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Strategies to advance the dream of integrated digital public service delivery in inter-organizational collaboration networks

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ABSTRACT

Public administrations are increasingly relying on collaboration within inter-organizational networks to coordinate the development and provisioning of integrated digital public services. Collaboration strategies are necessary to focus collaborative efforts, align and prioritize goals, and leverage concrete results that advance integrated service delivery (ISD). However, literature on inter-organizational collaboration strategies for integrated service delivery is scarce. This research identifies collaboration strategies in three qualitative case studies in Belgium. The cases present 33 collaboration strategies categorized into engagement, motivation, and joint action strategies. Collaboration strategies should complement each other. Together these strategies can help to overcome the adoption paradox, one of the key issues to advance ISD, which refers to service providers not being inclined to adopt an ISD unless it has many users, but users might not be willing to use and ISD before many service providers have adopted it. Policy-makers can use the identified collaboration strategies to advance integrated service delivery.

1. Introduction

Integrated (digital public) service delivery (ISD) is a long-held dream, but a hard to realize goal of public administrations and remains a central research focus (Boudreau & Bernier, 2017; Wimmer, 2002). ISD relies on the integration of previously separated public services into public service chains through the use of common interfaces and shared building blocks (e.g., identity and access management, common portals) provided by different parties (Bharosa, van Wijk, de Winne, & Janssen, 2015; Van Veenstra, Janssen, & Klievink, 2009). Examples of ISDs include combined permits or life events that can be delivered through one-stop-shops (Wimmer, 2002).

In a public administration context where service delivery is expanding beyond organizational, sectoral and territorial boundaries, ISD can be viewed as a complex web of loosely coupled building blocks provided by various inter-organizational networks (Chen, 2008). Collaboration between public legal entities in inter-organizational networks has become the de facto coordination approach to advance digital public service provision (Chen, Hu, Tseng, Juang, & Chang, 2019; Fan, Liu, Huang, & Zhu, 2019; Provan & Milward, 2001). In this context,

collaboration refers to “activities in which two or more agents work together to achieve shared goals” (Chun, Luna-Reyes, & Sandoval-Almazán, 2012, p. 6). The benefits of inter-organizational collaboration regarding service integration have been widely acknowledged in the literature and in particular for e-government (e.g., Agranoff, 1991; Dawes, Cresswell, & Pardo, 2009; Einbinder, Robertson, Garcia, Vuckovic, & Patti, 2000). Benefits relate to improved service delivery, better goal attainment, and the sharing of resources (Agranoff, 1991; Dedrick & Greenbaum, 2011; Einbinder et al., 2000).

Chen et al. (2019) posit that inter-organizational collaboration and service integration is also driven by a more comprehensive view of public service delivery. Such a joined-up service delivery prioritizes a public service provision in which users are no longer responsible for linking different public services together. ISDs follow this evolution. Regarding ISD, inter-organizational collaboration is specifically needed to establish the technical infrastructure, to integrate back-office systems and to stimulate adoption by users (Juell-Skielse, Lönn, & Päiväranta, 2017). Collaboration requires building trust so that public service providers are willing to work together to overcome differing expectations (Luna-Reyes, Gil-Garcia, & Cruz, 2007; Vangen & Huxham, 2003). At

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the same time, advancing ISD through inter-organizational collaboration is also hard to achieve due to the diversity of parties, diverse requirements, and the need for the development of infrastructures (Wouters, Janssen, & Crompvoets, 2020). ISD creates dependencies, including shared resources, making it harder for public legal entities to attain managerial and political objectives. These objectives might differ from the objectives of the ISD, and make public legal entities reluctant to give up their autonomy (Boudreau & Bernier, 2017; Van Veenstra et al., 2009; Yildiz, 2007).

In the last decades, a significant body of research has emerged regarding e-government collaboration. This body of research has mainly considered systems of information exchange and information sharing (e.g., Gil-García, Guler, Pardo, & Burke, 2019; Pardo, Gil-García, & Luna-Reyes, 2010) and systems of inter-organizational information integration (e.g., Chen et al., 2019; Luna-Reyes et al., 2007). Collaborative efforts concerning ISD are still an under-researched topic (Boudreau & Bernier, 2017; Lang & Brüesch, 2020). The e-government collaboration literature has also predominantly focused on examining factors that stimulate collaboration (e.g., trust, shared goals, clear goals and responsibilities) or that are detrimental to it (e.g., negative prior experience or a lack of funding) (e.g., Chen et al., 2019; Gil-García et al., 2019). What has been lacking is an examination of collaboration strategies to spur, utilize or mitigate digital government (see e.g., Van Veenstra et al., 2009). A strategy concerns setting long-term goals and defining actions to achieve those goals (Johnson, Scholes, & Whittington, 2008). The long-term goal is a collaboration among parties needed for creating ISD. Collaboration strategies consist of concrete actions that aim to focus collaborative efforts or lead to concrete joint actions that advance ISD. While some specific strategies, such as providing direct and indirect incentives for participation, have been identified in the e-government collaboration literature (Pardo et al., 2010; van Os, 2011), a comprehensive overview of collaboration strategies is still lacking.

This research contributes to the e-government literature by providing a comprehensive empirical insight into existing collaboration strategies in ISD. Hence, the research question in this paper is: *What are inter-organizational collaboration strategies to advance ISD?*

A multiple-case study approach is adopted to identify collaboration strategies. We draw on findings from three ISD cases in the region of Flanders, Belgium. Together they cover a wide range of collaboration strategies. The remainder of this paper is structured as follows. Section 2 contains the research background on collaboration strategies and ISD. Section 3 details the research method, while section 4 provides information on the cases. The results are presented in section 5 and discussed in section 6. Section 7 provides the conclusion.

2. Research background

2.1. Integrated service delivery

Although ISD has been the subject for research since the beginning of e-government research (e.g., Wimmer, 2002) and even before digital government initiatives (e.g., Agranoff, 1991; Waldfogel, 1997), there is less consensus about what it entails. We consider ISD as a subset of digital public service delivery. Following Lindgren and Jansson (Lindgren & Jansson, 2013, p. 167), we view a digital (or electronic) public service as a service in the public sphere that primarily relies on electronic mediation between actors. Digital public services undergo different development phases, such as initiation, piloting, operationalization and expansion (Wouters, Janssen, & Crompvoets, 2020). While the strategic objectives or core functionalities largely remain the same, digital public services can change throughout these phases. For example, when incorporating new technologies, implementing new regulations, or adding functionalities.

The key feature that distinguishes ISDs from other types of digital public services is integration. An ISD consists of a group of public services from different public service providers linked together in a

coherent manner in service delivery chains (Bharosa et al., 2015). Integration thus follows from the capability of public services (especially their interfaces, such as websites) to provide a single service, irrespective of the all the public service providers that delivering (parts of) the service (Puron-Cid et al., 2022). An ISD can also include private service providers. For example, private legal entities acting as intermediaries (Janssen & Klievink, 2009). These service delivery chains are orchestrated to provide ISD users with an integrated view and a seamless interaction (Klievink & Janssen, 2008; Van Veenstra et al., 2009). ISDs reduce the number of interactions and the need for users to negotiate with public service providers directly and separately, thus lowering the administrative burden (Van Veenstra & Janssen, 2011).

2.2. Inter-organizational collaboration and collaboration strategies

ISDs require organizations to collaborate together to integrate separate public services (Boudreau & Bernier, 2017). Collaboration in this paper concerns organizations working together to attain common goals (Kettl, 2006). In this research, collaboration refers to the process of organizations working together for the goal of establishing and modifying ISDs. By collaborating, organizations adjust their own internal business processes and systems to create a public service that is perceived by the user as an integrated whole (an ISD). The literature has paid attention to various forms of collaboration, including cross-sector collaborations (Bryson, Crosby, & Stone, 2006; Emerson & Nabatchi, 2015; Klievink, Bharosa, & Tan, 2016) and inter-organizational collaboration (Agranoff, 2017; Fan et al., 2019; Juell-Skielse et al., 2017; Luna-Reyes et al., 2007).

