Determinants of Business-to-Government Information Sharing Arrangements

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Abstract: Various types of inter-organisational systems (IOSs) are emerging to facilitate information exchange between companies and governments. These systems are developed in constellations of stakeholders who impose different and even opposing requirements on the information sharing arrangements. Yet which determinants shape the selected information sharing arrangement is not clear. The present research investigated such determinants through a review of IOS implementation literature and an in-depth case study. The literature review resulted in a list of determinants that were categorised using the Technological, Organisational and Environmental (TOE) framework. These determinants were analysed in detail for the Standard Business Reporting implementation in the Netherlands. The findings suggest that an information sharing arrangement should be conceptualised by both its architecture and its governance, as they are mutually dependent. In the case study, trust, power, the involvement of major public organisations, compatibility and interoperability were found to be the main determinants influencing the shaping of the information sharing arrangement.

Keywords: information sharing arrangement, inter-organisational system (IOS), XBRL, standard business reporting, B2G, TOE

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1. Introduction

The advance of information and communication technology (ICT) has changed the way organisations share information with each other. Information sharing has evolved from a paper-based mechanism to a digital one. Digital information sharing between two or more organisations is facilitated by inter-organisational systems (IOSs). Such systems can have different technical arrangements, including electronic storage, electronic interface, service bus, electronic gateway and service platform (Yang et al., 2014). IOSs are implemented in various domains, such as financial reporting (Bharosa et al., 2011, Dunne et al., 2013), supply chain management (Liang, 2015, Klievink, 2015) and public safety networks (Williams et al., 2009, Fedorowicz et al., 2014).

Digital information sharing using IOS can have many benefits, including improvements in information quality, faster information sharing, the ability to create comprehensive management information, improved coordination and communication among users, improved decision making, improved organisational performances and the creation of better public services (Zander et al., 2015, Praditya and Janssen, 2015, Zhang et al., 2005, Calo et al., 2012, Gil-Garcia et al., 2009). IOSs are therefore developed in many domains, which results in the adoption of a variety of different arrangements. Studies in this area have mainly focussed on government-to-government or business-to-business information sharing arrangements, and less on business-to-government (B2G) arrangements (Bharosa et al., 2013). This study fills the gap by identifying the determinants that influence the creation of an IOS arrangement in a B2G situation. In such a situation, public and private organisations may have different objectives, which can lead to conflicts. Whereas public organisations need the information to realise public values, companies often view the provision of information as an administrative burden that has no added value for them.

An IOS is the result of a process in which the involved actors interact with each other. The resulting arrangement can be viewed as a negotiated outcome. The benefits and costs of the system might not be evenly distributed. In B2G IOS, the relationship between businesses and government and their different structures and objectives need to be recognised (Klievink et al., 2012). When a new technology is implemented in an organisation, the organisation often needs to make adjustments (Orlikowski, 1992). The technology

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options determine the types of arrangements that are feasible given the financial constraints and influences. Thus, a multitude of factors, ranging from organisational to technical issues, affect the shaping of an IOS.

This present research addressed two main questions: 1) What factors determine the information sharing arrangement for B2G? 2) How do these factors influence the B2G information sharing arrangement? The first question was answered by synthesising a list of determinants collected from the literature. However, the actual influence of factors is likely to be dependent on the context. The second question was answered by investigating the determinants that play a major role within the Standard Business Reporting (SBR) system. The implementation of SBR was selected as a case study as it facilitates B2G information sharing for reporting financial data to the government.

This paper is structured as follows. In section 2, the theoretical background to IOSs and information sharing arrangements is discussed. The research approach is presented in section 3. Section 4 contains a list of factors identified from the literature. In section 5, the case study is described, with the discussion about how these determinants influence the information sharing arrangement. Finally, the conclusions are presented in section 6.

2. Theoretical Background

An IOS is "an automated information system shared by two or more organisations, and designed to link business processes" (Robey et al., 2008, p.2). Choudhury (1997) identified two basic configurations of IOS: bilateral (dyadic) and multilateral, as shown in Figure 1. Smaller organisations usually choose a dyadic configuration mainly because they fear losing control and have low IT maturity and limited resources, whereas large organisations often choose a multilateral configuration as this can result in more benefits for them (Singerling et al., 2015). B2G information sharing often involves both small and large organisations.

