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Understanding Actor Roles in Inter-organizational Digital Public Services

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Abstract. Different actor roles in inter-organizational digital public services are often neither understood nor acknowledged. This can result in challenges regarding the proper design and result in a lack of adoption of these services. In the literature, there exist various taxonomies outlining roles such as users, consumers or co-creators, although their value is limited. We define roles as the expectations regarding the actors and their responsibilities in the governance of a digital public service. The aim of this research is to better understand the various roles in inter-organizational digital service provisioning. This objective is achieved by examining existing classifications and using them to analyze the roles in three inter-organizational cases in Belgium. The multiple-case study reveals natural persons and legal entities often combine several roles. Public administrations have to collaborate to establish inter-organizational digital public services, but might be confronted with different perspectives regarding the end-user or other roles. This might lead to tensions and could have consequences regarding adoption. The results show that intermediary roles performed by non-public sector parties, such as mandate holders or private service providers, are lacking in existing classifications. A novel classification is proposed together with suggestions for the concept of roles, taking a comprehensive view on actor roles in the entire service delivery chain.

Keywords: Public service delivery · Actor roles · Inter-organizational services · E-government

1 Introduction

To foster digital government success, comprehending the roles that actors such as public legal entities and natural person assume in inter-organizational digital public services is key. An actor role (or role) can be defined as a "the responsibility for performing specific behavior, to which an actor can be assigned, or the part an actor plays in a particular action or event" [40, p. 60]. One actor typically can play multiple roles and roles can change over time. Through ICT's, traditional actor roles are changing [5, 22, 23, 42]. This evolution creates a challenge for governance. Clarity of roles – and the

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underlying responsibilities – among collaborating public organizations has in this regard been put forward as an important characteristic for digital government succes [14, 28, 36]. Defining and assigning actor roles can contribute to alleviating governance challenges created by interdependencies between involved actors [18, 45]. This is especially the case for inter-organizational digital public services, that require a multitude of actors to collaborate in order to link building blocks that form integrated service chains through which various services can be delivered [45].

A research gap presents itself regarding the understanding of the roles actors assume in the initiation, design, implementation and evaluation of digital public services and the larger societal context [23, p. 433; 1, p. 254, 257, 265]. If there is no mutual understanding of each other's perception regarding the roles they assume, then this can impact the effectiveness of collaboration [14]. It also potentially leads to resistance among involved actors in its governance [1]. Unclarity about roles can further adversely affect the design of a service and impact a service's adoption and its eventual use [9, 20].

Concepts such as users, citizens and consumers are used interchangeably and are often given different meanings. As Garcia [13, p. 335] points out, predefining an actor as a citizen already gives them certain rights and responsibilities, while a user is a more neutral term that is also applicable to non-citizen service users. At the same time, research has noted the different roles actors assume in the context of digital public service provision [e.g. 34]. Examples include roles such as a customer when comparing utility providers on a public website or applying for subsidies, or as client when obtaining e-health services. Differences in actor roles influence how public services are developed and what part actors are expected to play or themselves expect to take part in in the design and delivery processes [23, 35].

Prior research has investigated roles in specific settings (e.g. web service orchestration [16], open-source software (OSS) using agile methods [31] or Open Government Data [12]). A general examination and classification or taxonomy of roles in inter-organizational digital public services remains lacking. This research aims to understand the different roles actors can assume in the context of inter-organizational digital public service delivery. Our research question is the following: *what are different actor roles in inter-organizational digital public service delivery?*

We achieve our research aim through an exploratory multiple-case study involving three cases that entail inter-organizational digital services with respect to natural persons, private legal entities and public legal entities in the region of Flanders, Belgium. These cases show an intricate and complex landscape of actor roles, with three distinct but interacting types of actor roles.

The structure of the paper comprises 6 parts. Following the introduction, Sect. 2 looks at the research background on actor roles, including classifications. Section 3 details the multiple-case study approach. Section 4 provides a description of the cases and their characteristics. Section 5 presents the analysis of actor roles in the three cases. Section 6 contains the conclusion.

2 Research Background

To get an extensive overview on actors roles, in this section we review actor roles and classifications in the e-Government, Information Systems (IS) and Public Administration literature.

2.1 Actor Roles in the e-Government Literature

In the e-Government literature, various taxonomies, typologies and categorizations have been developed or proposed for end-user roles [e.g., 9, 34, 37, 43]. Based on a systematic review of stakeholder roles in the e-Government literature and building on Mintzberg [27], Rowley [34], distinguishes between 4 different roles that natural persons can adopt: customer, client, subject (of the state) (or legal subject) and citizen (which includes the role of voter and participator in the political process). For each of those roles, the auhor describes the nature of the roles, which can be viewed as the perspective that public administrations take towards them.

Stakeholder theory is often used to describe and analyze users and their roles [e.g., 2, 34, 35]. However, where stakeholder theory looks at power relations between stakeholders [35], the scope in this paper is limited to identifying the different actor roles.