This paper takes the e-government literature that has developed around inter-organizational and inter-agency collaboration as a starting point to explore inter-organizational collaboration in ISD (e.g., Chen et al., 2019; Chun et al., 2012; Gasco-Hernandez, Gil-García, & Luna-Reyes, 2022; Picazo-Vela, Gutiérrez-Martínez, Duhamel, Luna, & Luna-Reyes, 2018). Collaboration allows the involved organizations “to solve differences, identify interdependencies and build ownership of decisions” (Chun et al., 2012, p. 6). Through collaboration, organizations can exchange resources, such as knowledge or technology (Picazo-Vela et al., 2018), but also work out shared problems, such as ISD (Chen, 2008).

Inter-organizational collaboration is not easy to accomplish (Gil-García, 2012; Provan & Milward, 2001; Scholl & Klischewski, 2007), whether in a public administration context in general, or in a specific digital government setting that often includes long-term engagements through the integration of information systems (Juell-Skielse et al., 2017; Scholl & Klischewski, 2007). Differing expectations and preferences regarding public values, insufficient expertise and capabilities, a lack of consensus concerning the division of roles and responsibilities and the absence of trust between collaborators (inter alia) can pose considerable challenges (Chen & Lee, 2018; Juell-Skielse et al., 2017).

Collaboration necessitates organizations to balance autonomy, identity and cohesion (Chen, 2008). Boudreau and Bernier (2017) indicate how collaborative efforts need to overcome public service providers’ institutionalized attitudes towards autonomy and find ways to integrate (parts of) their public services. As Lundin (2007) found, joint action will only be fruitful by addressing mutual trust and goal congruence simultaneously. Emerson and Nabatchi (2015) argue that collaboration has to focus on three elements: (1) finding shared goals and agreeing on the methods for deliberation and determining actions (engagement), (2) motivate actors to start or to continue collaborating (shared motivation), and (3) providing capacities such as knowledge and resources that allow actions to be taken (capacity for joint action).

Collaboration strategies are necessary to approach these elements, bring focus to collaborative efforts, prioritize activities, and leverage concrete results. Strategies consist of long-term goals on the one hand and defining actions on the other hand (Johnson et al., 2008). In this article, objectives are stated in relation to advancing ISD. Those

objectives can be expressed in broad strategy statements such as establishing and gradually expanding the digital infrastructure of an ISD (i.e., adding functionalities), and stimulating adoption by users and public service providers. Collaboration can be considered a specific strategic action to improve policy outcomes in inter-organizational networks (Bryson & George, 2020; Imperial, 2005). Collaboration strategies in this research are actions that rely on collaboration. Those actions are directed at advancing the objectives of ISD specified above (i.e., the outcome of the collaboration) and/or at organizing the collaboration and encouraging the motivation of public service providers to participate in the collaborative efforts (i.e., the process of the collaboration). Strategies can be both deliberate and emergent, the latter meaning that strategies can be unplanned and can even be unrecognized (Bryson & George, 2020). In this paper, we look at both types of strategies in order to go beyond deliberate strategies noted by lead organizations and get a comprehensive overview of collaboration strategies for ISD.

2.3. Collaboration strategies for ISD

In the e-government literature, examples of collaboration strategies for ISD can be found, but they are often a side finding and often mentioned as part of the discussion. This section reviews the literature on e-government collaboration to gain insights into collaboration strategies. Studies regarding e-government collaboration and ISD are examined in particular.

Van Veenstra et al. (2009) identified four architecture design strategies to achieve ISD related to the architecture of services and the level of control by the parties involved: merger, orchestra, relay race, and broadcasting. For each of these architecture design strategies the authors describe the autonomy of the various parties involved. These strategies might be used to spur collaboration in several ways. They can, for example, be applied to overcome fears of losing public service providers' autonomy or to get around the organizational unreadiness of potential public service providers to integrate their services.

For public-private information platforms, Klievink et al. (2016) found collaboration strategies including deliberation to come to voluntary adoption of standards, collective business model designs to promote adoption of the service, and awareness creation related to potential advantages to the different parties involved.

Gil-Garcia, Chengalur-Smith, and Duchessi (2007) propose a collaboration strategy based on goal-orientation rather than micro-management, with clear and realistic goals. In order to deal with the expansion of the involved public service providers, the authors favor a more incremental approach with rapid (partial) results to demonstrate the collaboration's viability (Gil-Garcia, Schneider, Pardo, & Cresswell, 2005). Discussing the potential that different technologies offer can be a collaboration strategy to establish a common vision and set ambitious goals (Chen & Lee, 2018). van Os (2011) advances a business case as the central object for public legal entities that can be used to establish a consensus on the objective and scope of collaboration among collaborating public legal entities. Mutual adjustment through interaction and communication is another potential strategy used to form a consensus and find a common motivation to integrate existing ISDs (van Os, 2011).

Establishing clear roles and responsibilities can be a strategy intended to reduce resistance among participants in collaborative efforts (Gil-Garcia et al., 2019). Building on the work of Sayogo, Gil-Garcia, and Cronemberger (2016), collaboration strategies to pursue clear roles and responsibilities can consist of frequent interactions; being considerate of the diversity of participants' contexts, objectives and goals; and the use of boundary objects (Lönn & Uppström, 2016), with formal rules and procedures set at the initiation to guide collaboration (Gil-Garcia et al., 2019). As Gil-Garcia et al. (2019) note, the downside of more formalized relationships may come at the cost of having adequate flexibility to deal with new issues. Klievink et al. (2016) point to a division of roles that includes lead organizations. Those lead organizations can develop interface standards and provide technical guidance. Similarly, Gil-

Garcia and Sayogo (2016) advocate for formally assigned project managers.

The literature has well-established the need for strategies that induce trust among collaborating public legal entities (Chen, 2008; Chen et al., 2019). Clear roles and responsibilities have also been favored as a strategy for trust (e.g., Gil-Garcia et al., 2019). Trust can also be achieved by adequate communication (Chen & Lee, 2018), or by making clear the expected benefits, showing quick results, and using institutional arrangements such as laws and regulations (Luna-Reyes et al., 2007).

Other collaboration strategies relate to the use of incentives. van Os (2011) details direct incentives such as decreasing or increasing budgets or indirect incentives such as benchmarking. According to van Os, indirect financial incentives can be a source to stimulate motivation. Chen and Lee (2018) add clear requirements and technical support to complement financial incentives to public service providers.

The sharing of information and knowledge has also been put forward as a strategy in the literature (Gil-Garcia & Sayogo, 2016; Pardo et al., 2010). Knowledge sharing, in combination with formal and informal relationships between public service providers can be collaboration strategies that contribute to joint decision-making capabilities (Janssen, Kamal, Weerakkody, & Joha, 2012). Yang and Maxwell (2011) propose legislation and regulation as possible instruments to enhance trust between actors to stimulate information sharing.

In summary, the background literature provides four elements and suggestions for collaboration strategies. First, the literature points to collaboration strategies related to a stepwise and incremental approach to awareness-raising, setting common goals, the use of incentives, clear roles and responsibilities, formal and informal relationships and procedures, and information and knowledge sharing. Second, the literature also shows that collaboration strategies can be used to further a variety of goals, such as increasing mutual adjustment to the objectives and scope of the ISD, joint decision-making, motivation and trust, and adoption. However, not all collaboration strategies that were found in the literature made this clear. Third, the review finds that a single collaboration strategy can have multiple goals. Fourth, collaboration strategies can be supported by the service architecture of an ISD or legislation. However, a comprehensive overview of collaboration strategies for ISD focusing both on deliberate and emergent strategic actions remains lacking.

3. Research method

The objective of this research is to identify collaboration strategies for ISD. We do this by identifying collaboration strategies in three cases. The methodology adopts an interpretative and pragmatic research philosophy (Goldkuhl, 2012). This means that we rely on the interpretations made by the involved professionals to apprehend inter-organizational collaboration strategies (Walsham, 1995). The philosophy is pragmatic in the sense that the research is intended to identify collaboration strategies that have practical relevance.

