources and finally offer better services to citizen and businesses.

AuroraAI, so far, focuses on three life events (OECD, 2019):

- Moving away to study;
- Remaining in the labour market through lifelong learning;
- Ensuring family wellbeing after a divorce.

The system continuously improves itself leveraging on the so-called “reinforce learning”, where Aurora asks feedback on the service offered and learns which were the most useful. In this way, the algorithm can concentrate its effort in the most useful service activities.

A crucial aspect of the program is that it relies on the principle of data ownership by the citizens. In this way, it is possible to avoid any misconceptions about the nature of the services offered in such an innovative way. Some problematics could arise with government gathering data without the explicit citizens’ consent. Citizens and businesses are strongly empowered to opt in and out of services and to make decisions about with whom they share their data (AuroraAI, 2019).

“The rise of automation has enabled data consumption to become a reality. Additionally, the growth of mobile government and the increased use of mobile devices and apps is a perfect way to feed automated AI-driven alerts to civil servants in the event of changes in user data relating to services for which they are responsible – and allowing them to make adjustments in a timely manner.”
(OECD, 2020).

3.3. Rest of the world

Many countries in the world are moving towards the realization of proactive delivery of certain categories of public services. The trend is present in developed countries mostly belonging to Asia and Oceania. In this paragraph, the most interesting cases will be analysed in the following chapters.

3.3.1. The early adoption of proactivity in Australia

Australia is in the early stage of e-government development, starting the journey towards proactivity (Scholta *et al.*, 2019). Australia is a federal system which is composed of many organizations, and each one has its priorities and development programs. Scholta *et al.* (2019) addressed the reason why Australia is struggling in delivering service proactively for 6 main reasons:

1. Australia is a federal system composed by many organizations;
2. State government suffers from several technical issues, because of “*fragmentation and inadequate structures that inhibit data integration and centralization*”;
3. Integration is difficult to achieve despite the willingness to collaborate by state departments;
4. Some people may not want services to be delivered proactively because they may be too proud to accept help from the government;
5. Privacy issues;
6. Legal regulations;

In Australia, it is possible to access many services through a one-stop-shop portal¹⁸, which, through a user-friendly query-based navigation, creates a look-like event-based service. The system implicitly refers to business events, by naming the status of citizen

¹⁸ <https://www.servicesaustralia.gov.au>

and organisation, which naturally comes after an event is manifested. Through this portal, individuals can refer to the following groups:

- Families;
- Separated Parents;
- Job Seekers;
- Older Australians;
- Your Health;
- People with disability;
- Students;
- Migrants, Refugees and Visitors;
- Carers;
- Remote Australians;
- Indigenous Australians;
- Help in emergency;

While organisations can be identified in:

- Businesses;
- Health Professionals;
- Community.

Centrelink is the benefit section of the Australian portal, and one of the largest government systems to employ data mining (Milankovich, 2012). This benefit agency deals with more than 6 million claimants and carries out over 5 billion electronic transactions a year. The Job Seekers' Classification Instrument (JSCI) is a model used to evaluate benefit claimants and it assesses the risk of becoming unemployed in the long term. The high-risk group is thus identified and given more help in job hunting. Centrelink also uses data mining to identify fraudulent claimants and to identify those for whom further investigation is merited. The inspiration comes from insurance companies. Low-risk claims are paid quickly, and high-risk claims are investigated in further details. The Job Seekers' Classification Instrument belongs to the proactive delivery paradigm:

“The Job Seeker Classification Instrument (JSCI) is a questionnaire which seeks to identify a Participant’s risk of becoming or remaining long term unemployed. It does this by providing an objective measure of a Participant’s relative labour

market disadvantage based on the Participant's individual circumstances. The JSCI is also used to identify if a Participant has multiple or complex barriers to employment that may require further assessment via an Employment Services Assessment (ESAt). JSCI responses, and where appropriate the ESAt, provide valuable information to help providers to develop activities and assistance that can address a Participant's circumstances and help them find work." (Department of Education, Skills and Employment 2015)

The JSCI identified 18 factors and several sub-factors that have a significant relationship with a job seeker's likelihood of remaining unemployed for another year.

The factors considered are:

- Age and gender;
- Recency of work experience;
- Job seeker history;
- Educational attainment;
- Vocational qualifications;
- English proficiency;
- Country of birth;
- Indigenous status;
- Indigenous location;
- Geographic location;
- Proximity to a labour market;
- Access to transport;
- Phone contactability;
- Disability/medical conditions;
- Stability of residence;
- Living circumstances;
- Criminal convictions;
- Personal factors.

The most disadvantaged job seekers will receive enhanced supporting services delivered through employment services providers. Providers will deliver a professional, individualised service to help prepare and support job seekers into work. Providers will help to reduce job seeker's barriers to work through services such as career guidance, mentoring, vocational training, assistance in accessing non-vocational services such as counselling, work experience, job placements and post-placement support.

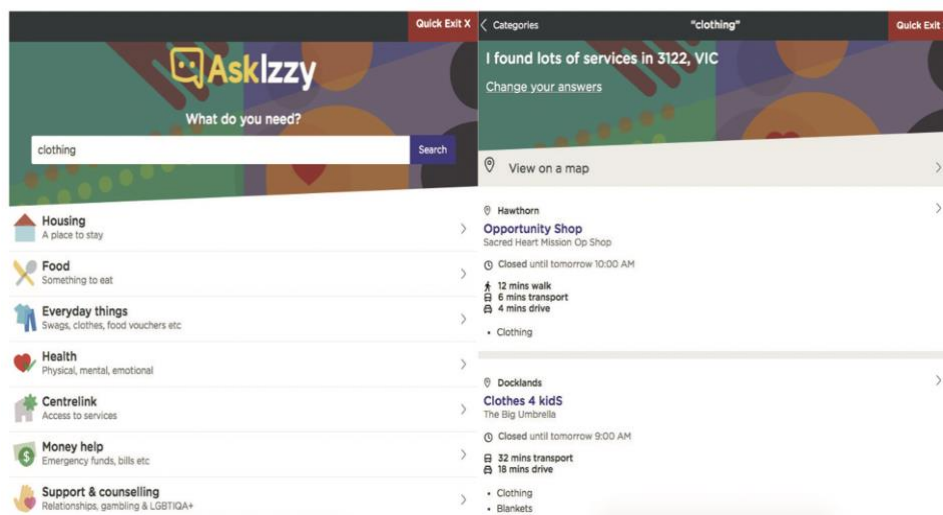


Figure 13: the AskIzzy platform.

AskIzzy platform is part of the CentreLink system, which consists of single one-stop-shop for homeless people services in Australia. The platform has the goal to help searching for necessary information regarding different topics in homelessness area based on people's needs.

It refers to different categories of interest: from medical to housing, from everyday issues to legal counselling and to technological support. The users of the web-application can specify their location typing a postcode after which the closest results are displayed. Erleheim (2019) founded out that social developers behind

Ask Izzy have recently added additional functionality to the platform. Now it is possible to use the Ask Izzy Open Data Platform (Ask Izzy, 2019b), which is a data tool providing actionable insights based on location-specific data regarding the supply and demand for homeless services. The data is updated almost near real time as opposed to information that previously came from government data sources. Through the open data platform, it is possible to see where people are looking for services, at what time of the day people are looking for services, where are they located, and which are their needs (Pro Bono Australia, 2018). Erleheim (2019) argues that the added functionality of the platform enables providing homelessness services proactively. By analysing the open data available through the platform service providers and policy-makers, it is possible to target potential service users exactly based on their needs, locations, and specific characteristics.

3.3.2. New Zealand's event services

“We need to become a modern public service to embrace the opportunities that digital offers.” (Strategy for a Digital Public Service 2020)

New Zealand government is aiming to use technology and digital tools to *“help people access personalised services where and when they need them, engage in decisions about issues they care about, and maintain trust in an open, transparent and inclusive government”* (Strategy for a Digital Public Service, 2020). New Zealand is re-inventing service design, in order to provide services that can evolve to meet people's needs as circumstances change.