In their apprehension of citizens in the context of digital public services, Distel and Lindgren [9, p. 126] (1) delineate how a natural person is conceptualized, i.e. what perspective is taken towards them, (2) posit natural persons' interaction in the policy, design and service process, and (3) examine the general position of natural persons in service governance. The authors [9, p. 125] found that in the literature there are often neither clear definitions of actor roles, nor explicit perceptions public service providers have with respect to the roles of an actor. They argue that the e-Government literature often treats users of digital public services as homogenous and public administrations only view them from a single perspective or role at the same time. In an era that considers user-centric digital public services a principal requirement of service delivery [8], understanding the expectations and perspective of users by public service providers becomes crucial in the design phase [20].

While most authors look at external end-users, Ashaye and Irani [1] examine the role of public servant. The authors also point to changing roles actors have during the phases of a digital public service's life cycle. They note how these roles have to be critically understood to ensure proper coordination in the different phases and that execution capacity can be undermined by excluding actors.

Furthermore, the e-Government literature mainly focusses on natural persons, while private legal entities (e.g., businesses, companies, self-employed workers or associations) have been studied to a much lesser extent [21, 34]. In addition to the roles of consumer [21], subject [3], or co-producer [33], private legal entities can also assume the role as (co-)producers of goods and services [45].

Besides the role of and perspective on (end-)users, the e-Government literature also has looked at the role of intermediaries in the service chain [17, 24, 38, 39]. An intermediary can be "any public or private organization facilitating the coordination

between public service providers and their users" [17, p. 38]. The role of intermediary has been closely examined in multichannel management (MCM) public service delivery [17]. In this context intermediaries can serve as an additional service delivery channel and provide value to end-users, by for example aggregating various digital public services and delivering them based on the specific requirements of user groups. Bharosa et al. [3, p. 153, 394] found that intermediaries can perform various functions and take advantage of economies of scale and specialization. Millard [25, pp. 53–54] stresses the existence of actors who use digital public services on behalf of others. The author's research points to one out of four users of digital public services acting on behalf of someone else (not including accessing digital public services as part of someone's job).

In addition to perspective roles and service chain roles, coordination roles have also often brought forward to alleviate dependencies and potential governance challenges between the involved actors [8]. Roles in this respect include (inter alia) these of initiator, enabler, developer and facilitator [16].

2.2 Actor Roles in the IS Literature

In the IS literature, roles are well established with respect to more technical roles of IS or IS managers, such as process engineer or enterprise architect [7], but less regarding inter-organizational digital services. In the context of processes Earl [10] conceptualizes actors as "people who perform a certain task based on a role" [10 in 3, p. 149]. In an enterprise architecture approach, roles comprise the responsibilities undertaken in different process steps and a role model describing the roles in a service can be seen as complementary to a service's process and data models [7]. Poniszewska-Marańda [30] highlights the complexity of identifying and organizing roles, especially in settings where roles are not very formalized, such as within organizations. Regarding access control models, the author represents roles as a set of functions, i.e., actions actors can undertake to achieve the responsibilities they are assigned to. Roles can be shared among various actors and actors can take up multiples roles simultaneously or over time, for example over the different phases of a service's design, development and implementation. Millerand and Baker [26] have shown how the traditional distinction between developer and user gets fuzzy as collaboration practices transform traditional interaction patterns.

2.3 Actor Roles in the Public Administration Literature

In the public administration literature, actor roles can be viewed from the three main governance paradigms. In the Classical Public Bureaucracy [42], which is centered around the hierarchy-type, the role of natural persons is one as a passive subject or client [29]. Under the role of subject, actors have a duty to the State, such as paying taxes, or, as client, they receive a professional service such as education or healthcare [27]. By contrast, under New Public Management (NPM), which is dominated by the market-type, natural persons came to be seen as customers [29]. This perspective added the importance of user satisfaction to the development and delivery of public services, but not necessarily through active involvement. It changed the characterization of public administrations to that of a service provider, rather than a legal authority [42].

Partly reacting to NPM, New Public Governance (NPG) is grounded in the network-type perspective and provides another narrative on actors' roles. This narrative is based around public service provision through inter-organizational networks [33]. (Groups of) Natural persons (and private legal entities) can be seen as co-creators of public services (or as partners [22]). They actively collaborate in multiple or all phases of a service's life cycle as an equal partner to public administrations [5, 42]. We follow Torfing, Sørensen and Røiseland [42], who perceive a co-producer as natural persons or private legal entities who jointly produce and deliver a public service. Consequently, co-producer is a type of intermediary role and part of the service chain that delivers a public service to an end-user. A role as co-producer can also be combined with that of a user.

A number of authors in Public Administration have also presented typologies of actors roles. For example, Mintzberg [27] distinguishes between customers, clients, subjects, and citizens, each with differing views on what external actors and public administrations expect from each other regarding public service delivery. Whereas, Thomas [41] differentiates customers, citizens and partners.

Leadership roles are often emphasized as a key enabler in inter-organizational policy-making and networks [19]. For example, Emerson and Nabatchi [11] distinguish between several leadership roles that coordinators or participants can assume, such as initiator, champion, convener, facilitator, mediator, expert and public decision-maker.