A qualitative multiple-case study approach was adopted for this research (Yin, 2018). It is suited to answer a "what" question and look for patterns in the data (Bhattacharjee, 2012). A case study approach is justified because it allows us to scrutinize collaboration strategies in detail and consider the context in which they are applied (Swanborn, 2010). We adopt a multiple-case study to understand the complexity of ISD phenomenon and to find collaboration strategies beyond the results of a specific case. The unit of analysis is the coordination between public legal entities. The research approach is deductive-inductive (Miles & Huberman, 1994). Insights from the literature are taken as a starting point to study the observations in the case studies, which are then used to expand the current understanding of collaboration strategies.

The number of possible ISDs is large and diverse. We chose to examine cases of ISD that deliver services to external users (i.e., natural persons and private legal entities), follow the move towards a more

central service provisioning following reintegration efforts (Dunleavy, Margetts, Bastow, & Tinkler, 2005), and focus on cases that cross administrative boundaries because collaboration there is particularly challenging (e.g., Chen et al., 2019). Therefore, we applied the following selection criteria. The cases entailed ISD, aimed at (1) (at least) external users, (2) incorporated multiple levels of government, and (3) collaboration has to be a core component of the governance of the public services, rather than a (from the start) mandated adoption of an existing public service. The cases were selected based on known characteristics (Denscombe, 2014). Based on these criteria, we selected three cases: (1) Digital Invoicing, (2) eBox, and (3) My Citizen profile. In these cases, ISD aims to provide value to natural persons and private legal entities in the region of Flanders, the northernmost state in the federal country of Belgium. The cases take place in a single country. On the one hand, this limits cultural and historical variability (Juell-Skielse et al., 2017). On the other hand, it poses a limitation on generalizability. Each of the cases has reached its expansion phase. Initial objectives relating to functionalities have been achieved, new functionalities are being developed, and adoption of users and public services is high or increasing.

Two data collection techniques were used: a review of documents and semi-structured interviews. Public and internal documents allowed us to examine the context of the cases, as well as the formal collaboration structures and instruments. Documents included policy documents, policy memoranda and policy letters, business plans, governance agreements, legislation, regulations, parliamentary questions, websites and technical documentation (manuals, standards). Depending on the case, these documents were located at the European, federal, regional and/or local level. These documents guided the interview questions and later served as a source for triangulation. We conducted pilot interviews with the main collaborators for each of the three cases to get insights into the cases.

The data collection followed a cross-sectional time horizon. Data gathering took place between February and October 2020. A total of 52 interviews were done, respectively 14 for Digital Invoicing, 18 for eBox and 25 for My Citizen Profile. Five interviews were shared between the eBox Case and the My Citizen Profile Case at the request of the interviewees. Appendix A provides an overview of the interviews, the public legal entities and the functions of the interviewees. These interviews typically lasted between 60 and 120 min. The interviews were done through video-conferencing tools (due to COVID-19). Informed consent was obtained at the beginning of each interview. Interviews were recorded and transcribed. A purposive sampling strategy was followed to select the respondents (Ritchie, Lewis, McNaughton Nicholls, & Ormston, 2013). The criteria for purposive sampling of the respondents were (1) their affinity with the ISD case and (2) their involvement in the coordination structures. In order to be representative for the public legal entities involved in the collaboration and incorporating non-responders, a balance was sought with regards to federal, regional and local public legal entities, larger and smaller public service providers, and those involved at the initiation and later phases. Questions in the semi-structured interviews related to the general context, actor roles, the setup of the public service and questions regarding the governance (e.g., strategic, legal and organizational aspects), as shown in Appendix B.

The analysis of the data is a thematic analysis (Braun & Clarke, 2006) and was carried out in NVivo. The goal of the analysis is to provide a rich description of the collaboration strategies in the data. The analysis entailed 6 steps: (1) familiarization, (2) initial coding, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) writing the analysis. Documentation and interviews were carefully read to get familiarized with the data. The analysis follows a process of deduction and induction. During the review of the documents and the pilot interviews, we found that collaboration strategies could be categorized into the three groups proposed by Emerson and Nabatchi (2015). For the initial coding, principal engagement, shared motivation, and joint action capacity were deductively used as sensitizing concepts to identify collaboration strategies. Because these concepts are still

abstract, the analysis was complemented with an inductive phase to search for additional themes within each sensitizing concept. Specific collaboration strategies were inducted from the data and grouped based on similarities. We carefully reviewed whether themes constituted new collaboration strategies or related to strategies as found in the literature. These three steps were done by the first researcher. The first and second researchers further refined, grouped, and/or renamed the collaboration strategies. The first researcher then wrote the analysis, in interaction with the other authors.

4. Case descriptions

This section describes the three cases that were selected to identify collaboration strategies for ISD in inter-organizational collaboration networks. Table 1 provides an overview of the characteristics of the three cases: Digital Invoicing, eBox and My Citizen Profile. These cases are embedded in the Belgian institutional and administrative context. Belgium is a federal country with (in contrast to other federations) two sets of federated states at the regional level: three communities (with competences such as education, culture and welfare) and three regions (responsible for e.g., housing, environment and mobility). Although Belgium is a federal country, it lacks typical federal characteristics such as a hierarchy of norms. A general intergovernmental e-government collaboration agreement and collaboration structure regarding digital government exist, but collaboration is mostly on a case-by-case. Each public administration at the federal and regional levels has one or more central public legal entities responsible for digital government. This paper focusses on three cases of ISD and the collaboration between and/or the federal level, the regional level of Flanders (a single public administration responsible for both community and regional matters covering the northern part of the country) and the local level.

The *Digital Invoicing Case* involves the digitalization of invoices and related documents for public procurement purposes. The ISD was initiated in 2009. Several central federal building blocks have been developed to allow for a single entrance that exchanges invoices from private legal entities to public legal entities, and vice versa for outbound invoices. The entrance is linked to the PEPPOL network of private Access Points that aims to digitalize invoicing across sectors (see Van Donge, Bharosa, & Janssen, 2022). Public service providers connect to the platform through the regional or federal enterprise service bus (ESB). Multiple collaboration structures were created. These structures regard inter alia the exchange of invoices from private legal entities to public legal entities, the exchange between private legal entities, and at the regional level between Enterprise Resource Planners (ERPs). The standardization of invoices is linked to European Directive 2014/55/EU. Collaboration is mainly driven by two central public legal entities. These are the federal public legal entity responsible for digitalization (*Federal Digital Transformation Office*), and the regional public legal entity responsible for e-procurement (the *Flemish ICT Support Agency*). The federal public legal entity coordinates with the PEPPOL network and is as a public service intermediary responsible for the main building blocks specifically related to Digital Invoicing. A Reflection Working Group at the regional level is the main collaboration structure. It is led by the regional public legal entity and is composed of the regional public service intermediary that provides ERP services to most regional public legal entities, as well as and regional public service providers with separate ERPs. Collaboration at the federal level is on a bilateral basis. The federal *Agency for Administrative Simplification* has a role regarding adoption by private legal entities. Digital invoicing became gradually mandatory for public service providers and private legal entities (suppliers) after the ISD was developed, starting in 2017 (following and going beyond the European Directive).

The *eBox Case* has the goal of developing two-way communication for official correspondence between public legal entities, natural persons and private legal entities through a federated system of secure digital mailboxes. Initiatives related to digital mailboxes go back to 2005.

Table 1
Case characteristics.