The main goal of the digital strategy is to create *“seamless services that are centred around the events in their lives”* (Strategy for a Digital Public Service, 2020). The system that New Zealand government is incorporating focuses on people behaviour rather than organisational aspects when designing services. According to the strategy, the innovative key mission to be pursued are:

- Society and people's needs are changing faster, and public organisations must be able to respond and adapt quickly;
- People expect to be involved in the design of services;
- We realise that, to take advantage of what technology has to offer, people with the right skills and behaviours are fundamental to a modern digital strategy;
- Our shared commitment to a unified public service;

SmartStart is a clear translation of the mentioned strategy into practice. It consists of an e-portal that makes it easier for users to access information and services around the birth of a child. SmartStart is the first of several integrated in development digital services based around life events. It enables users to:

1. Learn about having a child;
2. Navigate government services around the birth of a child;
3. Access and engage with government services in the simplest possible manner;
4. Consent to reuse information provided to one agency when seeking assistance from another agency;

SmartStart is the first of the New Zealand Government's integrated services to be delivered to citizens (starting from 2016). The Department of Internal Affairs, the Ministry of Social Development, Inland Revenue, and the Ministry of Health have worked collaboratively. SmartStart was built around a new methodology based on a new-born baby event. The activities which it allows are: finding a midwife, birth registration, adjusting Ministry of Social Development benefits and applying for the child's IRD number. All these activities can be done in one place, anywhere and anytime.

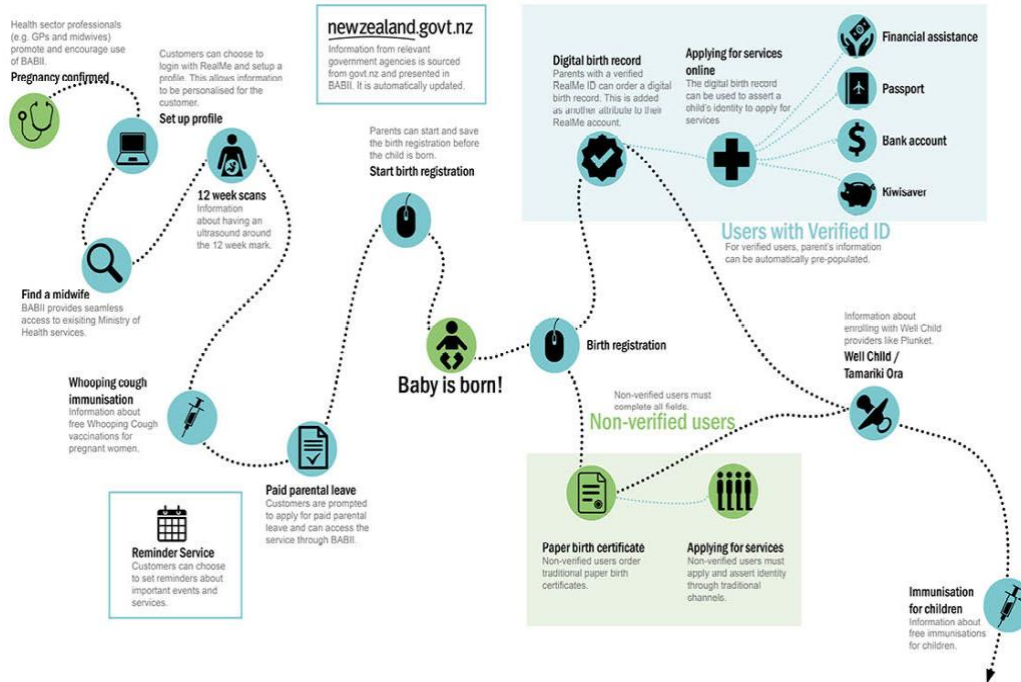


Figure 14: the SmartStart system, Govt.nz (2019).

The project has reached three important results: reducing customers’ pain points, improving the effectiveness of government services, and building a dynamic ecosystem. SmartStart reduced citizens’ pain points by facilitating the navigation across all relevant government services, integrating 55 services and sharing data between departments with minimal effort by the customer. It reduces the need for the customer to provide the same information repeatedly. The Ministry of Social Development provides a proactive service to their existing clients by removing the need for many clients to be interviewed and the need to purchase a birth certificate. The service has been well received by the Ministry of Social Development clients. In addition, parents can request an Inland Revenue number for their child while registering his birth, and by supplying their own Inland Revenue identification number, updating the tax department on their situation. The underlying proactive goal in the backend part of the service is here highlighted. In practice, it enables parents and caregivers to access relevant information and services for themselves and their babies from conception to early childhood, through the delivery of customer-centric, cross-agency digital tools and processes. It also establishes the

digital identity for a child to use throughout his life. SmartStart aims to build a dynamic ecosystem of life-business events (OPSI 2020). The infrastructure created can enable the integration to other life-event services, such as the already implemented End of Life Service¹⁹.

3.3.3. The citizen-centric perspective adopted by Taiwan

In the masterplan launched by the National Development Council (2011), Taiwan expressed its desire to push towards a new and innovative way of delivering public e-services.

“Our core value is to give value to information technologies, coordination and interactive participation, digital opportunity and e-inclusiveness.”

(Strategic plan for e-government development, 2011)

Government adoption of ICT in Taiwan is guided by the National Development Council (NDC), which holds primary responsibility for economic development, performance management, and e-government as the national “facilitator of good governance”. Under the NDC are the: Department of Overall Planning, Department of Economic Development, Department of Social Development, Department of Industrial Development, Department of Human Resources Development, Department of National Spatial Planning and Development, Department of Supervision and Evaluation, Department of Information Management, Regulatory Reform Centre, Secretariat, Personnel Office, Civil Service Ethics Office, Budget, Accounting and Statistics Office and National Archives Administration.²⁰

¹⁹ <http://endoflife.services.govt.nz>

²⁰ www.ndc.gov.tw/en

The program for e-government development started in 1998, accomplishing several milestones in its evolution, represented in Fig. 15.

1. The implementation of a government network infrastructure (“Taiwan Online” 1998-2000);
2. The promotion of online government services and “one window” service integration (“e-Taiwan”, 2001-04);
3. The advancement of ubiquitous access through a range of channels, from computers to cell phones to kiosks (“m-Taiwan” and “u-Taiwan”, 2005-11);

Starting from this solid organisational foundation, the advent of social media, open data, and big data presents new possibilities not only to make government more efficient but to fundamentally change the way government functions, delivers services, and solves public problems.

In the last phase (e-gov program 2012-2016) is presented a first definition of “Proactive One-Stop-Service”, which is addressed as “simplifying service processes and integrating interagency services from a lifecycle overall process perspective”.

The environment in which the Taiwan’s e-government is evolving is a favourable one for ICTs development. Taiwan is considered one of the most innovative countries for what concerns IT, and the interest towards technology extends to Taiwan's public administration (Scholta *et al.*, 2019).

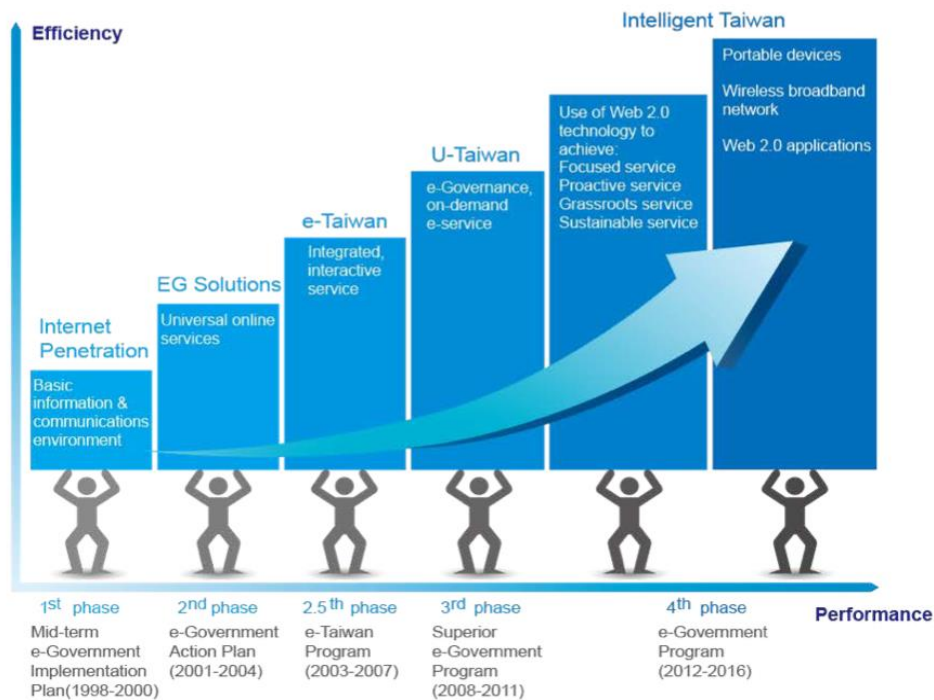


Figure 15: Taiwan e-government plan, NDC (2011).