While the importance of roles is often emphasized in the e-Government, IS and Public Administration literature and individual actor roles are frequently put forward as a key enabler to realize inter-organizational digital public services, existing typologies or conceptualizations are rather limited. They mostly focus on either the conceptualization of natural persons as end-users, or accentuate coordination and leadership from the side of public administrations. Moreover, the literature largely concentrates on digital public services for natural persons, rather than private legal entities or public legal entities. These gaps make it relevant to add to the literature on actor roles, more particularly by shedding more light on actor roles in inter-organizational digital public services.

From the classifications we found in the different literature domains, three dimensions seem to be apparent with respect to actor roles: (1) roles that consist of the perspective through which public service providers view service recipients, such as citizens, co-creators or consumers (2) roles with respect to the delivery of a service, and (3) roles with respect to the steering of public services across its phases. We will use these three groups of actor roles as a basis to look at the actor roles in practice. Based on both literature and practice we will generate a taxonomy for actor roles that also explores the interaction between different roles.

3 Research Approach

To understand actor roles in inter-organizational digital public services, we take on an interpretive and pragmatic epistemology [15]. Thus, our own understanding of actor roles in inter-organizational digital public services is based on the meanings of the involved actors [44]. The interpretivist approach is instrumental to the pragmatic approach. This means that we aim to understand the phenomenon to improve the governance of inter-organizational digital public services in practice. In line with the research question ("what" question) and the scarcity of empirical work, we opted for a qualitative

exploratory case study design. Qualitative research is suited to look into the patterns of behavior and explore a research problem, rather than making predictions or providing explanations [4]. A case study approach allows investigating phenomena in their real-life context [32, 46]. We intend to gather a more comprehensive view on possible roles and their interactions through a multiple-case study design than a single case study could provide [46]. Three cases have been selected: Digital Invoicing, eBox and My Citizen Profile. All three are cases deal with digital public service users in the region of Flanders, Belgium and include public administrations on the federal, Flemish (regional) level and/or local level. These cases were selected based on 3 criteria. (1) The cases had to entail various public administrations, preferably over several levels of government. (2) Those public administrations had to collaborate to achieve inter-organizational public service provisioning. (3) The end-users across the cases needed to be diverse (i.e., including natural persons, private and/or public legal entities).

We rely on an iteration between deductive and inductive research approaches to develop the taxonomy, alternating between insights from literature and the cases. A taxonomy can be viewed as a "collection of controlled dictionary definitions that are organized into a hierarchical structure" [3, p. 106]. Following Rowley [34, p. 55], deriving this taxonomy relied on an iterative process, where we compared roles in the cases to those in the literature and grouped similar roles in the literature.

The data collection focused on documents and semi-structured in-depth interviews as data sources. For each case, we first held interviews with the main actors in each case to apprehend the situation. These interviews provided us with (internal) policy documents, white papers and technical specifications; gave access to collaboration spaces, and (partly) provided contacts for the interviews (based on the purposive sampling strategy). These documents, together with laws, regulations, and publicly available policy documents allowed us to inquire into the involved actors and the formal roles.

The interviews relied on a purposive sampling strategy intended to examine the roles of the public sector administrations/organizations involved in the coordination. Interviews were conducted with product, project and program managers, civil servants at the operational level, management level and legal experts. We followed a broad interview guide through which we inquired into the context of the service, the service chain(s), several governance aspects and the involved actors and roles. We asked (1) who the actors were, (2) what roles they assumed, (3) who the users were, (4) if they had an approach towards their end-users, (5) how they were involved in the service delivery chain, and (6) how they were involved in the steering of the case. For each organization, we also inquired how they viewed their own role(s). Through the interviews, we could clarify roles found in the documents, identify additional roles and inquire into the shifting (of) roles as the service chain evolved over multiple phases over time. In total, 63 interviews (respectively 22, 19 and 27, whereas five interviews covered 2 cases) of 60–120 min took place. The interviews were either face-to-face or through video-conference tools (for the interviews in 2020). We opted for a broad sampling to gather many perspectives from the involved actors. The time horizon is cross-sectional and data collection took place in two rounds. First from January 2017 to January 2019 for the first round of Digital Invoicing (8 interviews with the lead government organizations that cover the context, coordination, governance and general actors roles). Based on the results, we opted for

an additional round of data collection that more clearly focused on actor roles. From April to October 2020 we undertook the second round of Digital Invoicing (with the lead government organizations and other public service providers), including the data collection for the other two cases.

4 Cases

In this section, we describe the background of each of the cases (Digital Invoicing, eBox and My Citizen Profile). Table 1 provides the characteristics of the cases, following the taxonomy presented in the next section. Each of the cases are in their expansion phase, following their initiation, piloting and operationalization [45].

Digital Invoicing relates to the realization of a common digital public service to send invoices and related business documents from private legal entities to procuring federal, Flemish and local public legal entities [45]. Private legal entities either send invoice-related documents through (1) a central portal, or (2) through an interoperable network infrastructure where Belgian public legal entities, natural persons and private legal entities can be reached through invoice/procurement services providers (i.e., Access Points). The financial systems of public legal entities (either their own or the one of a Shared Service Centre) integrate through their service integrator (who manages a central data exchange infrastructure).