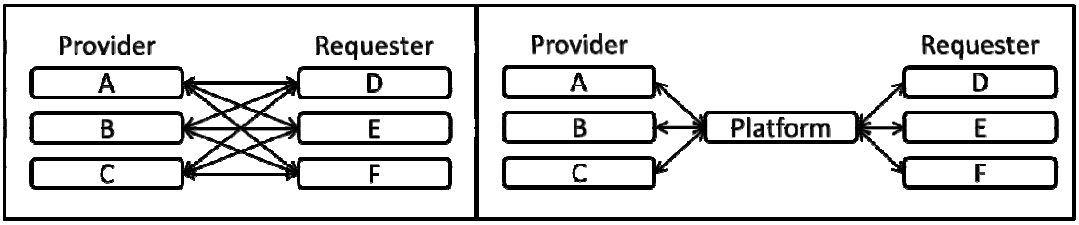

Figure 1: Bilateral connection (left) vs multilateral connection (right) (Choudhury, 1997)

A typical example of dyadic configuration is the Electronic Data Inter-exchange (EDI). EDI is "the movement of business data electronically between or within firms (including their agents or intermediaries) in a structured, computer-processable data format that permits data to be transferred without re-keying, from a computer-supported business application in one location to a computer-supported business application in another location." (Hill and Ferguson, 1989, p.3). The challenge in implementing EDI becomes greater when one organisation has to build connections with several organisations that have their own systems. Developing interfaces with all contacts can be costly, complex and inefficient. For this reason, it is necessary to standardise interfaces and processes.

Currently, a joint infrastructure model (called a service platform) has recently been created for multi-connection information sharing with a high level of standardisation (Yang et al., 2014). A service platform can help in processing information before it is sent to requesting parties. The processing level can be varied and can include features like data validity, a buffering system, certification or even security processes. However, to build such a platform, its standards and ownership and the division of costs need to be negotiated, and this may delay the development and adoption processes.

In this paper, 'information sharing arrangement' refers to the governance and architecture of an IT system that supports inter-organisational sharing activities. Creating such an arrangement entails addressing several matters, for example, centralised or decentralised information exchange, data management and data ownership, platform ownership and the decision making.

According to King (1983), the centralisation versus decentralisation issue is about the control or the balancing of power, organisational function and physical location. Control refers to the centralisation or decentralisation

of decision-making activity (is there a central steering board or does everybody need to be involved each time?). In terms of organisational function, centralisation versus decentralisation concerns the standardisation of organisational operations. Centralisation keeps an organisation's performance in line with organisational protocols and standards, whereas the flexibility of decentralisation is beneficial when the business process of an organisation requires close cooperation between its business units with less central guidance by and less standardisation from management. The latter often results in heterogeneity, but also in better customer-orientation. Finally, physical location refers to having all operations centralised at a single point or distributed over many places.

Data management is the process of collecting, processing, storing and distributing data (Krishnan, 2013). According to Pramatari et al. (2009), efficient data management is critical to ensure information quality and build users' trust in any decision from the information system. Data management also deals with privacy and who is allowed to use the data.

Platform ownership is about who owns, operates and maintains the information sharing platform. This also includes decisions about investments in the platform and development directions. The governance of the system is becoming one of the critical parts in realising a system that involves many actors. Basically, governance mechanisms deal with the decision-making structure, alignment process and formal communications between users (Weill and Ross, 2005).

Because the factors range from organisational to technical, the Technological, Organisational and Environmental (TOE) framework was adopted in this research as the synthesising framework for categorising the factors. Since its introduction by DePietro et al. (1990), TOE has been used as a valuable framework for the adoption of IT innovations at the organisation level (Chau and Tam, 1997). It provides important theoretical perspectives to study the contextual factors (Lin, 2014), a taxonomy for categorising factors (Dedrick and West, 2003) and flexibility to assess the complexity of IT adoption (Bosch-Rekveldt et al., 2011). The framework explores three elements of an organisation that influence its adoption decision of innovations, namely the technological, organisational and environmental contexts (DePietro et al., 1990).