Linders, Liao, and Wang (2018) analysed Taiwan's e-government infrastructure:

“The My E- Gov portal that provides a unified, “one-stop window” for citizens to access government information and services. “one-stop window” approach provides seamless access to government services by integrating the customer interface without necessarily integrating back-end processes. The implementation of this physical infrastructure has been accompanied by significant efforts to simplify and integrate administrative processes; cut down on regulations and forms; and streamline services and back-office functions. In Taiwan's Third e-Government Phase, this focus on service integration and simplification was followed by a shift towards mobile. As a result, the MyE-Gov portal today provides a unified government apps store with a comprehensive set of mobile applications that help im- prove the lives of citizens through such wide ranging functions as:

a mobile game to teach citizens about the importance of stocking emergency supplies during Typhoon season; a breast feeding room locator provided by the Department of Health; a water pollution reporting app; and a Job Bank for those looking for employment opportunities²¹.”

The e-government portal includes services related to: born, going to school, employment, raise, old age. The proactive initiative launched during the various programs are (Linder *et al.* 2015):

- “e-Housekeeper” is a centralized notification platform with many different services: license renewals, benefits notices to the due dates for fines, fees, and taxes.
- The proactive 1-9-9-9 hotline, which, in addition to a further consolidation of call lines, includes two innovative aspects: first, customer relationship and knowledge management systems, including a sophisticated Customer/Citizen Relationship Management (CRM) system. Second, enhanced authority and re-engineered processes to issue service requests. With this renewed authority, the reorganization empowered the 1-9-9-9 service to directly assign citizen service requests and complaints to the responsible frontline agencies and to reconcile issues, better addressing problems that cut across agencies.
- Door-to-door e-services: it consists of an e-inclusion program directed to rural communities. A similar service is offered by the Brazilian National Public School of Administration (Escola Nacional de Administração Pública). A platform has been created with free online training courses open to public servants and citizens seeking training in public services. (OECD, 2020).

²¹ See www.gov.tw for the full list

Job-seeking process is a time-consuming task and with very few levels of automation and support. The Korea Employment Information Service (KEIS) created “The Work,” with the aim of finding the right and suitable recommendation avoiding the need of long researchers and automatically integrating citizens preferences. The work acts in the following areas (OECD, 2020):

1. Reduce the amount of time it takes for job seekers to find information on the jobs they are looking for;
2. Realize social value by supporting the employment of various classes including middle-aged persons, and women who've experienced breaks in their careers;
3. Innovate data-based public services by boosting the use of public data.

Information are taken form the National job platform, which includes positions openings, training and certificates offers. Machine learning techniques are used to match the workers qualification with new positions and offers. Taiwan government has always been on the edge of public sector innovation, as it is possible to recognise from the evolution of its plans (NDC 2020):

- 2001 - 2007: E-taxation, E-documents horizontal integration, E-gazette;
- 2008 - 2011: ITaiwan mobile internet, e-invoice;
- 2012 - 2016: Open Data, MyHealth record account, Cloud medical records and invoices;
- 2017 - 2020: Cross domain one-stop-shop.

The next stage of the plan comprehends the realization of a Digital Government (DIGI+, innovative economic development plan 2017-2025):

“Using information as the backbone, apply IoT and blockchain to matching government services with people's needs, combine AI and cloud computing, to optimize decision-making quality and construct the next stage of public-private co-governance model for Smart Government.”

One part of the program consists of transforming the already-existing portal²² into an integrated one-stop platform that accesses entire government services. The project is already implemented, however the provision of the services on the portal is still reactive and require submitting online (or even physical applications).

The previously mentioned plan includes three main strategies (NDC 2018, Department of Information Management): open and transparent data, maximize added value; chained government network; integrated services functions to create innovative and smart proactive services. The proactivity of the e-government is going to be fortified according to the strategy: Taiwan government is aiming to create several end-to-end services, implementing a proactive delivery for employment matchmaking and emergency aid (Ministry of Labour, Ministry of Health and Welfare).

3.3.4. The innovative approach of Singapore

Starting from 1980s, *“Singapore government has tapped into advances in information and communications technology (ICT) to transform public administration and service delivery. It has benefited citizens and businesses in many ways, providing higher levels of convenience and cost-savings through greater productivity and effectiveness in service delivery. Its approach, though,*

²² www.gov.tw

was predominantly focused on delivering information to the public, with little interactive dialogue between government and citizens.”²³

Singapore’s e-Government Masterplan 2011–2015 aimed to usher in a new era. The idea was to shift from a “government-to-you” approach to a “government-with-you” approach in its delivery of e-government services, a vision of a collaborative government, with high levels of co-creation and interaction between government, the people and the private sector. The realisation of the plan permitted the launch of the one-stop-shop application Moments Of Life (MOL), which has been recently transported to a smartphone application (LifeSG)²⁴. The app has progressively added new features to better support citizens and create more comprehensive service bundle. LifeSG facilitates navigation by permitting a high level of personalisation. The functions are:

- Explore Services, divided in topics of interest:
- Personalised Dashboard;
- Benefits and Support Module with personalised information.

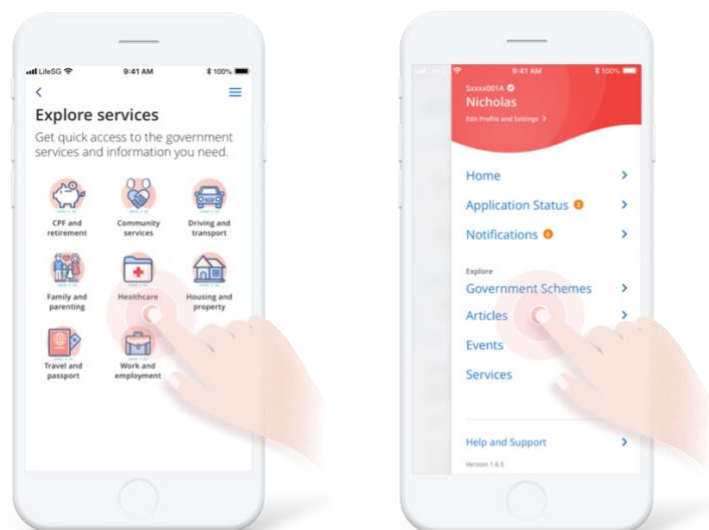


Figure 16: the LifeSG app.

²³ For more information visit www.centreforpublicimpact.org

²⁴ <https://www.life.gov.sg>

Singapore is redesigning its services around life events, since the app avoids searching multiple websites to get one thing done. LifeSG connects citizens to the right services, individuated on the basis of the data provided by the user in the moment of the registration, creating a proactive filter of the available services.

The services offered are:

- Eligibility for support budget;
- End-of-life planning;
- Job seeking support;
- Retrenchment of benefits and measures;
- Birth registration and family benefits;
- Receiving information regarding events or relevant services.

Another governmental effort which can be individuated in the same proactive direction is Parents Gateway. The platform is a one-stop, centrally coordinated app streamlining engagement between parents and schools, capable of direct mass communication through time-sensitive messages of high level of importance to all parents nationwide. With curriculum time saved, teachers previously burdened with onerous administrative work are free to focus on core teaching and to better meet students' needs. Parents stressed by disparate admin processes for children in different schools can now manage all in one app. There is a clear intention by the Singapore government to include all the public services all in one place soon, where citizen can manage all their opportunity using a simple, usable, effective application.

3.4. The digitalization of public service and public administration in Italy: the IO app

In the late 1980s, Europe formulated the first program (ESPRIT), which concerned the use of ICT. In the 2000s, Europe continued to promote new technologies, using the Internet and the development of services for businesses and the Public Administration from a digital perspective. In this sense, the European Digital Agenda was formulated on a well-defined strategy. This strategy involved a general improvement of the infrastructures and planned investments in ICT, cloud computing, big data, research, and innovation. Italy has decided to adapt to Europe by defining its strategies to improve services and digitalisation.