The **eBox** is an ecosystem of secure digital mailboxes. Natural persons can access all messages from public legal entities through public human interface providers or combine the stream of public correspondence with private messages (such as from banks or utility companies) through private interfaces offered by private human interface providers. Private legal entities either have access through a single public portal that interfaces with different public websites, a direct Machine-to-Machine (M2M) integration, or an indirect M2M integration through a private data service provider that offers mail processing services. Public legal entities deliver messages to a document provider that stores and exposes the messages. Delivery to document providers is direct or indirect. The latter is through a document service provider (who can also send messages through mail) and/or service integrator of the respective administrative level.

My Citizen Profile is a digital communication channel that can be integrated into the headers of regional and local portals and websites in the region of Flanders. It (1) allows a single sign-on for portals, websites and services and implements the no-wrong-door principle, (2) contains profile information that can be used when initiating digital public services, (3) shows information public administrations have regarding natural persons, and (4) as a horizontal digital counter consists of a collection of common portal functionalities regarding (inter alia) notifications and status updates. Public legal entities directly integrate to the different components from their business processes or do this indirectly through the central Flemish data exchange platform depending on the information flow and component.

Table 1. Case characteristics

Roles	Actors	Digital Invoicing	eBox	My Citizen Profile
Perspective roles	Natural persons	/	Citizen, Client, Customer, Subject	Citizen, Client, Customer, Subject
	Private legal entities	Customer, Producer	Customer, Client Subject, Producer	/
	Public legal entities	Co-creator Client Leader	Co-creator Client Leader	Client Co-creator → Client Participant Leader
Service chain roles: Users	Natural persons	No	Yes	Yes
	Private legal entities	Yes (incl. legal representatives)	Yes (incl. legal representatives)	No
	Public legal entities	Yes (federal, Flemish, local)	Yes (federal, Flemish, local)	No
Service chain roles: Intermediaries	Natural persons	/	Mandate holders	Mandate holders
	Private legal entities	Access Points Accountants	Private service intermediaries	/
	Public legal entities	Digital invoicing provider Service integrator Shared Service Center	Service integrators Document provider Document service provider	Regional service integrator
Coordination roles	Natural persons	/	Passive user feedback	Passive user feedback
	Private legal entities	Passive/active user feedback	Passive user feedback	/
	Public legal entities	Lead organizations Public service providers	Lead organizations Public service intermediaries	Lead organization Public service providers

5 Analysis

This section presents the taxonomy of actor roles in inter-organizational digital public service delivery that we could ascertain from the literature and the cases. Moreover, the cases explicate the types of roles and their interaction. For the **actor roles** (Fig. 1) we follow the three groups of roles we identified in the literature: (1) perspective roles, (2) service chain roles, and (3) coordination roles. The specialization type of relationship (white arrow) shows how a role can be specialized into more concrete roles. Several roles in the taxonomy with regard to natural person roles also have the association type of relationship (simple black lign). A role as co-creator can for example be closely related

to the one of citizen when it entails natural persons, but a role of co-creator can also apply to legal entities. Roles can also serve other roles (black arrow).

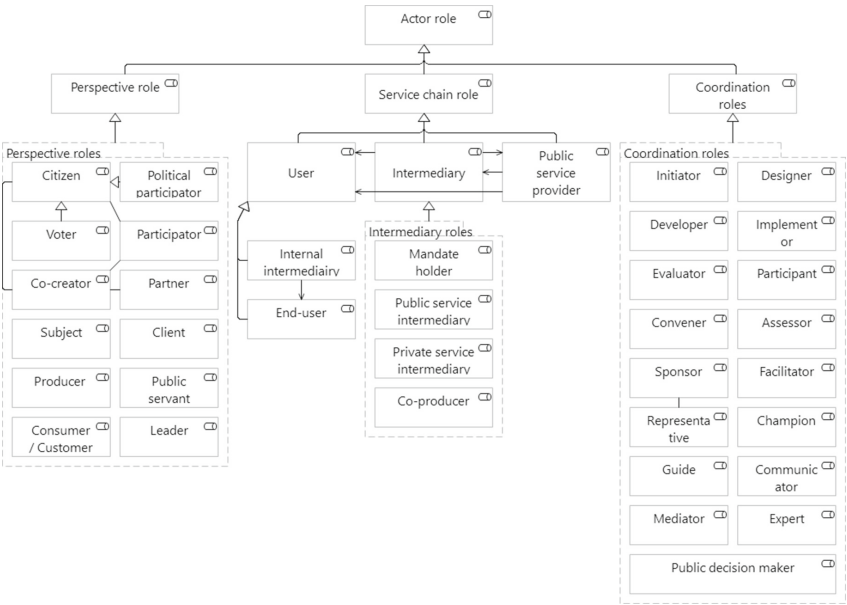

Fig. 1. Taxonomy of actor roles

Perspective roles entail the viewpoint that coordinators take towards the actors involved in the digital public service, but also how those actors view their own role in the delivery and steering of the service provisioning. In line with [34, 37], we found multiple combinations of perspective roles within each case. Building on the classifications in the literature [9, 34], these roles cannot just be associated with actors who are external end-users, but with all actors who take on service chain roles and/or coordination roles. The existing classifications seem to be too limited for the variation we observed. In the Digital Invoicing Case, private legal entities who send invoices for procured goods and service they delivered are not just viewed as a customer of the offered inter-organizational digital public services. At the same time, they are also viewed as producers who deliver goods and services for private and public legal entities alike.