	Users	Public service intermediaries and public service providers			Main collaboration structure(s)
Digital Invoicing	Private / Public legal entities	Federal, regional, (local)	15+ involved	2 federal and 1 regional lead organizations	Regional collaboration structure including regional lead organization, regional public service intermediaries and public service providers
eBox	Natural persons Private / Public legal entities	Federal, regional, (local)	10+ involved	2 federal and 2 regional lead organizations	Federal collaboration structure including two federal lead organizations with public service intermediaries Regional collaboration structure between regional lead organizations and large regional public service providers Collaboration structures with 2 federal and 2 regional lead organizations
My Citizen Profile	Natural persons	Regional, local	14 → 100+ involved	1 regional lead organization	Regional collaboration structure with regional lead organization and regional public service providers

Collaboration regarding a federated system of digital mailboxes that provide an integrated view to users was initiated between 2014 and 2016. Natural persons can choose between a public eBox or private portals. The eBox for private and public legal entities integrates directly with public service providers (or indirectly through a private data service provider). For correspondence between public legal entities and private legal entities, one of the federal legal public entities for social security leads the collaboration (the *Federal Social Security Agency*). The regional entity for entrepreneurship (*Flemish Agency for Innovation & Entrepreneurship*) is a single point of contact for the regional and local legal public entities. The federal public legal entity for digitalization and its regional counterpart (*Flemish Digital Agency*) are the lead organizations for natural persons. The federal public legal entity is responsible for the eBox for natural persons. Besides roles regarding the portals, there are Document Providers (a public service intermediary that organizes databases for other public legal entities to store and make messages accessible) and Document Consumers (public service providers that send messages to a Document Provider). The two federal lead organizations and the regional digital agency also assume the role of Document Provider (among other public intermediaries). The eBox ISD has a federated collaboration structure. The two federal lead organizations organize a Document Provider forum. Each Document Provider coordinates with its own set of Document Consumers. Separate collaboration agreements exist between the regional and federal lead organizations that also encompass two separate collaboration structures. After the eBox ISD was developed at the beginning of 2019, operationalization has been underway to federal, regional and local Document Providers and (message generating processes of) Document Consumers.

The *My Citizen Profile Case* encompasses an ecosystem of building blocks that aims to provide natural persons a no-wrong-door access to public services of all local and regional public legal entities. The ISD was initiated in 2014 and became operational at the end of 2018. Its portal functionality can be integrated into regional and local communication channels (portals, websites, digital counters). The portal offers the starting point of informational and transactional digital public service provisioning. Other building blocks provide (1) a Single-Sign-On to other public services, (2) basic information regarding the user, and (3) several generic portal functionalities such as a feedback application concerning authoritative data, a notification application, a certificate application, and a file status application. The My Citizen Profile enables ISD for each of these functionalities, e.g., natural persons get all notifications from local and regional entities through the notification application. The regional public legal entity for digitalization is the lead organization of the program and is a public service intermediary between public service providers and users. The main collaboration structure is led by the regional lead organization and is composed of the

regional and local public service providers. Since its operationalization, the processes of regional and local public service providers are gradually being integrated into the building blocks of the ISD.

5. Results¹

The cases reveal a wide range of collaboration strategies. Sections 5.1, 5.2 and 5.3 describe the collaboration strategies categorized into engagement, motivation and joint action collaboration strategies. Table 2 provides an overview of the 33 identified collaboration strategies. Appendix C details the frequencies of the mentioned collaboration strategies in the interviews. Some collaboration strategies were found in all cases, whereas others only in a single case. The latter suggests the need for further research to find all possible collaboration strategies. Section 5.4 shows how collaboration strategies across the three categories can be directed at specific issues. The section details this for the issue of the adoption paradox.

5.1. Engagement collaboration strategies

The first category of collaboration strategies is directed at fostering engagement between participants. Collaboration strategies in the Digital Invoicing Case were not much directed at engagement. The prospect of the legal (European) mandate and its implementation into federal and regional law made defining collaboration more straightforward. The initiation phase also concluded with clearly established mandates for the lead organizations and project structures based on executive decisions. The lead organizations organized an open deliberation process with public service providers. The two other cases did not have such strong legal or executive mandates, instead these cases relied on a business case to foster engagement among participants before the development of the ISD. The My Citizen Profile Case also built upon the broader project structure it was initially embedded in (the *Flanders Radically Digital* digitalization program). As part of the collaboration strategy 'Formal agreements at the management level to settle roles and responsibilities' the eBox Case and My Citizen Profile Case respectively use provider agreements and data sharing agreements to settle roles and responsibilities related to the processing of personal data.

A specific collaboration strategy found was related to the use of names. For the Digital Invoicing Case, at the regional level, the lead government organization convened a collaboration structure that was deliberately named 'Reflection working group' instead of 'Steering group'. This way, the lead government organization intended to downplay the importance of the collaboration structure to counter potential resistance of public service providers to participate.

"The goal of the group is actually to steer. Because, reflection

¹ This section makes use of quotes from the interviews. Quotes are attributed to individual interviewees by making use of codes. These correspond to interviews in Appendix A.

Table 2
Collaboration strategies.

Collaboration strategies		Digital Invoicing	eBox	My Citizen Profile
Related to engagement	Open deliberation process of actors involved in collaboration efforts	Yes	Yes	Yes
	Preserving the autonomy of public service providers through the architecture	No	Yes	Yes
	Business case to focus collaboration	No	Yes	Yes
	Formal agreements at the management level to settle roles and responsibilities	No	Yes	Yes
	Use cases, pilots and proof of concepts	Yes	Yes	Yes
	Deliberate use of names	Yes	No	Yes
Related to motivation	Demand oriented approach to deliberation, with priorities set by priorities by lead organization(s)	No	Yes	Yes
	Supply oriented approach to deliberation	Yes	No	Yes
	Formal agreements at the management level to build trust and commitment	No	Yes	Yes
	Finding common motivation and mutual understanding of each other's context	Yes	Yes	Yes
	Stimulate competition among early adopting public service providers	Yes	No	Yes
	Focusing on public services with large volumes or important public services	Yes	Yes	Yes
	Giving financial incentives	Yes	No	Yes
	Emphasizing lower burden for public service providers	Yes	Yes	Yes
	Use early adopters to demonstrate capability and build trust	Yes	Yes	Yes
	Being transparent about choices that are made	Yes	Yes	Yes
	Making clear long term continuity and finance	Yes	No	No
	Related to joint action	Dyadic collaboration by lead organizations	Yes	Yes
Separating business and IT collaboration		Yes	Yes	Yes
Re-using already existing services		/ ^a	In part	Yes
Change structural coordination approach across phases		No	Yes	Yes
Flexible user-oriented architecture (regarding the users)		Yes	Yes	/
Core functionalities and stepwise expansion		Yes	Yes	No
Flexible architecture, approach and legacy management regarding (adoption by) public service providers		Yes	Yes	Yes
Giving financial incentives to (early adopting) public service providers		Yes	No	Yes
Provide clear roadmap(s) to focus and to anticipate changes		Yes	Yes	Yes
Common support (for the integration of the various involved building blocks)		Yes	Yes	Yes
Taking into account financial and technical capabilities		Yes	Yes	Yes
Bilateral agreements (with public service providers / intermediaries / lead organizations)		Indirect	Yes	Yes
Stimulating knowledge transfer between involved (or new) public service providers within and outside of collaboration		Yes	In part	Yes
Providing varied documentation and technical support		Yes	Yes	Yes
Using legal frameworks to come to institutional arrangements / settle legal uncertainty		No	Yes	Yes
Ensuring a sustainable relation with IT-providers		In part	Yes	Yes

^a Not a viable collaboration strategy due to the architecture of the ISD.

working group, we gave that name to get it going, but actually, the working is that of a steering group. (D5.1) It does work, because that's what was reported. You see that there is a lot of ambition there. (D5.2) Yet, if we had called it a steering group from the onset, it wouldn't have come off the ground, I think. Because you immediately get someone who says: "Ow, what's going to happen there?" (D5.1).

In the My Citizen Profile Case, to come to a more supported definition of the goal and the scope, the name of the service was changed (before going into production) from 'My Citizen Counter' to 'My Citizen Profile' in the piloting phase. The reasoning was that "because a 'counter' meant too much of a takeover. It gave the impression of a takeover. And that is not what we wanted to express" (M3.1). Public service providers with more established 'brands' could feel threatened by the takeover and loss of a prominent digital communication channel. "It was a threat from the point of view of what already existed" (M4.1) one program managers explained.