However, the framework also has several disadvantages. It does not explain the decision process or causality within the factors, nor does it provide a core set of constructs for IOS adoption (Rui, 2007). Furthermore, Dedrick and West (2003) argued that the TOE framework does not provide an integrated conceptual model or a comprehensive theory. We concur with this criticism and therefore used the TOE framework only to classify the factors.

3. Research Approach

There is limited knowledge of the factors that determine the arrangement of B2G information sharing. However, which factors are important is likely to be dependent on the context. In this study, data were collected from literature to obtain determinants that influence the shaping of an information sharing arrangement. At the beginning, we started to collect data using general terms, such as 'inter-organisational information system', 'inter-organisational system', 'e-government' and 'information sharing'. We then started using specific keywords, for example 'electronic data interchange', 'EDI', 'eXtensible Business Reporting Language, or XBRL, reporting system', 'standard business reporting' and 'public safety network'. Data were collected from journals and from proceedings of conference on e-government and information systems. The latest version of the e-government reference library (Scholl, 2015) was also used as a source. The results were filtered and determinants with similar meanings were combined. The determinants were then categorised using the TOE framework. The result is the list of factors presented in the following section.

The literature review resulted in a list of possible factors that influence the shaping of B2G information sharing arrangements. As determinants are likely to be context-specific, an in-depth case study was carried out to understand which factors were determinants of the information sharing arrangement. This helped to identify determinants by identifying factors that have more influence than others. Furthermore, the case study helped to identify how determinants are applied in practice. The implementation of SBR in the Netherlands was used as a case study. The SBR system was established in 2009 and has already been used to exchange more than 2.7 million documents (Bharosa et al., 2015). The system is a good example of an IOS that facilitates businesses to

submit their financial statements, including annual reports, statistics and tax reports, to government agencies, and government agencies to respond to those statement.

In total, three people were interviewed and each interview lasted for 1.5 – 2 hours. The respondents represented both public and private organisations, and were selected based on their role in the implementation of SBR. One interviewee was the project leader of the requesting party, one was the advisor to the shared service organisation, and one was a business process consultant working in the field of SBR. The last-mentioned respondent enabled us to capture an overview that goes beyond the single public or private party view. The selected respondents provided rich and comprehensive information regarding SBR.

Data triangulation is crucial in ensuring the validity of qualitative research (Yin, 2003). In the present research, both the data and the researchers were triangulated. Data from publicly available documents, peer-reviewed papers, direct interviews, and reports, including video presentations by the innovation champion in the development of SBR, were collected. Two researchers analysed the collected data using a qualitative tool. The results were then discussed and aggregated to produce the interview reports. The interview reports were then sent to the interviewees, who were asked to confirm and elaborate their answers. A detailed explanation of the case study is presented in section 5.

4. Research Findings: overview of factors

The review of IOS literature uncovered 26 determinants influencing the shaping of the information sharing arrangement. The governance and architecture can be considered comprising the information sharing arrangement (Drews and Schirmer, 2014, Borgman et al., 2013). Information sharing arrangements range from centralised or decentralised networks, through data management and system ownership, to the decision-making processes.

These determinants were grouped using the TOE framework to structure the findings and to enable the analysis. In addition to mapping the factors into the TOE categories, some similar factors were combined; for example, 'Availability of resources' covers the availability of funding, assigned employees and skilful employees. Tables 1, 2 and 3 summarise the Organisational, Technological and Environmental factors respectively, which influence the information sharing arrangement from the literature, and provide a brief description of each factor, including how it influences the adoption process and the arrangement.

Table 1: Organisational determinants of the information sharing arrangement from literature (Praditya and Janssen, 2016)