Italy has always shown its desire to adapt to the European context. Transformation and innovation of services to citizens and businesses have been underway for about a decade. The Italian government had already made significant progress in 1997 with the Bassanini law which provided for a general reform process of the Italian government based on devolution, restructuring, simplification, and ICT leverage. The final point of this reform introduced new concepts of interconnected administration and online services. In this context, e-government initiatives have also been formulated based on the guarantee of easy access to services such as certificates, licenses, authorisations, procedures for starting new activities (Virili, 2001). Over the years, European countries have equipped themselves with digital agendas. The European Digital Agenda is based on (AGID, ICT spending in the Italian Public Administration):

- Improving online access for consumers and businesses with the will to shorten the distance between the online world from and the offline one;
- Creating a favourable environment for the development of digital networks and services;

- Maximizing the growth potential in the European digital economies with investments in ICT, Big Data, Cloud Computing, improvement of public services.

Transformation is aimed at exploiting ICT to simplify access to services. Furthermore, the use of ICT results in essential improvements in transparency and accessibility and in a real transformation of the public administration. The Italian government has therefore committed itself to achieve the objectives of digital growth and assistance to administrations for the modernisation and transformation of services.

Italy, however, has always proceeded slowly due to the presence of some factors that have hindered a rapid transformation. The Italian delay was related to geographical and generational issues, but also to the absence of well-defined strategies. In 2014, a document called the Digital Agenda was prepared to define the strategy for services and public administrations to the technological evolution. Data from the European Commission's Digital Agenda Scoreboard, dating back to 2014, indicated an extreme weakness in the use of online services by both businesses and citizens. From an infrastructural point of view, Italy was in line with the average of the other European countries, even if lagging in the development of electronic services. This delay depended on:

- Socio-demographic characteristics: presence of a large gap in the use of the Internet between the new generations and the older age groups;
- Appreciation of the public administration's online services: only a small number of users declared themselves completely satisfied with the online services, the others said themselves not at all satisfied or quite satisfied.

The factors that determined the non-use of the internet were connected to the lack of skills, the perception of uselessness, economic inaccessibility.

The digital strategy, contained in the 2014-2020 Agenda, envisaged a multi-stage process aimed first at identifying the strategic sectors that have a substantial impact on the transformation of the public administration, and then at identifying best practices.

The Digital Agenda first identified the characteristics of the supply and demand for network services:

- Supply: it appears to be correlated to the degree of diffusion of internet use, to the possession of ICT skills, to the low level of technologies use by the older age groups and by Italian micro-enterprises.
- Demand: there is a big gap comparing to other European countries, and the effort of administrations is often not enough. Regions and large municipalities show a more remarkable ability to activate network services than smaller municipalities.

To accelerate the Digital Agenda implementation, the Digital Transformation Team was introduced by a decree in 2016. The team aimed to make public services accessible to citizens and businesses through a mobile-first approach, reliable, scalable, and fault-tolerant architectures. It relaunched some projects that had been set aside, such as PAGOPA for public administration payments, SPID digital identity for easy access to digital public services. At the same time, new projects have been launched, such as API which defines the guidelines for public administration communications through API (Battisti, 2020). From an ISTAT survey conducted a few years later, in 2018 it emerged instead that:

- 54.6% of the Italian regions and 48.3% of the municipalities made it possible to carry out the entire process from the start to the end of at least one service;

- About 87.8% of local public administrations still use analogue tools for registration;
- For internet connections only 41% of local public administrations access the internet with fast connections and 17.4% with ultra-fast connections;

Digitisation of public services is one of the indicators that contribute to forming the DESI index, a composite index that quantifies the country's digitisation in all its components. It is based on connectivity, human capital, internet services, integration of digital technologies and electronic public services. Italy is currently lagging in terms of digital growth both in general (Digital Agenda and DESI index) and in terms of e-government and electronic public services (Matteucci, 2019). Italy, in fact, in 2019 was among the last in Europe for digital interaction between citizens and public administration. This result is closely related to the lack of knowledge of services, poor digital skills, and the strong link with analogue (Agi-Censis Report, 2019). From the eGovernment Benchmark (2019) a large gap emerges in Italy in the availability of online services at national, regional but also at a local level. The indicator assesses the overall availability of online public services, but despite an excellent overall performance, there are still significant shortcomings. Current results depend on lack of coordination, lack of skills and technologies, lack of attention to user centrality and lack of interoperability. Over the years, some inefficiencies have been overcome but there are still important problems to be solved (Battisti, 2020).

For what concerns the topics investigated in this work, namely one-stop-shop, life-business events and proactivity, Italy seems far from effectively bringing these paradigms into the public administration. Nevertheless, a project appears to be heading in the right direction: the IO app. The platform aims to become a single one-stop-shop to meet public entities and services. The project is in the onboarding stage in which public entities are joining the platform. The functionalities so far

permit to receive notifications, to pay for public services, to receive personalized services on the base of the data provided and the preferences expressed.

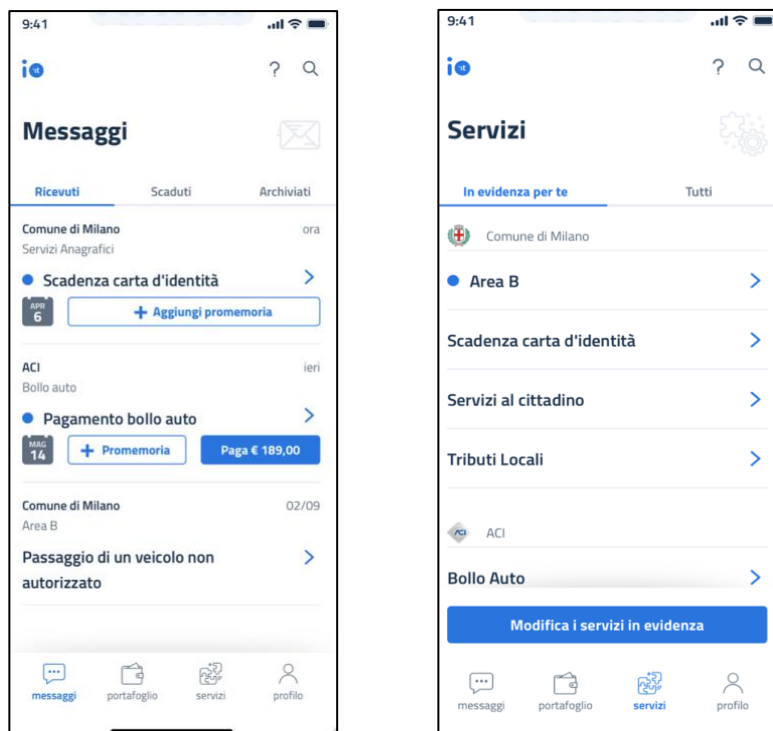


Figure 17: the IO app.

The regulatory basis of the IO.it project is art. 64 bis of the new CAD (Digital Administration Code), which provides a single point of telematic access to the public administration services, and which highlights a fundamental change in the relationship between citizens and PA, centred on three key aspects: simplicity, speed and transparency. The goal is to bring the citizen closer to the administration, making simple mechanisms that are often still complex and cumbersome.

The IO app is, therefore, the tool designed to concretely enable Digital Citizenship, providing citizens with a direct connection to public administration services and communications. The app *"makes it possible to effectively use digital public services, both of central and local PA, allowing citizens to receive communications*

from PA and make payments for public services even from their smartphones". (Strategy for the technological innovation and digitalization of the country, 2019)
The objectives are to make citizen-PA communication more efficient; to simplify the use of the digital services of central and local public administrations; to increase the number of electronic payments made by citizens; to increase citizens' knowledge of digital public services and their use.

"IO is the 'public services app' that transforms the relationship between citizens and the public administration, putting people at the centre and eliminating complexity: a single interface to access all public services directly from your smartphone after identifying yourself with your digital identity. Through IO, citizens will be able to access all the procedures that concern them, including those relating to their businesses, thanks to the integration between IO and impresa.italia.it, managed by Infocamere. And, in the future, public utility services provided by private individuals will also be accessible through IO". (Strategy for the technological innovation and digitalization of the country, 2019)

CHAPTER FOUR

4.1. Methodology

“A methodology refers to a model to conduct a research within the context of a particular paradigm. It comprises the underlying sets of beliefs that guide a researcher to choose one set of research methods over another.”
(Dina Wahyuni 2012)

Once developed an exhaustive theoretical framework (chapters one and two), a qualitative method has been used to merge the obtained literature knowledge with the use cases (chapter three). In this way, the result can be assumed as reliable because built on three pillars: existing literature analysis, uses cases and interviews. Qualitative research deals with non-numeric data, coming from²⁵:

- Observations;
- Interviews;
- Focus groups;
- Surveys;
- Secondary research.