> "A company should be able to submit its bid digitally. It has to be much more streamlined, and European. This philosophy, namely e-procurement is a part of the government, but is just as much a part of the business world. Both aspects must be treated equally." Project manager, Digital Invoicing Case.

This much broader perspective was one of the reasons not to just develop a government website to send invoices to public legal entities, but also to integrate the inter-organizational digital public invoicing service within a broader platform.

The cases affirm how perspective roles can change over the service's life cycle [1, 5, 30, 42]. In the case of My Citizen Profile the roles shifted as the phases of the service progressed from piloting to operationalization/expansion and as new public service providers (who integrate particular services or deliver particular citizen data to the application) became involved. The perspective roles associated with public service providers changed from both clients of the central intermediary and co-creators to a more passive role as participant. According to some of the interviewees, this seems to be related to on the one hand the growing number of public service providers, increasing from ten to almost a hundred.

> "I think, with 100 people, can you decide something by consensus? No. I think we can all agree on that. […] A partner council with 100 clients, that makes little sense. A feedback group with a number of people who are interested in contributing makes sense. It is correct, the bigger you become, the more important that account management and client management will become." Director ICT Division, My Citizen Profile Case.

On the other hand, there are constraints to deliver a shared infrastructure that is flexible to include legacies and can cope with the capabilities of the involved public service providers [45]. At the same time, some participants involved in the initiation and development saw a much narrower role for themselves, rather as pure clients for who the application was merely an extra communication channel or who were only interested in one or some of the building blocks of My Citizen Profile. Hence, role perspectives also might be dependent on the perspective actors have of themselves.

> "Actually, we mainly cooperated on the status updates. […] We have also attended quite a number of meetings, steering groups and so on. But we mainly focused on how we can exchange status updates as efficiently as possible." Product manager, My Citizen Profile Case.

Service chain roles refer to the responsibilities and expected actions of all actors within the service delivery network [3]. Building on the literature [17], we identified three main roles: (i) the user, (ii) the intermediary, and (iii) the public service provider. In an inter-organizational digital public service setting, multiple public service providers and one or more intermediaries can link up various service chains to deliver (a) common type(s) of service(s) to users. A clear relationship exists between these three roles, i.e. a service provider creates value, which is carried to the intermediary, who adds value by integrating multiple service chains to give the user full access through one channel of their choice [3]. In the My Citizen Profile Case, there is no associated portal or website that directly delivers the information and services to users. Rather, the public service intermediary who manages the building block integrates the services in the portals and websites of the public service providers.

While individual users themselves are often portrayed as homogenous, we could differentiate between two types of users: end-users and internal intermediaries. For the G2B eBox services this pertained to the legal representative of a private legal entity who manages the eBox for the entire entity and who routes the individual messages to the actual individual end-user. The same holds true for public legal entities regarding the B2G and C2G eBox services, where messages have to be routed to case handlers.

From the three cases, we found that multiple combinations between these three roles are likely. The eBox ecosystem serves natural persons, private legal entities, as well as public legal entities. Perceived as clients by the intermediaries/coordinators, public legal entities can take both the public service provider and user roles. As the former, they use one of the many central services offered by the intermediaries. As the latter, they use the same interface as the private legal entities to get access to replies from natural persons and private legal entities. Multiple public legal entities, who are public service intermediaries for other public entities, also take on a public service provider role.

The cases also demonstrate the variety of intermediaries [39] and key position they have, both inside and outside public administrations. Public service intermediaries not only developed the main building blocks, but also aligned and standardized processes and data in our cases. Other public service intermediaries managed other building blocks, such as data exchange platforms, that were already part of the larger digital government infrastructures, so public services could be integrated. As the integrated public services progressed through their life cycles, the roles of intermediaries often changed, reflecting the needs and challenges within the larger internal and external service context. For example, in the Digital Invoicing case, private service intermediaries were only actively engaged in the development of the service chain infrastructure after the perspective regarding the users had changed (supra). As the eBox case proceeded from the operationalization to the expansion phase, the central public service intermediary at the regional level opted to combine two intermediary roles to deal with dependencies further down the chain.

A final intermediary role that we observed is that of mandate holder. In the My Citizen Profile Case, this refers to natural persons such as parents, guardians or custodians, who need access to information and public services on behalf of someone else. According to Millard [25, p. 53], a quarter of e-government usage is by somedoby acting on behalf of someone else. Developing an infrastructure supporting mandate holders and internal intermediaries is an important requirement for success. With different systems, different semantics and mandates often service-specific, this proved a significant challenge for governance.

> "The part about roles and mandate management, we notice that's a very difficult story. You actually have because they include that generically. A mandate or a particular role can be very diverse for different applications. And the more generic that they build it, the less fine-grained it sometimes is for your own application, because you notice that the need is still slightly different. So on that front we are waiting to see how that the vision of mandates, certain roles, its management can be further developed and that we can build on that." Project leader, My Citizen Profile Case.