No	Determinants	Source	Description
1	Firm size	(Sambamurthy and Zmud, 1999, Singerling et al., 2015, Zhu et al., 2003)	Firm size influences both user adoption and system arrangement. Smaller organisations usually choose a bilateral configuration mainly because they fear losing control and have limited resources.
2	Firm structure	(Sambamurthy and Zmud, 1999, Zheng et al., 2009, Yang and Maxwell, 2011)	Firm structure influences system arrangement. Firm structure may reflect IOS legacy and system governance. Firms with many branches usually prefer a decentralised network.
3	Management support	(Borgman et al., 2013)	IT adoption usually requires support from top-level management, e.g. the provision of resources or the ability to change the organisational structure. In terms of arrangement, management support plays a role in decision making, taking into consideration the advantages and disadvantages of certain arrangements.
4	Firm strategy	(Sambamurthy and Zmud, 1999, Grover, 1993, Gil-García et al., 2007)	Firm strategy influences both user adoption and system arrangement. Building a system that aligns with a firm's strategy, either business or IT, will increase the eagerness of the firm to adopt the innovation.
5	Number of users	(Yang et al., 2014, Strong et al., 1997)	The number of users determines which architype should be used to govern the IOS, including the distribution of power in decision making.
6	Availability of resources	(Sambamurthy and Zmud, 1999, Yang and Maxwell, 2011, Singerling et al., 2015)	When more resources are available, they can be used for pilot project implementation and enable larger investments.
7	Power	(Savoldelli et al., 2014, Hart and Saunders, 1997, Yang and Maxwell, 2011)	Larger parties or government agencies sometimes push specific solutions for the implementation. These organisations also prefer to have a centralised and top-down approach in the governance.

No	Determinants	Source	Description
8	Trust	(Hart and Saunders, 1997, Nicolaou et al., 2013)	Existing relationships with other users influences how the organisation deals with certain agreements in terms of e.g. centralised vs decentralised.
9	Level of adoption	(Hameed et al., 2012, Saha, 2010, Barrett and Konsynski, 1982)	Active users may contribute more to the governance and decision making related to the system, and may gain more benefits compared to passive users.
10	Firm governance	(Sambamurthy and Zmud, 1999)	Mode of organisational governance influences the mode of IT governance in the organisation. Thus, mode of IT governance of organisations will influence the IOS arrangement.
11	Governance Structure	(Borgman et al., 2013, van den Broek and van Veenstra, 2015)	Governance maturity in organisations influences innovation adoption. Organisations with more governance maturity are less amenable to new technology as they need to ensure that security standards and legal requirements are complied with.
12	Purpose of sharing	(Bharosa et al., 2015, van den Broek and van Veenstra, 2015)	The data shared can vary depending on the sharing purpose. Reporting data are different from transaction data, for example, in terms of exchange frequency and type of final data to be sent to users. This can affect system arrangement.

Table 2: Technological determinants of the information sharing arrangement from literature (Praditya and Janssen, 2016)

No	Determinants	Source	Description
1	IT maturity	(Zhu et al., 2004, Singerling et al., 2015) (Gil-García et al., 2007)	Poorly integrated systems (usually in government agencies) make IT-facilitated information exchange more difficult to implement.
2	IT compatibility	(Borgman et al., 2013, Hung et al., 2015)	If new technology is compatible with the legacy, firms tend to adopt it. The cost will be relatively lower and it will be easier to create integration.
3	IT complexity	(Borgman et al., 2013)	Government agencies tend to build new autonomous IT systems without connecting them with legacy systems, which results in less integrated IT systems.
4	Number of interfaces	(Bharosa et al., 2015, Singerling et al., 2015)	A large number of systems are used, whereby the large number of interfaces makes communication between systems complex.
5	Process compatibility	(Kamal et al., 2014, Singerling et al., 2015, Vernadat, 2010)	The flexibility of an IOS is needed to accommodate the diversity of organisations incorporated in the system.
6	System security	(Savoldelli et al., 2014, Sayogo and Gil-Garcia, 2014, Yang and Maxwell, 2011)	System security is a critical factor in IOSs. Exchanging information could violate user privacy and could make organisations resistant to adopt the system.
7	Interoperability standard	(Sayogo and Gil-Garcia, 2014, Henning, 2013)	Interoperability standard influences user adoption and system arrangement because this standard determines the internal process adaptation and effort required of organisations.
8	Standardised data	(Guijarro, 2009, Scholl et al., 2012, Vernadat, 2010)	Standardised data influence user behaviour and system arrangement. Users need to adopt standardised data in their system to make this shared data easier for the requesting party to interpret. Low maturity in IT system usually makes this adoption process more difficult.
9	Amount of data	(Bharosa et al., 2015, Tallon et al., 2013, Sá et al., 2015)	Bigger files need more storage, faster connections and better processors. It can also be assumed that bigger files contain more information and need to be processed in a more complicated way.
10	Number of transactions	(Bharosa et al., 2015, Singerling et al., 2015)	The amount of data that government agencies require to be reported is increasing in line with the number of new regulations. This factor is also why multilateral reporting systems are very helpful for organisations.