5.2. Motivation collaboration strategies

The second category of collaboration strategies seeks to enhance mutual understanding, build trust, and preserve participants' commitment to collaboration.

In the eBox Case, formal collaboration agreements also served as a motivation collaboration strategy, meant to enhance trust between the different government levels with respect to the dependencies that would be created by the latter having to rely on the former to send official correspondence (such as messages related to taxes).

Impacting both the eBox and My Citizen Profile Cases, the COVID-19 crisis was instrumentalized as an ad hoc collaboration strategy for common motivation and spurred development and adoption among

intermediaries and public services providers to provide a rapid communication channel with natural persons. A lead organization noted that "we did see with the corona crisis and especially in the beginning, when the paper mail didn't work well, that there were many institutions that showed interest in getting on board." (E12.1).

Another collaboration strategy in the three cases was convincing public service providers of the benefits of ISD. While some public sector organizations were already motivated to contribute to ISD, others were not. Emphasis was placed at inter alia the benefits regarding a user-oriented approach related to ISD, external efficiency for natural persons and private legal entities as well as internal efficiency (i.e. emphasizing the total cost of ownership).

Giving financial incentives proved a viable collaboration strategy to stimulate commitment among (potential) public service providers. "The basic connection of Mercurius or PEPOL, that cost is already fully borne by [the Federal Digital Transformation Office]. That's not being passed on, and in that area I think that's to us, everybody who makes use of it, is an incentive." (D10.1).

Unremarkable, this was related to stimulating the capacity of public service providers to integrate by ensuring adequate resources. In the Digital Invoicing Case, central financial resources were allocated to the lead regional public entity that financed the development and dedicated support services from the regional intermediary to the local and regional public service providers. "Digital invoicing is a bit of an exception, we [the Flemish Digital Agency] have a dedicated support contract with the Flemish ICT Support Agency." (D8.1) For the My Citizen Profile Case, financial incentives consisted of co-financing the initial integration of the portal functionality into the websites of public service providers. A local public service provider remarked that "co-financing, that's obviously a very easy one. We were lucky that we were indeed able to do that

integration with the header without it actually costing any money. So Flanders has looked at that smartly as far as I'm concerned." (M21.1).

5.3. Joint action collaboration strategies

The third category of collaboration strategies aims to develop the capacity for collaboration, and enhance the adoption of the ISD by public legal entities. Instead of a single intergovernmental collaboration structure the Digital Invoicing and the eBox Cases relied on several collaboration structures and bilateral approaches to come to joint action within and across inter-organizational networks. Due to the characteristics of Belgium's federal institutional system, there is almost no hierarchy between the federal level and the regional entities. Burdens on establishing formal inter-governmental cooperation agreements are also high. Furthermore, while ISD is stressed as important by each government, priorities between the federal administration and the regional entities differ.

The number of senders in the scope of the Digital Invoicing Case and the eBox Case includes all public legal entities in Belgium. In the Digital Invoicing Case bilateral collaboration between lead organizations is augmented with a collaboration structure bringing together the ERPs at the regional level. "You actually take care of a lot of complaints there. For example, there are problems with certain suppliers. [...] What is also important, you have some [public service providers] that are on different tracks. Other systems are added. Then they start helping each other. The federal government is always there, the people from [the Flemish Digital Agency] are there too. (D5.2).

The collaboration strategy in the eBox case is more complex. In addition to a joint action collaboration strategy focusing on bilateral lead organization collaboration, the case comprises federal collaboration structures regarding federal intermediaries, as well as collaboration structures between federal and regional lead organizations. While complex and especially time-consuming for the lead organizations, the federated collaboration approach is at the same time a collaboration strategy to keep the number of collaboration partners at the same time manageable. "We have a potential of – depending how you count – between 5000 and 6500 possible document senders. You can't possibly start having meetings with all those organizations." (D4.1) Service providers also saw this as beneficial as "you can stand with several against the other partner. [The Flemish Digital Agency] represents us. They almost represent the Flemish government, so to speak. If you are there as one entity, it is much more difficult. Even though we are an important player in certain matters." (M6.1) For both the Digital Invoicing and eBox cases, bilateral collaboration and a flexible architecture regarding public service providers allowed for the lead organizations to develop additional functionalities specific to or at the tempo of their own set of public service providers.

5.4. Collaboration strategies covering multiple categories

The cases reveal that collaboration strategies may have to be used simultaneously to address issues. Several collaboration strategies were used to mitigate the 'adoption paradox', a key issue that emerged from the cases. The adoption paradox concerns the relationship between the adoption of a public service by users and the adoption by public service providers. On the one hand, public service providers were hesitant to rely on ISD because adoption by the user remained low. On the other hand, lead organizations and public service providers worried that users would not be willing to adopt the digital service if not enough volume was created. Also, focusing on promoting the ISD without having a large enough volume of services available was thought to demotivate users to adopt the ISD. An interviewee put it in the following way: "You're only going to fill your box if there's also a lot of interest in it. Because if there's a lot of interest, then the pressure is higher to fill the box. That's the chicken or the egg." (M9.1).

In the eBox Case the focus partially rested on integrating public

services that have large volumes of messages. The adoption of the ISD by public service providers was meant "to be the catalyst for other entities. The small ones let's say." (E10.1) Messages with high volumes related to personal income taxes, pensions, child allowances, and the regional invitation to get vaccinated for COVID-19. On the other hand, the architecture of the eBox was set up for integration of eBoxes with private service providers. In this way natural persons could receive invoices from private legal entities (e.g., utility companies) in a single digital environment.

In the My Citizen Profile Case, the following collaboration strategies were followed to deal with the adoption paradox. First, opening up as much personal information contained in (base) registries that could be easily displayed to natural persons to quickly create volume. Second, focus on those services that are useful to a large number of users, such as showing information from local governments with respect to civil registration certificates. Third, prioritizing large public service providers that could more easily integrate a high volume of public services. Fourth, building blocks and functionalities were chosen to reflect the portal functionalities that had not yet been developed. These included a notification functionality, a status update functionality for running procedures and a feedback functionality regarding wrong or incomplete personal data. Fifth, prioritizing authentication for users. This way, users could use the My Citizen Profile to authenticate their identity (and choose the appropriate role) to get single sign-on access to public services. "What we often see is that connecting to [the central access management building block] is a trigger to integrate the header. More and more local governments are starting to work with [it] and you can feel that this causes the [integration to the] header to pick up speed." (M4.1).

In the Digital Invoicing Case the issue of the adoption paradox appeared to play less of a role. Clear rules were established by both the federal and regional governments that gradually mandated the use of the digital public service on both sides of the service chain. Collaboration strategies still had to be devised to motivate public legal entities. To this end, a collaboration strategy of testing the digital invoicing service was used to demonstrate its viability. The testing focused on private and public legal entities with large volumes. A collaboration strategy to further adoption was to implement a flexible infrastructure that allowed suppliers and buyers to send or receive digital invoices without having to rely on each other capabilities.

6. Discussion

6.1. Collaboration strategies for ISD

The results brought forward a large variety of inter-organizational collaboration strategies for ISD directed at many goals. Those collaboration strategies are presented in Table 2. Following the research background, some of these collaboration strategies have been noted, while other collaboration strategies extend the literature. The cases follow the literature that the elements underpinning collaboration strategies can be part of collaboration strategies serving different goals. For example, direct and indirect incentives appear to be important to engage, motivate and create joint action potential alike (Chen & Lee, 2018; van Os, 2011). Indirect incentives can be incorporated through a business case collaboration strategy to make clear the expected benefits (Luna-Reyes et al., 2007). Such a collaboration strategy can provide potential public service providers with a cost-benefit analysis for costs saved or avoided by not developing or managing functionalities themselves. The rest of this section discusses the collaboration strategies related to each of the categories and considers the relationship between collaboration strategies and ISDs.