Coordination roles, as a third group of actors roles, comprise responsibilities about the steering of the inter-organizational digital public service's design and accomplish the strategic and operational goals set up by policy-makers. In line with earlier research, coordination roles were crucial towards establishing and maintaining adequate service levels, promoting the service to new groups of users and public service providers, and interacting with the political level [e.g., 11]. Differences in the perspective roles public service providers have regarding their own role and others have of their own role can lead to the identification of tensions on how the inter-organizational digital public service should operate [14]. This was prevalent in the eBox Case, where some public legal entities only halfheartedly integrated with the service and joined in the coordination.

> "The battle has been won by eBox you might say, because we only send notifications via eBox." Project manager, eBox Case.

Our findings affirm [9] that roles in inter-organizational service provisioning are more diverse than previous studies that focus on specific aspects of digital public services, such as the interaction with the external users. Users can exist on both ends of a service chain. In the eBox Case, public legal entities are end-users of the inter-organizational service when receiving reply messages, while natural persons and private legal entities are end-users when they get messages from public legal entities.

Roles can be composed of different roles, be part of other roles and can be allocated to or performed by multiple partners [16]. In the three cases, the coordination roles were linked to the public service intermediaries. Though, this is possibly due to the selection of the cases and is a limitation with respect to the research findings. For all three groups of actor roles, role definitions, role combinations and role relationships changed or shifted as the inter-organizational services changed from one phase to another and reacted with the internal and external service context.

6 Conclusion

In digital public services, natural persons, private legal entities and public legal entities interact with each other based on various roles. These roles can be interrelated and change over time. Understanding roles is a critical element in the design and adoption of public services. Based on a multiple-case study approach, a taxonomy of roles was presented. Building on the types of roles in the literature, the cases show that actor roles are quite diverse and interact with one another. We identified three types of roles: (1) perspective roles that describe how public administrations view the recipients and delineate how those actors view themselves (10 roles were found). (2) Service delivery chain roles relate to the activities of actors that take part in the actual delivery of the digital public service from public service providers (over intermediaries) to users (3 main roles). (3) Coordination roles pertain to the responsibilities regarding the overall governance of the inter-organizational digital public service over its life cycle from initiation, development, operationalization, expansion, adaptation and evaluation (17 roles). While many roles were present in each case, not all roles occurred at the same time. This especially pertains to the perspective roles. We recommend to use the role taxonomy for understanding

interorganizational services delivery and also use the taxonomy as the basis for designing and stakeholder analyses.

Our research results into several suggestions for the concept of roles. First, we recommend to distinguish between actors and their expected behavior. Second, classifications are often limited to natural persons instead of private legal entities and public legal entities. This can help to understand their adoption of digital public services and point to whether enablers and barriers of e-government adoption are shared between different actor groups. Third, users themselves are not a homogenous group. From the cases, we could differentiate between internal intermediaries and end-users. Fourth, the research shows that private service intermediaries can play an important role in delivering digital public services to the intended external end-users. The role of mandate holders seems vital to expand service adoption to a large number of groups in society who are not typical digital public service users. Fifth, actor roles come in multiple forms and often several roles are shared or combined. This combination can also change over time. Hence, it is not possible to have a hierarchical relationship between the three groups of actor roles, with the exception of the perspective role of leader.

The research presented in this exploratory study has limitations that affect its generalizability. First, its results are limited to the Flemish/Belgian e-government context, the type of inter-organizational digital public service delivery, the specific roles (not) encountered in the cases, and the governance that is characterized by central digital public organizations who act as the main coordinators. Second, to map the roles of external users, we relied on the document and questions asked to actors within public administrations. Third, exploratory research has a broad scope and cannot fully apprehend all different actor roles in inter-organizational digital public service delivery.

The research presented in this paper could thus be relevant for similar inter-organizational digital public services to incrementally add roles and examine the relationships between the perspective roles, service chain roles and decision making roles. Future research could look into inter-organizational digital public services that involve coproduction and co-creation in the service delivery and decision making processes, and examine possible role conflicts for users who as recipients and potential decision makers are conceptualized by public service providers from different perspectives.

Implications for practice include a further understanding of the governance challenges with respect to the approach to the user that collaborating public administrations delineate. Viewing users from different perspectives can help to identify tensions in the development and the operationalization of an inter-organizational digital public service. In line with earlier research [14, 18, 28, 36], our cases confirm that a clear division of roles and responsibilities seems a principal enabler for inter-organizational collaboration and integrated digital public service delivery. Understanding the perspective through which users, intermediaries and public service providers view each other might also contribute to better deal with governance challenges related to stakeholder and expectations management. Giving more attention to the role of mandate holders might be taken into consideration as a potential strategy to advance goals with respect to inclusion.