Table 3: Environmental determinants of the information sharing arrangements from literature (Praditya and Janssen, 2016)

No	Determinants	Source	Description
1	Government regulation	(Kuan and Chau, 2001, Zhu et al., 2004, Zhang et al., 2005)	Policies such as mandating electronic disclosure can force organisations to implement certain systems, whereas policies such as privacy acts will be critical for the system arrangement, because it will make the data provider more cautious in the exchange process. In this case, network security will be the key factor.
2	Competition intensity	(Borgman et al., 2013, Kuan and Chau, 2001)	External pressure such as competition or public pressure forces organisations to innovate – not only in finding new revenue streams but also in making their business process more efficient.

No	Determinants	Source	Description
3	Diversity of users	(Sayogo and Gil-Garcia, 2014)	The diversity of users involved in an IOS, with different goals or structures, leads to difficulties in finding a negotiated solution to the system arrangement.
4	Innovation initiator	(Klievink et al., 2016)	IOSs involving government authorities are usually initiated by those authorities, but it is also possible for businesses to trigger the innovation, because of their flexibility in investing in new technology. This factor can influence the governance of the system.

The list of factors derived from the literature provided insight into which factors might influence the shaping of information sharing arrangements, but did not make clear which factors might be the determinants in a given situation. We therefore carried out an in-depth case study, which is reported in the following section.

5. Determinants in Standard Business Reporting – Netherlands

The implementation of SBR is an example of a B2G IOS to reduce the administrative burden in the financial reporting process. B2G information sharing has been achieved by adopting the standardisation of data, the standardisation of processes and a centralised platform in the network between reporting parties and requesting parties (Geijtenbeek and Lucassen, 2012). SBR replaces the paper-based filings and enables the government and businesses to have an ”unequivocal, cost-effective, secure, and adaptable method” for information sharing (Geijtenbeek and Lucassen, 2012)

Because the implementation of SBR was a long process, we created the timeline shown in figure 2 to help us understand the main events that took place and to analyse the factors that were important during the various implementation phases.

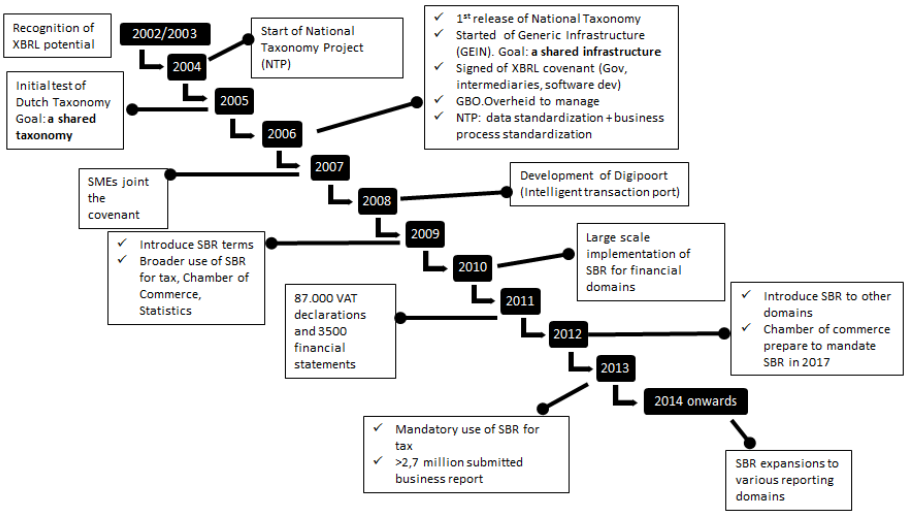

Figure 2: Key events in the implementation of SBR

The programme was initiated in 2002 when the Netherlands Ministry of Economic Affairs recognised the importance of using ICT to simplify the business reporting process. In that year, the Ministry created a programme called ICT and Administratieve Lastenverlichting (‘ICT and reducing the administrative burden’), which is a cooperative venture with industry. One of the successful projects in this programme – OTP (Overheidstransactiepoort; ‘Governmental transaction portal’) – was the use of an electronic gateway for filing financial reports in several formats (Bharosa et al., 2015). The implementation of this system resulted in the recognition by the involved organisations, especially the government, in the need for standardisation in the financial reporting system to avoid heterogeneity and fragmentation and to ensure interoperability. Implementing standardisation in data, process and technology offers opportunities for the involved organisations to decide what kind of configuration to use in the system and how to achieve an optimal process flow to reach the shared objectives; this resulted in a network effect and thus increased user adoption. In other words, standardisation was an important factor in shaping the information sharing arrangement, especially in the early stages of implementation.