Qualitative research implies several advantages:

- Flexibility;
- Natural settings;
- Meaningful insights;
- Generation of new ideas.

²⁵ <https://www.scribbr.com/methodology/qualitative-research/>

Limitations in the interpretation of data by the researchers determine some issues for qualitative research:

- Unreliability;
- Subjectivity;
- Limited generalizability;
- Labour-intensive.

Qualitative research starts with assumptions, a vision of the phenomenon by the researcher (Creswell *et al.*, 2007):

“To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, and data analysis that is inductive and establishes patterns or themes. The final written report or presentation includes the voices of participants, the reflexivity of the researcher, and a complex description and interpretation of the problem, and it extends the literature or signals a call for action.”

The characteristics of a qualitative research are (Cresswell *et al.*, 2007):

- Natural settings: researchers take the data from the place where the issue arises;
- Researchers as a key instrument of data collection: the researchers collect data themselves using interviews, researches and analysing documents;
- Multiple sources of data: usually multiple sources are considered;
- Inductive data analysis: the process is bottom-up, from the singular pieces of information to a generalised knowledge;
- Emergent design: the initial plan is hard to be described in the first phase of the research;

- Theoretical lens: the way the researcher see the issue is central in the research activity;
- Interpretative inquiry: the interpretation is crucial and can be a quality deterrent;
- Holistic account: all the complex interaction that characterised the issue examined need to be included in the research.

The standard form of qualitative research is the following (Creswell, 2003), named “*Qualitative Constructivist Interpretivist Format*”:

“Introduction

Statement of the problem (including literature about the problem)

Purpose of the study

The research questions;

Delimitations and limitations;

Qualitative research strategy;

Role of the researcher;

Data collection procedures;

Data analysis procedures Strategies for validating findings;

Narrative structure;

Significance of the study;

Preliminary pilot findings;

Expected outcomes;

Appendices: Interview questions, observational forms, timeline”

This methodology has been chosen for its simple and practical applicability. A vast and under-investigated topic such as proactivity needed a variant to the presented model. The study began with the acknowledgment of a lack of shared knowledge about the proactivity spectrum; therefore, a comprehensive and systematic literature review is proved to be needed. Once built the scientific foundation

necessary to understand public e-service and proactivity, a wide-range desk analysis on all the possible use cases related to the topic was run to overcome the limited experimental knowledge of this phenomenon. Starting from the literature and leveraging on public sector innovation observatories, it was possible to identify several proactive service use cases, and various one-stop-shop implementations as well.

The tools used for this purpose are traditional online research and the interrogation of public databases belonging to public sector observatories (OPSI, SCOOP, G2B and others). In addition, use cases gathered from scientific publications have been used as well. Finally, the literature and the use cases have been crossed with the elements obtained in the interviews, determining a comprehensive analysis which ultimately allowed to build a complete model. Out of approximately 50 interview requests, gathering contacts from the use cases collected, five proactive public services representatives have been interviewed alongside with a public service researcher. The model, realised crossing interviews material, literature definitions and use cases, has been built to organise the actual knowledge and to help creating a more robust basis for future research.

4.1.1. Systematic literature review

The research made in the preliminary phases of the work permitted to identify few terms that guided the systematic study of papers. The keyword used in the domain of e-government and using the SCOPUS platform for the study are:

- Proactive public service: 30 documents.
- No-stop shop: 2 documents.
- Anticipatory service: 3 documents.
- Invisible service: 8 documents.

Tab. 9 lists all the relevant documents obtained filtering the abstracts of the papers individuated in the first place. The total number decreased from 43 to 13 after the abstract study.

<i>Key 1</i>	<i>Key 2</i>	<i>Title</i>	<i>Author</i>	<i>Citations</i>
Proactive public services	E-government	Establishing efficient governance through data-driven e-government.	Agbozo, E., & Spassov, K. (2018).	5
		Metadata sets for e-government resources: The extended e-government metadata <i>schema</i>	Charalabidis, Y., Lampathaki, F., & Askounis, D. (2009).	6
		Identifying design principles for proactive services through systematically understanding the reactivity-proactivity spectrum.	Erlenheim, R., Draheim, D., & Taveter, K. (2020).	0

		Designing proactive business Event Services: A case study of the Estonian company Registration Portal	Körge, H., Erlenheim, R., & Draheim, D. (2019).	0
		Proactive e-governance: Flipping the service delivery model from pull to push in Taiwan.	Linders, D., Liao, C. Z., & Wang, C.. (2018).	23
		Personalisation, proactivity and artificial intelligence. A new paradigm for the provision of public service electronics?	Rico, C. I. V. (2020).	0
		Designing proactive public services as sociotechnical systems by using agent-oriented modelling.	Sirendi, R. (2016).	0
		A conceptual framework for effective appropriation of proactive public e-services.	Sirendi, R., Mendoza, A., Barrier, M., Taveter, K., & Sterling, L. (2018).	4
		Bringing service design thinking into the public sector to create proactive and user-friendly public services	Sirendi, R., & Taveter, K. (2016).	7
		Managing stakeholder interests in e-government implementation: Lessons learned	Tan, C., Pan, S. L., & Lim, E. T. K. (2005).	87

		from a Singapore e-government project.		
No-stop shop		From one-stop shop to no-stop shop: An e-government stage model.	Scholta, H., Mertens, W., Kowalkiewicz, M., & Becker, J. (2019).	31
Anticipatory services	E-government	A conceptual life event framework for government-to-citizen electronic services provision.	Alsouds, A. R., & Nakata, K. (2011).	2
		Digital public service innovation: Framework proposal.	Bertot, J. C., Estevez, E., & Janowski, T. (2016).	8

Table 9: systematic literature review.

Proactivity is an under-investigated topic. Looking at the number of citations, rarely the documents overcome 30 mentions. Therefore, the number of papers to build the literature review was not sufficient. To overcome this issue, the reference of the identified studies has been researched as well. The final number of the literature base (both considering the so-called grey literature: articles, reports and other informal investigation) has, in this way, reached a significant number of documents. The result of the review, presented in chapter two, has permitted the necessary basic understanding of proactive service delivery.

4.1.2. Use cases analysis

“A research method that facilitates a deep investigation of a real-life contemporary phenomenon in its natural context is a case study.”
(Woodside, 2010)

“Interpretive case study focuses on analytical generalisation to develop and extend theory.” (Wahyuni, 2012)

The case study method is the one on which the research strongly relied. Yin (1994) identified seven types of case study research:

1. The use of multiple sources of evidence, in a converging manner;
2. The explicit specification and testing of hypotheses and rival hypotheses, especially in lieu of control or comparison groups;
3. The dominance of deductive strategies, whereby research starts with theorizing;
4. Program logic models as a standard way of initiating a program evaluation;
5. Portfolio analysis, using qualitative criteria to differentially weigh the outcomes from a project or the projects within a program;
6. The use of replication logic, rather than aggregating data, when comparing the results from multiple sites or cases.

The use cases have been red through the lenses of a series of hypothesis regarding several dimensions which finally could define and categorise them, with the aim to find patterns and similarities. The dimensions analysed are:

- Trigger: what makes the service workflow start;
- Initiator: who is in charge of the initial required actions;
- Data gathering: how the required data are collected;

- Requirements of the recipient: what needs to be done to be eligible;
- Requirements of the provider: what preparation has to be put in place;
- Value delivered: which benefits are entailed in the service.

The qualitative case study facilitates the exploration of an issue, in its natural context, using a variety of data sources. The different point of views give a more reliable consistency of the research outcome. The context is crucial in investigating case studies, this is the reason why all the services highlighted in chapter three were aligned with the strategies and national context of the countries which have realised them. The use cases have been selected according to even a possible connection with the proactivity domain, approximately 60 use cases were analysed in total and 21 are related to proactivity, as shown in Tab.10.