6.1.1. Engagement collaboration strategies

Collaboration strategies related to coming to principled engagement appeared the least contested in the cases. The cases acknowledge the

importance of lead organizations having formal coordinator roles (Gil-Garcia & Sayogo, 2016; Klievink et al., 2016). Once public service providers had shown a willingness to collaborate, consensus on the division of roles and responsibilities and the position of the lead organizations within the network was relatively quickly reached or accepted, even if the diversity of the collaborating public legal entities was rather high (in the eBox and My Citizen Profile Cases) (Sayogo et al., 2016). The relatively effortless clarity on roles and responsibilities might rather be because of the central position of these organizations within the public administrations. Public service providers joining the collaboration at a later stage also did not appear to pull into question earlier agreements on the division of roles and responsibilities (in line with Gil-Garcia et al., 2019; Lönn & Uppström, 2016). Coming to a shared goal of the ISD and a clearly specified scope was more difficult than agreeing on the distribution of roles. Lead organizations organized interactions with participants collectively and bilaterally to stimulate mutual adjustment (van Os, 2011). Some public service providers in the My Citizen Profile Case who did not see their priorities reflected in the scope took on a lukewarm approach to collaboration or even dropped out.

6.1.2. Motivation collaboration strategies

Collaboration strategies in the cases associated with bringing about motivation seem to be less related to trust creation than is indicated by the literature (Chen, 2008). The eBox law was meant to increase trust between administrations (Luna-Reyes et al., 2007; Yang & Maxwell, 2011). Given that ISDs increase the dependencies of public service providers on public service intermediaries in the chain, trust between collaborators might have to go alongside with formal agreements that set service levels. A department head specified that “trust is sufficient for me at my level, but is not sufficient at the operational level. [...] There have to be agreements, because I also have a customer internally. And if my people can't get to data for three days, then that's a problem for our operational functioning, so there must be service level agreements.” (M16.1). Formal agreements were adopted to this extent in the eBox and My Citizen Profile Cases. As a demonstration of each collaboration's viability to deliver public services (Gil-Garcia et al., 2005), the three cases also used early adopters to demonstrate the capabilities necessary to allow ISD and generate trust.

6.1.3. Joint action collaboration strategies

Collaboration strategies related to joint action were the most prominent in the interviews. In line with previous literature (Gil-Garcia & Sayogo, 2016; Pardo et al., 2010), the sharing of information and knowledge was seen as an important strategy to come to joint action. Following Klievink et al. (2016) a first collaboration strategy in this regard related to providing varied documentation and technical support by the lead organizations. A second collaboration strategy, especially acknowledged by respondents in the Digital Invoicing Case, was the transfer of knowledge within and outside of the formal collaboration structure (following Janssen et al., 2012). This is likely more in this case than the other two due to its more limited scope. Respondents indicated that informal collaboration happened when two public service providers relied on the same ERP technology (provider).

Deliberation to come to the voluntary adoption of standards, another collaboration identified by Klievink et al. (2016) was not found in the cases as a collaboration strategy. This could be because of the public-private context of the ISD in which those deliberations took place. In the Digital Invoicing Case, invoice standards were set by the European Directive. In the My Citizen Profile Case, public service providers did partake in processes to develop standards (e.g., related to sending notifications). But those did not appear to be part of the collaboration strategies. Many of the collaboration strategies related to joint action are also outside of those found in the review of the literature. Several collaboration strategies are linked to the characteristics of ISD.

6.1.4. The relationship between collaboration strategies and ISDs

The results demonstrate how collaboration strategies incorporate the characteristics of ISDs and their digital public service chains to enhance collaboration. Collaboration leads to back-office systems of various public service providers being integrated into service chains to achieve ISD. Such an architecture creates dependencies among public service providers. These dependencies include resource dependence, shared user relationships, and shared reputations (Malone & Crowston, 1994), potentially leading public service providers to resist participating in or continuing collaborative efforts. Employing the architecture design strategies put forward by Van Veenstra et al. (2009) shows how the cases incorporated the characteristics of the service chains into their collaboration strategies.

The approach in the eBox Case can be characterized as a broadcasting strategy. A federated system of databases was set up with a front-end eBox application interfacing with several back-end databases based on common standards. The case used the architecture of the public service as a strategy to preserve the autonomy of public service providers through the ISD architecture to generate engagement. This approach was thought to lower the barriers for participation. Public service providers could thus organize (or keep organizing) their own message database. The case also employed the use of formal collaboration agreements at the management level between the lead federal organizations and regional lead organizations to ensure the continuity of message delivery.

The Digital Invoicing Case follows a merger strategy. The lead organization at the federal level owns the main building block through which all incoming and outgoing invoice documents pass through. Invoice documents are standardized through the European Invoicing Directive and information systems are tightly coupled. The federal and regional public legal entities relied on several motivation collaboration strategies and joint action collaboration strategies to manage resource dependency among actors and establish a good reputation of the ISD. These collaboration strategies relate to early adopters and service providers with large volumes to demonstrate the robustness of the ISD and clear communication, transparency, and long-term continuity and financing.

The architectural strategy in the My Citizen Profile Case can be described as an orchestration strategy. Public service providers align their processes with the relevant building blocks of the ecosystem owned and orchestrated by the regional lead organization. A collaboration strategy was chosen in which the public service providers preserve their autonomy. For example, a notification that is intended as a reminder for an appointment only requires a standardized notification at the end of the process. Public service providers can choose between a push and pull model and can also use additional communication channels outside of the ecosystem.

The collaboration process also has to be able to take into account the technical capabilities of the public legal entities. The three cases relied on flexible architectures to allow actions to be taken even though particular public service providers only had a low organizational readiness (Van Veenstra et al., 2009). This enabled lead organizations and public service providers to expand functionalities earlier or tailor solutions to specific needs (e.g., related to legacies or specific requirements), preserving motivation among public service providers and stimulating joint action.

The results indicate the difficulty in creating and maintaining collaboration. The cases highlight how in the absence of a directive regulatory framework (for two of the three cases), prevents finding shared motivation in the early phases. The Digital Invoicing Case shows that pending regulation can be a driver to start collaboration. However, collaboration strategies were still necessary to establish linked service chains and expand functionalities. The findings also point to the limitations of a collaborative approach outside the context of ex ante obligations that drive collaboration on the one hand and adoption on both sides of the service chain on the other hand. This is demonstrated by

governments using their authority to stimulate the adoption of the eBox (at the federal level) and My Citizen Profile (at the regional level) in respectively the operationalization and expansion phases. In a more directive regulatory context, lead organizations in the Digital Invoicing Case had to be less reliant on formalized relationships and embarked on a more flexible and goal-oriented approach (Gil-Garcia et al., 2007; Gil-Garcia et al., 2019).

There seem to be differences in collaboration strategies over the different phases of ISD. During the initiation and expansion phases, a demand-oriented approach appears to be more successful for shared motivation. In the piloting and operationalization phases, a supply-oriented approach to collaboration could potentially lead to more joint action and quicker implementation. However, this could not be analyzed due to the cross-sectional time horizon.

6.2. Limitations

Our research is not without limitations. First, the single-country approach limits the generalizability. The nature of Belgium's federalism poses limitations to the generalizability of the research. The potential for hierarchical coordination is limited as there is no hierarchy of norms between the federal level and the regional entities. This makes collaboration the default option for cases that have an intergovernmental dimension and limits the potential for contrasting cases (Yin, 2018). The research also focused on collaboration strategies, which largely excluded an analysis of the public service context that can actively shape collaboration efforts (Luna-Reyes et al., 2007). Other cases in different contexts might find additional collaboration strategies.

Second, following the choices made in the case selection, the cases we examined presented only a subset of ISDs. For example, the ISDs in this paper were directed at natural persons and private legal entities as users. Many existing ISDs are also between public legal entities, such as data exchange services, or involve co-creation and co-production with natural persons and private legal entities. Other cases might thus reveal different collaboration strategies. As such, we recommend generalizing the findings in further research. At the same time, the cases provide a comprehensive overview of collaboration strategies, with many shared between cases. This leads us to expect that the identified collaboration strategies might be generalizable.