The National Taxonomy Project (NTP), which was initiated in 2004, can be considered the starting point for the use of XBRL as the main standard in data exchange for SBR; the main idea was to have a common set of

definitions for data exchange. The XBRL is used mainly because it provides the expression of data definition and the standardisation of data exchange for financial reports. These address the difficulties that occurred in the previous system when the same vocabulary could have different meanings, and thus improved accounting data and financial information quality, and eased the evaluation process of the reported data (Perdana et al., 2014). However, this standardisation also requires a suitable information infrastructure, so in the same year, the design of the generic infrastructure (GEIN) – a new interface of OTP that enables more modularity and flexibility in the information processes – was also started. In 2006, the design was completed and the Netherlands released the first version of the Netherlands Taxonomy (NT). The information infrastructure can be regarded as the resulting IOS arrangement together with the governance.

Earlier in 2006, numerous meetings, including political lobbying, had been conducted to establish the public–private cooperation between the government, intermediaries, businesses and software developers. The political lobbying mainly occurred when the decision making could not be finalised or a deadlock was reached. Such deadlocks were reached when stakeholders could not reach agreement not only at the strategic level, but also at the tactical and technical levels. The common goal was the adoption of the Dutch XBRL Taxonomy for financial reports. In this phase, the adoption process for SBR was greatly assisted by the involvement of the Dutch tax authorities and VNO–NCW (the Dutch employers' federation). The tax authorities provide a connection to all business entities and all government agencies in the Netherlands. It is also aligned with the objective of SBR to improve the administration process of tax reports. Furthermore, before adopting this XBRL-based reporting system, the tax authorities were already using an XML-based reporting system in their back-office, thus no extreme transformation was needed and there was no internal resistance. Finally, the governance of the new system adopted the existing public–private cooperation between tax authorities, tax consultants, taxpayers and tax-software providers. As for the involvement of VNO–NCW, it was more about communication. The VNO–NCW basically mediated the communication from government agencies to industries and within industries. This organisation is also connected to all industry domains, which reduces the effort in creating public–private cooperation. So, the adoption of the system by major public organisations is also considered as an important factor for the information sharing arrangement.

'GBO.Overheid' – a public service centre under the responsibility of the Ministry of Interior and Kingdom Relations – is responsible for providing public e-services in the Netherlands. This organisation was put in charge of the development of both the taxonomy and the shared infrastructure. Since then, the focus of the NTP has been expanded to business process standardisation in addition to the data standardisation.

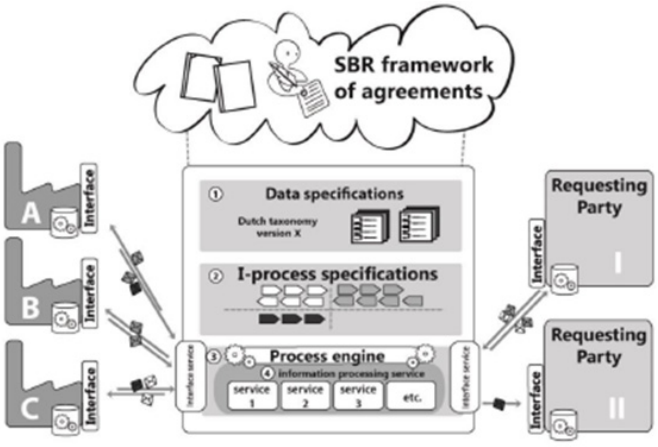

Figure 3: SBR Architecture (Bharosa et al., 2015)

In 2008, the development of Digipoort, based on GEIN, as the main infrastructure of SBR was started. Digipoort is a government-owned multiport platform where the government's message traffic is processed (indicated as no. 3 in figure 3). Government agencies can use Digipoort to automate business and supply chain processes. In Digipoort, shared data from the reporting parties undergo several processes assigned by I-process (no. 2 in figure 3), including the authentication of the sender, basic validation of the data based on the taxonomy (no. 1 in figure 3) and reuse of data according to the requirement of the requesting parties (also based on taxonomy). These processes also act as a buffering system in dealing with huge amounts of data and with network problems. Therefore, in the resulting information sharing arrangement there is no centralised storage

in SBR. This reduces the chances of security breaches and keeps the ownership of the shared data in the hands of the reporting organisations.