<i>Nation</i>	<i>Service</i>	<i>Institution</i>
<i>Estonia</i>	E-taxation with pre-filled forms.	Tax and custom Board
	Family, retirement, disable children benefits delivered without the need of an application.	Social Insurance Board
	Facilitated registration for companies, in which other actors/institution are proactively involved in the process, eliminating reactive steps formerly needed.	Centre of Registers and Information Systems
	Notification about service availability and deadlines.	
<i>Austria</i>	Proactive tax return related to certain conditions; no application needed, only corrections can be asked.	FinanzOnline
	Family allowances for new-born families, without requiring an application when a child is born.	ALF

	Notification service about service availability and deadlines.	
<i>Finland</i>	Artificial intelligence program which tailors public service offer on the base of explicitly provided citizen data, contemporary allocating resources on the base of common requests.	AuroraAI
<i>UK</i>	Family Database, which helps to adopt a predictive risk modelling to anticipate the support to who need it the most.	Interagency Hub, Bristol
	Predictive identification of people at risk of knife crimes and modern slavery.	National Data Analytic solutions
<i>Taiwan</i>	Door-to-door e-services, enabling e-inclusion with in-site consultations on e-services access.	National Development Council (NDC)
	The 1-9-9-9 hotline, designed to proactively reach citizens and propose services.	National Development Council (NDC)
	E-housekeeper, a notification and support service for house owners.	National Development Council (NDC)
	The work, a job seekers recommendation engine based on AI.	Korea Employment Information Service (KEIS)
<i>Brazil</i>	Online free courses for citizens and civil servants to better use public e-service.	National Public School of Administration
<i>Australia</i>	JSCI, model used to assess the risk that citizens will become unemployed in long-term. The high-risk	Department of Education, Skill and Development

groups are thus identified and addressed with a special help in job hunting.

AskIzzy, an open data platform where it is possible to see where people are looking for services, at what time of day people are looking for services, where are they are, and what are their needs. In this service and resource can be efficiently adjusted.

Centrelink

New Zealand

SmartStart, a bureaucracy reduction system which proactively deals with many governmental agencies when a baby is born.

Departments of Internal Affairs, Social Development, Inland Revenue, Health

Germany

E-taxation with prefilled forms, the data are gathered from several governmental registries.

German Tax Agency

Portugal

E-taxation with prefilled forms, the data are gathered from several governmental registries.

Portugal tax board

Table 10: proactivity use cases.

Concurrently, a collection one-stop-shop implementations has been gathered to identity 11 innovative use cases (Tab. 11).

<i>Projects</i>	<i>Nation</i>	<i>Stage</i>	<i>Description</i>
<i>One stop shop App</i>	Singapore	Development	LifeSG, an application that aims to unify all the accesses of public services.
	Italy	Development, early stage	IO, application that aims to facilitate the relation between the public bodies and the citizen.

<i>One stop shop website</i>	Estonia	Deployed	A broad, user-friendly, life vent based one-stop portal.
	Sweden	Development	Skatteverket, a system which aggregates few services in semi-one-stop shop system,
	Austria	Deployed	USP.gv.at, where information and services available in the e-government portal
	UK	Deployed	Uk.gov, which guides the citizen trough different web pages using life/business events and adopting an easy-to-use step by step navigation.
	Australia	Deployed	Services Australia, which through a user-friendly and query-based navigation creates a look-like event-based service.
	New Zealand	Deployed	Govt.nz, event-based citizen portal.
<i>Dedicated life-event portal</i>	New Zealand	Deployed	SmartStart, an integrating information system and access to services into a new step-by step navigation to save time and effort for parents.
		Deployed	End of life, a single entry for death related services.
	Australia	Development	AskIzzy, homeless platform which incorporate many different life-saving services.
	Singapore	Deployed	Parents' gateway, a single entry for parents to facilitate their bureaucratic journey.

Table 11: one-stop shop implementations.

4.1.3. Interviews

Any interview plan requires a specific protocol because an interview “*is an interest in understanding the experience of other people and the meaning they make of that experience*” (Seidman, 1991). Different interview methodologies evolve in different set of questions, such that “*later participants respond to queries quite different from those to which earlier participants responded*” (Knox, 2009). Alternative strategies in running interviews are (Goulding, 2005):

- Grounded theory;
- Ethnography;
- Phenomenology.

In ethnography, for example, the interview is more a ‘*friendly conversation into which the researcher slowly introduces new elements to assist informants to respond*’ (Spradley, 1979). The basic themes or topic areas of the investigation are likely determined ahead of time, but not the sequence of the specific questions. As stated by Kvale (1996), “*Sometimes only a first, topic-introducing question is asked and the remainder of the interview proceeds as a follow-up and expansion on the interviewee’s answer to the first questions*”.

The work’s central focus has been developed according to semi-structured interviews based on the ethnography principles, still a set of topics and open questions has been previously shown to the interviewees. This scheme was created before obtaining the specific needed information and to enable comparison across cases.

Interviewees were researched in two fields: public services experts and people working in the organisation reported in the use cases. A formal request has been

sent to 52 members of the proactive organisation and observatories. To the six civil servants the welcomed the proposal, the following questions were posed:

- *Role, responsibilities, personal history, main activities.*
- *Description of the service offered: domain, initial steps, evolution, future developments.*
- *How would you describe the organisational and technical shift of running proactive services based on life events?*
- *How did the relationship with the stakeholders (citizens, public employees and other public institutions) of the service change?*
- *Which were the barriers your organisation faced in moving towards proactivity/life event service?*
- *Which were, on the other side, the most significant enablers?*
- *How do you think the one-stop-shop portal, life/business events and proactive service delivery are connected?*
- *How do you think the service your institution offers could evolve and improve?*

A series of back questions has been created to target specific aspects of interest:

- *How the relationship with the citizen has changed? How does he perceive the new reception of the service?*
- *How did the collaboration with the other agencies change? Was it a driver or a consequence? How much is this aspect important?*
- *Before adopting the proactive delivery, was developing a life event portal the first step? How do you think these two domains are connected?*
- *Do you think public administrations have to work around life events to become proactive?*
- *Do you think one-stop shop is a precondition for proactivity?*
- *Is there a different degree of proactivity in the services you offer?*

To better introduce the results of the research activity reported in the following section, an introduction was asked to the six interviewees, who were interviewed between April and June 2021 (approximately 30-50 minutes per interview):

“I am currently working at the observatory of public sector innovation, where our team focuses on different topic areas with an open-minded research activity. Mostly of our use cases refer to where public sector innovation intersects with digital government topics.” (Public service expert, Public Sector Innovation Observatory)

“I am in the role of manager of public services, this means that we have direct client contacts ... I'm also representing all the tax services from the public side, which are directed to citizens, excluding businesses, so I am a service manager for natural person services. My responsibility is to create a strategic view where our services are going to and what we want to offer to our clients ... Our goal is to keep in mind that we have to make all the data collecting in a way which is clear and comfortable for our customers. To do that, when possible, we use some data that we already have in our database or we ask for the other institutions which already collect this kind of information.” (Proactive public service manager, Estonian Tax and Custom Board)

“I am head of financial documentation, and my main responsibilities are to verify the eligibility of benefits service. I personally have to be sure that the clients who have rights to our benefits receive them on time and in the right amount of money.” (Proactive public service manager, Estonia Social & Insurance Board)

“I support the activity of data collecting and requirements review.”
(Public service assistant, Estonia Social & Insurance Board)

“I am a manager of the centre of registers and information systems, which resides under the Ministry of Justice administration. It consists of an IT body which covers many activities: from desktop management to special information system design and development We develop information systems of various public administration bodies, and we maintain their workstations space.” (Public service support manager, Estonia Centre of register and Information System)

“I assist the manager in its work, and I personally contribute to project development and deployment.” (Public service support assistant, Estonia Centre of registers and Information System)

4.2. Results and future research

The first analysis layer aimed to fix the definition of proactivity, to discover the requirements from both the citizens and the public administration, and to identify what characterises the relationship with the one-stop shop. Proactivity, in its essence, consists of *“automated services based on life events”*. The terms *“automated”* and *“life event”* address which requirements public institutions shall meet:

- The service workflow (or a part of it) needs to present some level of automation in the citizens’ eyes.
- Governments need to be able to track life-events of citizens and business. This conveys that the database needs to be updated, secure and interoperable (a life event interferes with multiple public organisations).
- The citizen must provide, voluntarily or involuntarily, data regarding their actual condition. In fact, *“if citizens don’t share data and allow to create a*

digital identity, a proactive delivery is impossible to be actuated”.
(Interviewee #1)

Looking at the other side, it appears clearly from the interviews that there is a strong first prerequisite for proactive service: the digital identity.