Third, the research is limited regarding the effectiveness of individual and combined collaboration strategies. Further research can look into the effectiveness of individual collaborative strategies in single cases or through a comparative approach of cases. We also recommend examining the impact of ICT-mediated collaboration strategies vs. those that do not.

A fourth limitation relates to the selection of the interviewees. While we adopted a sampling strategy that aimed to be representative to the public legal entities involved in the collaboration, multiple persons in different roles could be involved for a single public legal entity. Some of these persons had already left the public legal entity at the time of the data gathering. Future research could include the roles through which different persons collaborate on behalf a public legal entity, their dynamics and the impact on the collaboration.

Fifth, the cross-sectional time horizon did not allow us to fully discern differences between development phases. It is easy to imagine that initiation might need different collaboration strategies than operationalization and expansion. Research with a longitudinal time horizon (the temporal dimension of collaboration in Chun et al., 2012) could untangle changing types of collaboration strategies across phases, and reveal which collaboration strategies are more suited in the short and long term.

6.3. Contribution to theory

This paper presents the results from three in-depth case studies. These results provide the first comprehensive overview of concrete

collaboration strategies in interorganizational collaboration networks to develop and advance ISD, which was lacking in the literature. The results indicate that the identified collaboration strategies might be generalizable, but additional empirical research should be performed. Together with identifying a key issue for advancing ISDs, i.e. the issue of the adoption paradox, the research presented in this paper moves forward the thinking on collaboration strategies in ISD and allows to come to a better understanding of how collaboration unfolds to advance ISDs.

6.4. Implications for practice

ISD remains one of the central digital government challenges. The research points towards collaboration strategies that might prove valuable for practitioners. In line with Gil-Garcia and Sayogo (2016) formally appointed service chain coordinators as lead organizations, either one for the entire service or one per level of government, might prove beneficial to devise and put collaboration strategies into action. An approach centering around lead organizations and bilateral coordination could be an alternative to formal intergovernmental collaboration structures. Understanding and utilizing collaboration strategies adapted to deal with issues such as the adoption paradox, as well as different capacities, capabilities and perspectives to users and public service providers might enable practitioners to further develop, operationalize and expand ISDs.

7. Conclusions

ISD is high on the agenda of governments, but no comprehensive overview of collaboration strategies exists to advance ISD. This article contributes to the e-government literature by identifying collaboration strategies to advance ISD in interorganizational collaboration networks. Three ISD cases in the region of Flanders, Belgium were examined to this extent. We empirically identified 33 collaboration strategies for ISD categorized into engagement, motivation, and joint action collaboration strategies. The contribution is twofold. First, the analysis gives insight into what concrete collaboration strategies are used in ISD and provides insight into how they are formed and combined to address certain issues. Collaboration strategies depend on the situation, as the characteristics of the service chains can impact public service providers' willingness to collaborate and rely on ISD for their service delivery.

In our cases principal collaboration strategies were centered around lead organizations that combined collaboration strategies attuned to each case and often took on intermediary roles in the digital service chains. Lead organizations had to identify the mix of collaboration strategies that advances ISD in the short and long term, as collaboration strategies can be conflicting and public service providers can become less motivated to participate or drop out entirely. This seems especially so in a federal setting with a horizontal distribution of power and without strong intergovernmental collaboration structures.

An important issue was overcoming the 'adoption paradox', which required a combination of collaboration strategies. This issue concerns the impact the adoption of a public service by users has on the adoption by public service providers and vice-versa. Not overcoming this paradox can be seen as a bottleneck for widespread use. Collaboration strategies in the cases included flexible infrastructures that decoupled the capabilities of users and public service providers so one actor can make use of the ISD independent of the technical capabilities of others, and a focus on the integration of public services with high volumes to stimulate public legal entities to collaborate and integrate their services to the ISD. The cases show that collaboration strategies can bring about ISD and provide policy-makers strategies to advance ISD.

As a second contribution, the collaboration strategies identified in this research offer opportunities for research to further expand the knowledge on inter-organizational collaboration that advances ISD. Together with additional cases and further analysis, this research could be used as a stepping stone towards a theoretical model to understand

how collaboration strategies can be combined, prioritized and changed over time to advance ISD. In building towards such a model, further research can focus on finding additional collaboration strategies, examine the effectiveness of collaboration strategies, look into how these collaboration strategies complement each other, and how changing collaboration strategies as ISDs pass through service design and delivery phases. A better empirical understanding of collaboration strategies can lead to insights for academics and practitioners that might advance the long-held dream of ISD.

CRediT authorship contribution statement

Stijn Wouters: Project administration, Writing – original draft,

Conceptualization, Methodology, Investigation, Formal analysis, Visualization. **Marijn Janssen:** Conceptualization, Formal analysis, Writing – review & editing, Visualization. **Veiko Lember:** Conceptualization, Writing – review & editing. **Joep Crompvoets:** Funding acquisition, Project administration, Supervision, Resources, Conceptualization, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Overview of the interviews

ID ^a	Level	Public legal entity	Function interviewee	Interview shared with
D1	Federal	Digital Transformation office	D1.1 Project manager	
D2	Regional	Department	D1.2 Project manager	
D3	Federal	Federal Public Service	D2.1 Advisor	
D4	Federal	Federal Agency	D3.1 Team leader	
D5	Regional	ICT Support Agency	D3.2 Project manager	
D6	Regional	Agency	D4.1 Director-general	
D7	Regional	Agency	D4.2 Project manager	
D8	Regional	Digital Agency	D5.1 Project manager	
D9	Regional	Agency	D5.2 Project manager	
D10	Local	City	D6.1 Analyst	
D11	Regional	Agency	D7.1 Team leader	
D12	Regional	Agency	D7.2 Case manager	
D13	Regional	Agency	D8.1 Product owner	
D14	Local	City	D9.1 Accountant	
E1	Federal	Digital Transformation office	D10.1 Accounting manager	M1
E2	Regional	Digital Agency	D11.1 Accounting manager	
E3	Regional	Digital Agency	D12.1 Accountant	
E4	Federal	Digital Transformation office	D12.2 Accountant	
E5	Regional	ICT Support Agency	D12.3 Accountant	M5
E6	Regional	Agency	D13.1 Department head	
E7	Federal	Federal Public Service	D13.2 Advisor	
E8	Regional	Department	D13.3 Accountant	M11
E9	Regional	Agency	D14.1 Process manager	
E10	Regional	ICT Support Agency	D14.2 Accountant	
E11	Federal	Agency	D14.3 Business analyst	
E12	Federal	Social Security Office	E1.1 Domain manager	
E13	Federal	Federal Public Service	E2.1 Product owner	
E14	Regional	Agency	E3.1 Analyst	M18
E15	Regional	Agency	E3.2 Legal expert	
E16	Federal	Digital Transformation office	E4.1 Project manager	M19
E17	Regional	Agency	E5.1 Program manager	
E18	Federal	Agency	E6.1 Department head	
M1	Federal	Digital Transformation office	E6.2 Project manager	E1
M2	Regional	Digital Agency	E7.1 Advisor	
M3	Regional	Digital Agency	E7.2 Project manager	
M4	Regional	Digital Agency	E8.1 Department head	
			E8.2 Project manager	
			E8.3 Project manager	
			E9.1 Manager	
			E10.1 Business analyst	
			E11.1 Project leader	
			E11.2 Team leader	
			E12.1 Advisor-general	
			E12.2 Program manager	
			E13.1 Strategy analyst	
			E14.1 Program manager	
			E14.2 Program architect	
			E15.1 Manager	
			E16.1 Legal expert	
			E17.2 Account manager	
			E18.1 Program manager	
			E18.2 Service owner	
			M1.1 Domain manager	
			M2.1 Legal expert	
			M3.1 Program manager	
			M4.1 Program manager	