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References

1. Ashaye, O.R., Irani, Z.: The role of stakeholders in the effective use of e-government resources in public services. Int. J. Inf. Manag. **49**, 253–270 (2019)
2. Axelsson, K., Melin, U., Lindgren, I.: Public e-services for agency efficiency and citizen benefit – findings from a stakeholder centered analysis. Gov. Inf. Q. **30**(1), 10–22 (2013). https://doi.org/10.1016/j.giq.2012.08.002
3. Bharosa, N., van Wijk, R., de Winne, N., Janssen, M. (eds.) Challenging the Chain: Governing the Automated Exchange and Processing of Business Information. IOS Press, Delft (2015). https://doi.org/10.3233/978-1-61499-497-8-i
4. Bhattacherjee, A.: Social Science Research: Principles, Methods, and Practices. Global Text Project, Tampa (2012)
5. Bovaird, T.: Beyond engagement and participation: user and community coproduction of public services. Public Adm. Rev. **67**(5), 846–860 (2007). https://doi.org/10.1111/j.1540-6210.2007.00773.x
6. Brandsen, T., Honingh, M.: Definitions of co-production and co-creation. In: Brandsen, T., et al. (eds.) Co-Production and Co-creation: Engaging Citizens in Public Service, pp. 9–17. Routledge, New York (2018)
7. Birkmeier, D., et al.: The role of services in governmental enterprise architectures: the case of the german federal government. In: Saha, P. (ed.) Enterprise Architecture for Connected E-Government: Practices and Innovations, pp. 262–287. IGI Global, Hersey (2012). https://doi.org/10.4018/978-1-4666-1824-4.ch011
8. Chen, Y.-C., Hu, L.-T., Tseng, K.-C., Juang, W.-J., Chang, C.-K.: Cross-boundary e-government systems: determinants of performance. Gov. Inf. Q. **36**(3), 449–459 (2019). https://doi.org/10.1016/j.giq.2019.02.001
9. Distel, B., Lindgren, I.: Who are the users of digital public services? In: Panagiotopoulos, P., et al. (eds.) ePart 2019. LNCS, vol. 11686, pp. 117–129. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-27397-2_10
10. Earl, M.J.: The new and old of business process redesign. J. Strat. Inf. Syst. **3**(1), 5–22 (1994). https://doi.org/10.1016/0963-8687(94)90003-5
11. Emerson, K., Nabatchi, T.: Collaborative Governance Regimes. Georgetown University Press, Washington, DC (2015)
12. Ferretti, G., et al.: Orchestrated co-creation of high-quality open data within large groups. In: Lindgren, I., et al. (eds.) EGOV 2019. LNCS, vol. 11685, pp. 168–179. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-27325-5_13
13. Garcia, L.M.: User centric E-government: the modernization of national migration institute in the Southern Mexican border. In: Scholl, H.J., et al. (eds.) EGOV 2016. LNCS, vol. 9820, pp. 328–335. Springer, Cham (2016). https://doi.org/10.3233/978-1-61499-670-5-328
14. Gil-Garcia, J.R., Guler, A., Pardo, T.A., Burke, G.B.: Characterizing the importance of clarity of roles and responsibilities in government inter-organizational collaboration and information sharing initiatives. Gov. Inf. Q. **36**(4), 101393 (2019). https://doi.org/10.1016/j.giq.2019.101393
15. Goldkuhl, G.: Pragmatism vs interpretivism in qualitative information systems research. Eur. J. Inf. Syst. **21**(2), 135–146 (2012). https://doi.org/10.1057/ejis.2011.54
16. Janssen, M., Gortmaker, J., Wagenaar, R.W.: Web service orchestration in public administration: challenges, roles, and growth stages. Inf. Syst. Manag. **23**(2), 44–55 (2006). https://doi.org/10.1201/1078.10580530/45925.23.2.20060301/92673.6
17. Janssen, M., Klievink, B.: The role of intermediaries in multi-channel service delivery strategies. Int J. Electr. Gov. Res. **5**(3), 36–46 (2009). https://doi.org/10.4018/jegr.2009070103