“I think that digital identity is a prerequisite for having the once-only principle and then proactive delivery ... across different case studies a milestone yet not really clear is that a lack of adoption of digital identity can completely block proactive innovations.” (Interviewee #1)

Therefore, both public organisations and the citizen are needed to overcome the barriers of a successful proactive implementation. First, organisations need to arrange services to be *“triggered or offered by multiple different organisations departments. Those parts can still exist separately and still function separately, but they need to understand to communicate with all the other different parts. Which ultimately could intercept the information and start the service procedure, or a part of it, or store the data and wait for it to be useful”*.

This element highlights and brings forward the necessity for a significant change in the public administration workflow, where a joint effort to change the *“mindset”* and *“communication”* between departments should be brought forward to *“eliminate the burdens of the citizens and businesses to receive to public services”*. The cultural change will drive the technical one because it is the *“proactive effort”* through which public employees reach citizens that is *“modifying the technologies used inside the public administrations”*. More in details, the way the communication system between departments (and towards citizens) is structured *“will in large part dictate how like the services are offered and procedures are handled”*. To support this, where proactivity is fully implemented public employees *“started to feel empowered from this new delivery, in a way that they are more actively participating to solve the problems of the citizens and more likely*

try to find some always better solution to deploy these services. The key is to let the public employees try to offer solutions before the issue becomes urgent. Why do you have to wait for the people to say that an issue arises if you already have all the information about it?"

As mentioned previously, the fundamental precondition is that every citizen is “*embarked and enrolled in the digital identity projects*”. In this direction, “*accessibility to the Internet in general*” is a crucial aspect to obtain a digital identity. In this case, Taiwan’s proactive “e-inclusion” service can be taken as a leading reference. A possible solution to make citizens adopt the digital identity can be “*excluding some service to the non-digital enrolled ones*”. The UK brought a different inspiring approach, which consists of “*digital fidelity programs to increase the adoption of the digital identity in the population*”. Essential partners for implementing digital identity are private issuers. For example, banks allowed a fast-growing adoption in Estonia since the early stages:

“.. banks allowed people to have access and authenticated themselves, easily accessing our services using the bank application. It was a very convenient very convenient partnership from organizational point of view. In general, the collaboration with the private sector was important and from a technical point of view, both considering the digital signature and the digital identity. It was something that would have had a high cost if developed internally and finally, a strong enabler of institutions’ data transfers with a proactive exchange of information”. (Interviewee #5)

Another driver of the “proactivisation” of service is, once assumed, a continued communication paradigm between public organisations, the necessity to exchange data quickly, safely, and effectively. An example of this continuous improvement is the evolving X-road interoperability project in Estonia, where “*the manual data exchange between departments is evolving towards an automated one*”. X-road

consists of a *“middle layer through which public entities exchange information safely and in respect of law”*. Since the data exchanged are sensitive and subject to stringent policies protecting citizens’ privacy, public organisations can operate only *“by the limit of the existing law regulating the data exchange. To overcome this limit, a new law needs to be issued to achieve proactivity”*. Therefore, governments need to ensure that their legislation is not blocking public organisation to *“proactively exchange data”*. According to the GDPR and many legislations, citizens need to be informed who their data are shared with:

“... you have to say what kind of data are you collecting and what are you doing with that. So, where is not explicitly permitted by the law the data cannot be shared. For these reasons, the laws need to prevent possible frictions in the service delivery, concurrently assuring the security of the data. GDPR is very strict, this for all the institutions covering sensitive information, for taxes related even stricter.” (Interviewee #2)

Another crucial aspect for database, interoperability, and data exchange management is: *“a needed a univocal code for every citizen to deploy proactive services”* (Interviewee #5).

Is therefore needed that every citizen is *“identified at birth with a code”*. But it is not only the data exchange and the digital identity that affect proactivity, understanding which is *“the right amount of data is also crucial for effectively implement proactive services”*. Another consideration must be that completing changing the paradigm of public e-service an adverse reaction by citizens could appear. As a result, *“the shift must be accompanied by a strong communication campaign, able to ensure the acceptance and perceived value by the final customers, the citizens”*. Another related aspect is that once accepted, this new system creates *“extremely high expectation from citizens, who don’t accept*

anymore to fulfil data manually". In other terms, the quality framework of the service changes radically.

To conclude the analysis of the proactivity preconditions, a vast collection of one-stop shop innovative use cases has been gathered to understand which effective connection there is between one-stop shop and proactivity. According to the evidence, the countries highly performed on one-stop shop portal or application side (see UK and Singapore) are not necessarily the leading ones in the proactive delivery. This result has been confirmed by the interviewee opinions as well. It was then possible to find a final connection in a *"convenient but not necessary"* step towards the proactive service delivery and to an *"omnichannel citizen approach"* towards citizens. The requirements and the relation with one-stop shop are summarised in Fig. 18.

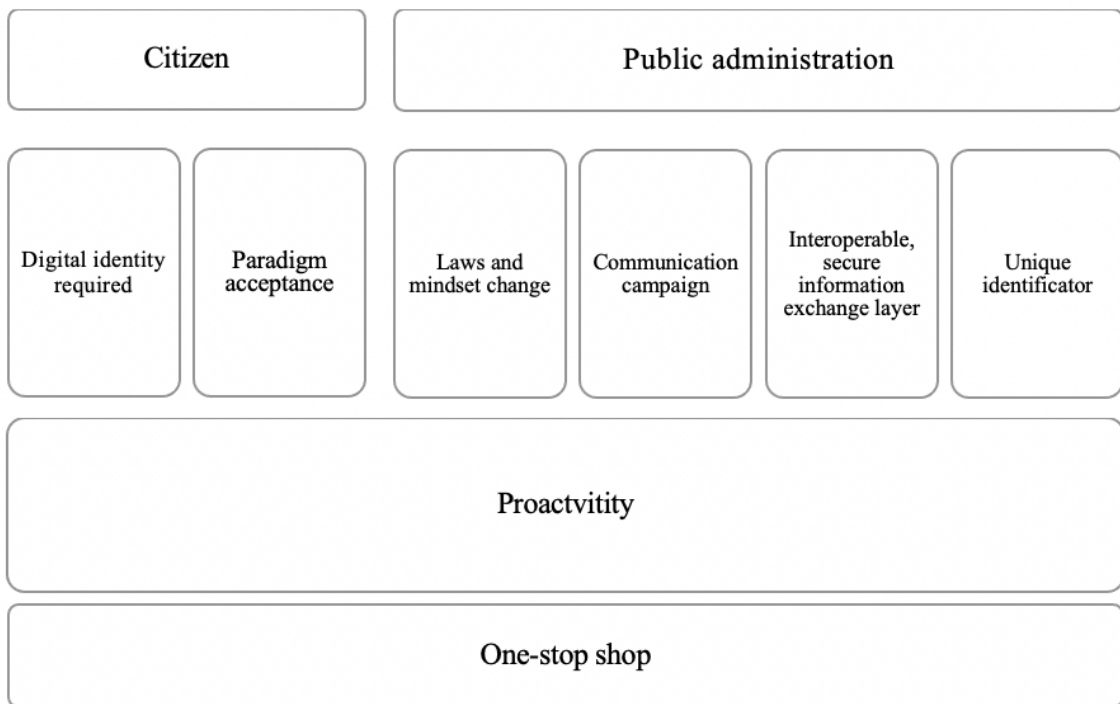


Figure 18: Proactivity Preconditions Framework.

Therefore, if one-stop-shop is not the technical starting point of proactivity, from where should a public organisation start to implement a fully operable proactive service? The concept of a life-event portal should be considered in this logical path, in a way that *“making the public administration working around life-events makes it easier to build proactive service around them”*. Thus, organising the public administration around events is still not a precondition but a highly advisable practice to be put in place.

Looking at other possible starting points for the proactive journey, seen the experience of Estonia and its proactive benefit service, the best practice is assumed as *“picking up one granular service where optimally one organisation has full control or maybe two organisations are focused, it could be easier to gather the data behind and use it to automate the whole service or even part of it”*. Therefore, by looking at the use cases, it is reasonable to think that the first granular service to start with is proactive e-taxation, for two main reasons: it is the most reproduced at the global level, and it is characterised by a low risk of errors since the citizens have always to confirm their data.

The categories of services that can be deployed proactively, and if there is a degree of proactivity, are the next two aspects investigated. According to the interviewees, there is no such a strict concept for what concerns a proactive degree scale. It is more effective to look at the *“proactive maturity level of service”*, which is instead a degree of complexity needed to implement the service obtained by *“the involvement of multiple actors and the execution of several eligibility assessments”*.