The year 2009 is another milestone in the history of SBR, because that was when the government started to use the term SBR instead of NTP and redefined its objective, that is, to be a generic system-to-system (S2S) message exchange. The government also decided to expand the use of SBR to the Chamber of Commerce and the Netherlands Central Bureau of Statistics in addition to the tax authorities. In 2010, the large-scale implementation of SBR was started and GBO.Overheid was renamed Logius.

A large volume of XBRL messages within the financial domains were involved in the system. In 2011, 87,000 value added tax (VAT) declarations and 3,500 financial statements were processed through the system. The operational issues then become part of the focus of the programme due to the high number of message exchanges. In the same year, the government decided to mandate the use of SBR as the exclusive channel for tax and customs reports per 2013, and as the exclusive channel for VAT per 2014. SBR started to expand the potential use of XBRL in non-financial fields in 2012, and the Chamber of Commerce prepared to mandate the use of SBR in 2017. The number of financial reports submitted through SBR increased significantly from around 2.7 million in 2013 to around 15 million in 2015. This increase was not only because of the regulation, but also because the benefit of SBR already perceived by the users: it strengthens the trust of stakeholders to continue using SBR and even extend it to be used in other domains. Another recent expansion is related to the development of taxonomy: it was previously fully carried out by the government, but it is now open to all users.

According to the three interviewees, the governance of SBR was one of the key factors in the implementation process. The governance structure provides the decision-making structure, rights, responsibility and formal communication among stakeholders. The SBR governance changed over time and is intrinsically connected to the information sharing architecture. Two principles were used in establishing the system governance of SBR: 1) rigid, to guarantee the stability of cooperation and architecture, using precautionary, proportionality and equality of the decision-making processes; 2) flexible, to guarantee adaptability of new solutions, extensions or new chains. This is manifested in open innovation, for example, in developing the taxonomy, and voluntary governance approach.

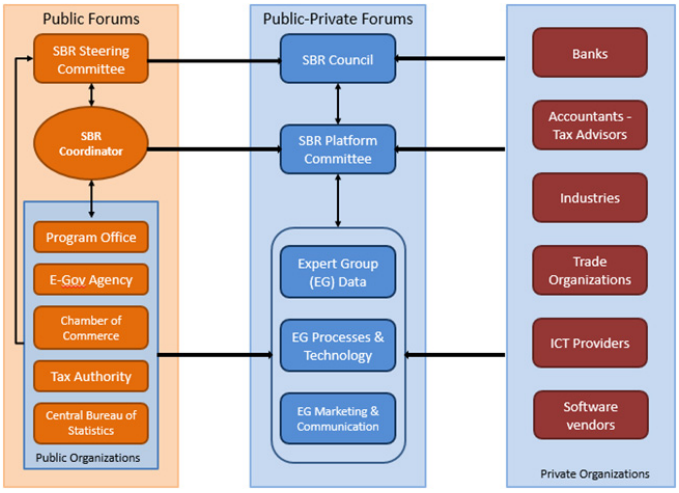

Figure 4: The structure of SBR governance (Bharosa et al., 2015)

The governance of SBR consists of two building blocks (as depicted in figure 4): the public SBR forums (left) and the public–private SBR forums (centre). The public SBR forums deal with the administrative authority of the public–private forums and the information architecture. The top hierarchy of the forums is the SBR Steering Committee, which is composed of representatives from all government agencies. This Committee handles the strategic level, including future expansions of SBR and its information infrastructure. The tactical level in the forums is the SBR Coordinator group, which is composed of representatives of all project leaders at government agencies. This section handles the monitoring and evaluation of the costs and activities of the operational level. The operational level in the forums is composed of experts from government agencies working together with expert groups in the public–private forums to resolve issues regarding the services and to identify the need to change processes or taxonomies and determine the impact of such changes.