18. Klievink, B., Janssen, M.: Coordinating e-government service delivery. In: Chun, S.A., et al. (eds.) Proceedings of the 11th Annual International Conference on Digital Government Research, pp. 209–216. Digital Government Society, Puebla (2010)
19. Klijn, E.-H.: Networks and inter-organizational management: challenging, steering, evaluation and the role of public actors in public management. In: Ferlie, E., et al. (eds.) The Oxford Handbook of Public Management, pp. 257–282. Oxford University Press, Oxford (2005)
20. Kotamraju, N.P., van der Geest, T.M.: The tension between user-centred design and e-government services. Behav. Inf. Tech. **31**(3), 261–273 (2012). https://doi.org/10.1080/0144929X.2011.563797
21. Lee, J., Kim, H.J., Ahn, M.J.: The willingness of e-Government service adoption by business users: the role of offline service quality and trust in technology. Gov. Inf. Q. **28**(2), 222–230 (2011). https://doi.org/10.1016/j.giq.2010.07.007
22. Linders, D.: From e-government to we-government: defining a typology for citizen coproduction in the age of social media. Gov. Inf. Q. **29**(4), 446–454 (2012). https://doi.org/10.1016/j.giq.2012.06.003
23. Lindgren, I., Madsen, C.Ø., Hofmann, S., Melin, U.: Close encounters of the digital kind: a research agenda for the digitalization of public services. Gov. Inf. Q. **36**(3), 427–436 (2019). https://doi.org/10.1016/j.giq.2019.03.002
24. Löbel, S., Paulowitsch, B., Schuppan, B.: Intermediaries in the public sector and the role of information technology. Inf. Polity **21**(4), 335–346 (2016). https://doi.org/10.3233/IP-160387
25. Millard, J.: User attitudes to E-government citizen services in Europe. Int. J. of Elec. Gov. Res. **2**(2), 49–58 (2006)
26. Millerand, F., Baker, K.S.: Who are the users? Who are the developers? Webs of users and developers in the development process of a technical standard. Inf. Syst. J. **20**(2), 137–161 (2010). https://doi.org/10.1111/j.1365-2575.2009.00338.x
27. Mintzberg, H.: Managing government, governing management. Harvard Bus. Rev. **74**(3), 75–83 (1996)
28. Pardo, T.A., Burke, B., Gil-Garcia, J.R., Guler, A.: Clarity of roles and responsibilities in government cross-boundary information sharing initiatives: identifying the determinants. In: Lavin, L. (ed.) Proceedings of 5th International Conference on e-Government, pp. 148–155. Curran Associates, Redhook (2009)
29. Pestoff, V.: Co-production and third sector social services in Europe: some concepts and evidence. Int. J. Vol. Nonprofit Org. **23**(4), 1102–1118 (2012). https://doi.org/10.1007/s11266-012-9308-7
30. Poniszewska-Marańda, A.: Modeling and design of role engineering in developmentof access control for dynamic information systems. Bull. Pol. Acad. Sci. Tech. Sci. **61**(3), 569–579 (2013). https://doi.org/10.2478/bpasts-2013-0058
31. Robles, G., Gamalielsson, J., Lundell, B.: Setting up government 3.0 solutions based on open source software: the case of X-road. In: Lindgren, I., et al. (eds.) EGOV 2019. LNCS, vol. 11685, pp. 69–81. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-27325-5_6
32. Robson, C.: Real World Research. Blackwell, Oxford (2002)
33. Rodriguez Müller, A.P., Steen, T.: Behind the scenes of coproduction of smart mobility: evidence from a public values' perspective. In: Lindgren, I., et al. (eds.) EGOV 2019. LNCS, vol. 11685, pp. 338–352. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-27325-5_26
34. Rowley, J.: e-government stakeholders - who are they and what do they want? Int. J. Inf. Manag. **31**(1), 53–62 (2011)
35. Sæbø, Ø., Flak, F.K., Sein, M.J.: Understanding the dynamics in e-Participation initiatives: looking through the genre and stakeholder lenses. Gov. Inf. Q. **28**(3), 416–425 (2011). https://doi.org/10.1016/j.giq.2010.10.005

36. Sayogo, D.S., Gil-Garcia, J.R., Cronemberger, F.: Determinants of clarity of roles and responsibilities in interagency information integration and sharing (IIS). In: Scholl, H.J., et al. (eds.) EGOV 2016. LNCS, vol. 9820, pp. 126–134. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-44421-5_10
37. Scott, M., DeLone, W.H., Golden, W.: Measuring eGovernment success: a public value approach. Eur. J. Inf. Syst. **25**(3), 187–208 (2016). https://doi.org/10.1057/ejis.2015.11
38. Sharma, R., Mishra, R.: Investigating the role of intermediaries in adoption of public access outlets for delivery of e-government services in developing countries: an empirical study. Gov. Inf. Q. **34**(4), 658–679 (2017). https://doi.org/10.1016/j.giq.2017.10.001
39. Sorrentino, M., Niehaves, B.: Intermediaries in E-inclusion: a literature review. In: Sprague, R.H., Jr., (ed.) Proceedings of the 46th Hawaii International Conference on System Sciences (HICSS), pp. 1–10. IEEE, Honolulu (2010). https://doi.org/10.1109/HICSS.2010.239
40. The Open Group: ArchiMate 3.1 Specification. Van Haren Publishing, Zaltbommel (2019)
41. Thomas, J.C.: Citizen, customer, partner. Rethinking the place of the public in public management. Public Adm. Rev. **73**(6), 786–796 (2013)
42. Torfing; J., Sørensen, E., Røiseland, A.: Transforming the public sector into an arena for co-creation: barriers, drivers, benefits, and ways forward. Admin. Soc. **51**(5) 795–825 (2019). https://doi.org/10.1177/0095399716680057
43. van Duivenboden, H.: Citizen participation in public administration: the impact of citizen oriented public services on government and citizens. In: Khosrowpour, M. (ed.) Practicing E-government A Global Perspective, pp. 415–445. Idea Group, Hershey (2005). https://doi.org/10.4018/978-1-59140-637-2
44. Walsham, G.: Interpretive case studies in IS research: nature and method. Eur. J. Inf. Syst. **4**(2), 74–81 (1995). https://doi.org/10.1057/ejis.1995.9
45. Wouters, S., Janssen, M., Crompvoets, J.: Governance challenges of inter-organizational digital public services provisioning: a case study on digital invoicing services in Belgium. In: Viale Pereira, G., et al. (eds.) EGOV 2020. LNCS, vol. 12219, pp. 223–235. Springer, Cham (2020). https://doi.org/10.1007/978-3-030-57599-1_17
46. Yin, R.K.: Case Study Research: Design and Methods. Sage, Thousand Oaks (2018)