“Collecting data from multiple sources to reorient approaches around individuals requires digital maturity across government, including a critical number of digitalised services.” (OPSI 2020)

According to this finding, the maturity level of the service has been added as a level of analysis, with the final purpose of categorising proactive services. For the

purpose of the research, if a service part is proactive, the whole service is considered belonging to proactive delivery, despite the trigger resides in citizens or not. So, to be considered proactive, a service needs to present at least an “*automated*” part and to be based on “*life events*”. This aspect allowed to include many services that seemed far from the literature definitions but that finally presented interesting aspects and a valuable contribution to the model definition.

The use cases are summarised in Tab. 12, with the definition given to them by authors, researchers, and observatories. Aligned to real-life implementations, the model has been used to distinguish the most relevant elements and to create a new framework to define and categorise all the declinations of proactivity. In this way, the model demonstrates which category of services can rearrange their workflow and become proactive.

<i>Service</i>	<i>Nation</i>	<i>Trigger</i>	<i>Value delivered</i>
<i>Benefit and allowances</i>	Estonia, Austria	Public entity	Money
<i>Predictive risk assessment</i>	UK, Australia, Finland, Taiwan	Public entity	Assistance
<i>E-inclusion</i>	Taiwan, Brazil	Public entity	Assistance
<i>Proactive hotline</i>	Taiwan	Public entity	Assistance
<i>Notification service</i>	Taiwan, Singapore, Austria, Estonia, Italy	Public entity	Information
<i>Event service</i>	Estonia, New Zealand, Austria	Citizen	Simplification of procedures
<i>E-taxation</i>	Estonia, Germany, Sweden, Austria, Portugal	Citizen	Simplification of procedures

Table 12: proactive services benchmark.

The following innovative categorisation has been realised by the author, by linking the finding of the use case analysis, the literature review, and the interviews.

Category: *unpredictable life-event services*.

Definition (Scholta 2019): “*In proactive services delivery means that the government delivers a service to a citizen when a life event occurs, without the citizen having to request the service.*”

Characteristics:

- Trigger: life-event, communicated by a public organisation or a third party.
- Initiator: public organisation.
- Role of the recipient: no interaction, when the law context and the purpose of the service allows it, otherwise can be asked to confirm the will to receive the service.
- Role of the provider: assure eligibility, data protection and correctness.
- Value delivered: benefits given through the service (i.e. money, grants, licenses).
- Maturity level: high.

Examples: proactive social benefits, proactive tax return.

Category: *predictable life-event services*.

Definition (Erlenheim *et al.*, 2020): *Proactivity in the public sector involves providing services to the public on behalf of the government's own*

initiative, based on the assumption that citizens support this and based on the data available in the government databases. Proactive services are provided automatically or with the consent of a person. “

Characteristics:

- Trigger: life event.
- Initiator: public organisation.
- Role of the recipient: none.
- Role of the provider: proactively gather data by cooperating with other governmental institutions.
- Value delivered: burden, time, effort elimination.
- Maturity level: high.

Examples: e-taxations with pre-filled forms.

Category: *anticipatory services.*

Definition (Bertot 2016): *“Anticipation can be based on demographics (e.g. age or marital status), life circumstances (e.g. change in employment, disaster recovery or movement to a new location), or some other contextual factors. Anticipatory services (or proactive services) are therefore predicated on the ability of governments and citizens to seamlessly share information and data that enable the prediction of citizen needs.”*

Characteristics:

- Trigger: database queries and data mining techniques.
- Initiator: public organisation.
- Role of the recipient: opt in.

- Role of the provider: gather data and analyse them for identifying risk groups.
- Value delivered: a pre-emptive assistance is given to citizens at financial and societal risk.
- Maturity level: high.

Examples: job seeking support, e-inclusion, pre-emptive risk assessments.

Category: *tailored services*.

Definition (Linders *et al.*, 2018): *“Proactive e-government shifts from the ‘pull’ approach of traditional e-government - whereby the citizen must first know, decide, and seek out government services - towards a ‘push’ model, whereby government proactively and seamlessly delivers just-in-time information and services to citizens based on their needs, circumstance, personal preferences, life events, and location.”*

Characteristics:

- Trigger: data provision.
- Initiator: citizen.
- Role of the recipient: submit data.
- Role of the provider: facilitate the service research process and create a technical base to endure the automation and the correctness of the offer.
- Value delivered: service recommendation, facilitating of navigation access to service.
- Maturity level: medium-low.

Examples: recommendation systems, personalised citizens’ apps.

Category: *simplification services*.

Definition (Estonia, 2017): “*Proactive services are the direct public services provided by an authority on its own initiative in accordance with the presumed will of persons and based on the data in the databases belonging to the state information system*”

Characteristics:

- Trigger: incoming life event.
- Initiator: citizen.
- Role of the recipient: actively engage in the service provision.
- Role of the provider: rather Inform proactively or run a part of the service procedure proactively.
- Value delivered: information delivery, simplification of procedures.
- Maturity level: medium.

Examples: notifications, proactive one-stop shop, e-inclusion.

It was then possible to divide proactive services into two sub-categories, using the trigger as discriminant. To the first sub-category belong all the proactive services strictly related to life events, as shown in Tab. 13.

<i>Life-event proactive services</i>	<i>Unpredictable life-event service</i>	<i>Predictable life-event service</i>
<i>Trigger</i>	Life event	Life event
<i>Initiator</i>	Public organisation	Public organisation
<i>Role of the recipient</i>	Opt in/opt out	None

<i>Role of the provider</i>	Assure eligibility, data protection and correction	Assure eligibility, data protection and correction
<i>Value delivered</i>	Benefits and grants	Proactive data gathering
<i>Maturity level</i>	High	High

Table 13: proactive services based on life events.

The second category refers, instead, to the proactive support services, in which the government takes a less evident, but still significant, proactive position into delivering assistance, information and simplification of procedures to citizens. Still, data can trigger a service but always in sight for future incoming life events.

<i>Proactive support services</i>	<i>Anticipatory services</i>	<i>Tailored services</i>	<i>Simplification services</i>
<i>Trigger</i>	Data mining	Data provision	Incoming life event
<i>Initiator</i>	Public organisation	Citizen	Citizen
<i>Role of the recipient</i>	Opt in	Provide data	Active
<i>Role of the provider</i>	Assure eligibility, data protection and correction	Facilitate the service research process	Rather Inform proactively or run a part of the service procedure proactively
<i>Value delivered</i>	Pre-emptive assistance	Service recommendation	Information and simplification of procedures
<i>Maturity level</i>	High	Medium-low	Medium

Table 14: proactive support services.

The extensive gathering and systematisation of the use cases into a new categorisation of proactive services, alongside the synthetic theoretical model to better understand the requirements and the relationship with the one-stop shop, represent the main contributions of this work. A new model to interpretate the proactivity spectrum, based on inductively analysing real-life implementations, was created, but still some elements deserve further research attention. As brought up by Khun *et al.* (2020), the quality in non-interaction is a topic that deserves further investigations, as the paradigm to assess the value of a service should move from ex-post to rather an ex-ante one.

This field of investigation should be brought forward taking the citizens into account, reaching them with surveys and tests to understand to which extent is possible to provide services in a proactive way without assisting to a phenomenon of rejection or low final perceived quality.

Another aspect conveying the citizen adoption of the proactive service is understanding which “*communication campaign would effectively onboard citizens into proactivity and digital identity*”. To address this issue, the tool of the focus group could be an essential evidence element to better comprehend which aspects are stressing more the citizens and what could impact more on their perception of proactive services. Furthermore, one of the critical elements that the research activity has highlighted is the necessity to intersect the digital identity issue with the domain of proactivity. Another aspect that should be brought to the attention is the fairness of proactive service innovation, how many people can have the resources to navigate the internet and to access to the tool that permits them to receive services proactively. The global pandemic has shown how a big portion of the population is still far to be fully on board with the e-government initiatives for a series of cultural and technical barriers. Therefore, the feasibility of implementing a proactive delivery should consider the digital e-inclusion, and

future research should attempt to find a solution to mitigate this issue and better understand the connections between these two domains.

Another interesting element that will cross soon the boundaries of proactivity, e-services and public administration is the automation of decisions permitted by AI. As proactive delivery consists of a “data-driven” innovation (OECD, 2020), the data analysis could be addressed by autonomous tools that final emit the decision about eligibility for the service, eliminating another burden for civil servants and allowing them to concentrate on more value-added activities.

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