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ID ^a	Level	Public legal entity	Function interviewee	Interview shared with
M5	Regional	ICT Support Agency	M5.1 Program manager	E5
M6	Regional	Agency	M6.1 Manager	
M7	Regional	Agency	M7.1 Team leader	
M8	Regional	Department	M8.1 Product owner M8.2 Program manager	
M9	Local	City	M9.1 Coordinator	E8
M10	Regional	Agency	M10.1 Manager M10.2 Project manager	
M11	Regional	Department	E11.1 Department head E11.2 Project manager E11.3 Project manager	
M12	Local	City	M12.1 Team leader	
M13	Regional	Department	M13.1 Data and application manager	E14
M14	Regional	Agency	M14.1 Project manager	
M15	Local	City	M15.1 Project leader	
M16	Regional	Department	M16.1 Division head	
M17	Regional	Agency	M17.1 Team leader	E15
M18	Regional	Agency	M18.1 Program manager M18.2 Program architect	
M19	Regional	Agency	M19.1 Manager	
M20	Regional	Agency	M20.1 Product owner M20.2 Product owner M20.3 Product owner M20.4 Coordinator	
M21	Local	City	M21.1 Department head	E14
M22	Local	Organization	M22.2 Advisor	
M23	Regional	Agency	M23.1 Coordinator M23.2 Team leader	
M24	Local	Municipality	M24.1 Department head	
M25	Local	Municipality	M25.1 Policy manager	

^a D: Digital Invoicing Case, E: eBox Case, M: My Citizen Profile Case.

Appendix B. Interview protocol

Context

What are current or former initiatives related to the public service?
 What are the goals and what is the scope of the public service?
 What is the general historical context of the public service?
 Why and when did your organization become involved in the governance of the public service? What is the role of your organization?
 How was the public service initiated inside your organization?
 How does the public service stand in relation to the vision concerning user-centricity in your organization?

Actors

Who are the actors?
 What are their roles? How are the actors involved in the service chain? Who are the users?

Organization of the public service

What are the involved building blocks and what are their functionalities?
 Which choices did your organization make regarding integration and why were those choices made?
 What are the functionalities the public service (still) has to provide for your organization?

Governance aspects

What are the strategic and operational goals related to the public service?
 How does your organization look at the legal and privacy aspects related to the public service?
 What are the organizational aspects related to the public service?
 Who is involved in the coordination of the public service?
 What are the most important collaboration structures? Are there bilateral consultations?
 Which subjects are discussed where?
 How and where are decisions taken? Are these binding?
 What was the impact of the collaboration during initiation/piloting on the current collaboration?
 Was and is their consensus on what the scope of the public service is?
 Was and is their consensus on how the collaboration should function?
 How did and does the collaboration process unfold?
 Did the collaboration have an impact on coming to a consensus on the scope?
 Should some subjects receive more attention?
 What are the different needs and preferences between actors?
 What was and is the common motivation to collaborate? Is this motivation shared by all involved actors?
 Was and is their consensus on the actions that should be taken?
 Have there been obstacles to implementing those actions? How have they been dealt with?
 Are there any additional actions that are needed regarding adoption by public legal entities and users?
 How does your organization look at contracts and agreements related to the public service?
 How does your organization evaluate the collaboration?

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Context

What data does the public service use?
 How does your organization look at the semantic and technical standards related to the public service?
 How does your organization look at the financial arrangements related to the public service?

General evaluation and future

Did the collaboration have an impact on the outcome of the public service?
 Did the collaboration have an impact on how your organization views user-centricity, generic building blocks and/or ISD?
 What are the follow-up steps?
 Are there elements we haven't discussed yet but that you want to add?

Appendix C. Frequency of references to collaboration strategies

Collaboration strategies			Digital Invoicing	eBox	My Citizen Profile
Related to engagement	Open deliberation process of actors involved in collaboration efforts	(11/17) ^a	Yes (1/1)	Yes (2/2)	Yes (8/14)
	Preserving the autonomy of public service providers through the architecture	(5/6)	No (n.m.) ^b	Yes (4/5)	Yes (1/1)
	Business case to focus collaboration	(7/12)	No (1/2)	Yes (4/5)	Yes (2/5)
	Formal agreements at the management level to settle roles and responsibilities	(17/30)	No (n.m.)	Yes (10/22)	Yes (7/8)
	Use cases, pilots and proof of concepts	(14/16)	Yes (5/6)	Yes (5/6)	Yes (4/4)
	Deliberate use of names	(5/5)	Yes (1/1)	No (n.m.)	Yes (4/4)
	Demand oriented approach to deliberation, with priorities set by priorities by lead organization(s)	(9/9)	No (n.m.)	Yes (3/3)	Yes (6/6)
	Supply oriented approach to deliberation	(14/27)	Yes (7/16)	No (n.m.)	Yes (7/11)
Related to motivation	Formal agreements at the management level to build trust and commitment	(6/6)	No (n.m.)	Yes (4/4)	Yes (2/2)
	Finding common motivation and mutual understanding of each other's context	(10/13)	Yes (1/2)	Yes (6/7)	Yes (3/4)
	Stimulate competition among early adopting public service providers	(6/9)	Yes (5/8)	No (n.m.)	Yes (1/1)
	Focusing on public services with large volumes or important public services	(17/33)	Yes (1/1)	Yes (8/15)	Yes (8/17)
	Giving financial incentives	(12/18)	Yes (4/5)	No (n.m.)	Yes (8/13)
	Emphasizing lower burden for public service providers	(13/18)	Yes (1/1)	Yes (6/9)	Yes (6/8)
	Use early adopters to demonstrate capability and build trust	(6/7)	Yes (1/1)	Yes (2/2)	Yes (3/4)
	Being transparent about choices that are made	(9/17)	Yes (2/5)	Yes (1/1)	Yes (6/11)
	Making clear long term continuity and finance	(8/10)	Yes (8/10)	No (n.m.)	No (n.m.)
	Related to joint action	Dyadic collaboration by lead organizations	(35/76)	Yes (6/6)	Yes (11/41)
Separating business and IT collaboration		(9/15)	Yes (5/9)	Yes (1/2)	Yes (3/4)
Re-using already existing services		(4/5)	/ ^c	In part (2/2)	Yes (2/3)
Change structural coordination approach across phases		(17/34)	No (n.m.)	Yes (9/17)	Yes (8/17)
Flexible user-oriented architecture (regarding the users)		(12/22)	Yes (7/14)	Yes (5/8)	/
Core functionalities and stepwise expansion		(12/18)	Yes (3/3)	Yes (9/15)	No (n.m.)
Flexible architecture, approach and legacy management regarding (adoption by) public service providers		(36/91)	Yes (6/13)	Yes (16/37)	Yes (14/41)
Giving financial incentives to (early adopting) public service providers		(14/17)	Yes (5/5)	No (n.m.)	Yes (9/12)
Provide clear roadmap(s) to focus and to anticipate changes		(16/25)	Yes (2/2)	Yes (7/14)	Yes (7/9)
Common support (for the integration of the various involved building blocks)		(13/16)	Yes (3/4)	Yes (6/7)	Yes (4/5)
Taking into account financial and technical capabilities		(16/20)	Yes (4/4)	Yes (4/4)	Yes (8/12)
Bilateral agreements (with public service providers / intermediaries / lead organizations)		(35/57)	Indirect (10/13)	Yes (13/27)	Yes (12/17)

(continued on next page)

(continued)

Collaboration strategies		Digital Invoicing	eBox	My Citizen Profile
Stimulating knowledge transfer between involved (or new) public service providers within and outside of collaboration	(11/21)	Yes (9/19)	In part (1/1)	Yes (1/1)
Providing varied documentation and technical support	(21/36)	Yes (8/17)	Yes (6/11)	Yes (7/8)
Using legal frameworks to come to institutional arrangements / settle legal uncertainty	(9/14)	No (n.m.)	Yes (8/13)	Yes (1/1)
Ensuring a sustainable relation with IT-providers	(14/32)	In part (5/7)	Yes (4/5)	Yes (5/20)

^a (Number of interviews with mentions / total number of mentions).

^b Not mentioned in the interviews.

^c Not a feasible collaboration strategy due to the architecture of the ISD.

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