The public–private forums deal with SBR development regarding network integration, including compliance with the SBR standards, government rules and other financial/accounting standards. The forums' structure can be changed over time, for example, because of the shifting focus of the development or the involvement of different stakeholders. The highest hierarchy of the SBR public–private forums is the SBR Council, as the strategic level, which is composed of top-level management from government agencies and businesses. The main job of the Council is to define the framework for using SBR in the longer term, including how to market this system to be used in other domains. The second layer is the SBR Platform, as the tactical level, which consists of representatives from businesses and government agencies with hands-on experience who identify issues that affect the adoption. The operational layer, as mentioned earlier, is the SBR Expert groups. There are three expert groups in the SBR public–private forums: Data, Process & Technology, and Marketing.

SBR uses a multiport platform owned by the government (Digipoort). The development of this infrastructure shows the centralisation in the operational level and physical location driven by the governmental power. In the upper layers – taxonomy and i-process – a similar situation appears. The development of the taxonomy and i-process was monopolised by the government, even though businesses could also contribute indirectly. However, a decentralised approach is used in the system governance, mainly to assist the uptake of the system by increasing the participation level. Representatives of businesses and intermediaries were involved in the decision-making process regarding the technical issues, and other issues that could hinder or delay the adoption process. This involvement has led to the emergence of trust in the system and strengthened the relationship between stakeholders. The effect of these conditions was the shift of power from government to public–private cooperation.

Table 4: Main determinants found in the case

TOE Category	No	Determinant	Explanation
Organisational	1	Trust	Perceived benefits and the governance structure promote trust in SBR. Trust is reflected in the strong contribution of users in the decision-making process of the system even though the governance is applied on a voluntary basis.
	2	Power	The wider adoption of SBR by businesses resulted in the shift of power from government to businesses, mainly reflected in the decision-making process in the tactical and technical layers (e.g. The development of taxonomy). It was previously fully carried out by the government, but it is now open to all users.
	3	Involvement of major public organisations	The decision of the Dutch tax authorities to adopt SBR was a big push towards wider adoption since every company has to provide tax reports. The objective during the early implementation of SBR focussed on this domain, which is reflected in the adoption of existing public–private cooperation for the early governance of the system.
Technological	1	Compatibility	Standardisation of data, technology and process is needed to avoid heterogeneity and the fragmentation of existing IT systems owned by organisations. This compatibility and interoperability within the system resulted in multi-connection information sharing using a centralised infrastructure.
	2	Interoperability	

6. Conclusions

This study identified the determinants that influence the shaping of information sharing arrangements. The literature review led to the discovery of 26 factors, namely 12 organisational factors, 10 technological factors and four environmental factors. An in-depth case study was conducted to gain more insight into how these factors influence the information sharing arrangement. Of the 26 factors, five prominent factors were found in the case study. The case study also demonstrated that the determinants change over time. In different phases, different determinants played a role. Furthermore, the case shows that the information sharing arrangement is reflected in the system architecture and the inter-organisational governance structure, as the two elements are intrinsically linked.

The development of SBR shows the importance of compatibility and interoperability as determinants shaping the information sharing arrangement, especially in the early phase of implementation. With the standardisation of data, technology and process, compatibility and interoperability were achieved within the

system, which resulted in multi-connection information sharing using a centralised infrastructure. In the early stage of the implementation, the importance of major public organisations adopting the system was recognised, which led to the ease of communicating with and marketing the system to the potential users.

After the system was established, trust and power played major roles, and thus were the important factors. Trust was engendered because the users recognised the benefits of the system and because of the structure of governance, which provides a medium for stakeholders to contribute to the system. With the increase in trust, the uptake of the system, even without being mandated by the government, increased significantly, which resulted in the shifting of power. In the early adoption phase, the development of the system was fully guided by government agencies. With the growing influence of businesses, the governance of the system changed, as did the business layer of the architecture.

Our case study provided insight into the factors that were relevant to the case; however, it did not allow us to realise the contextual determinants in the creation of B2G information sharing. Further studies could provide more insights into the influence of determinants among domains. The list of factors from the literature can be used as a solid basis for this.

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