The Janus-Faced Approach to Governance: A Mismatch Between Public Sector Reforms and Digital Government in Estonia

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ABSTRACT

While the Estonian digital government has received considerable attention in research and policy circles, there has been a lack of broader understanding of digital government initiatives in the context of public sector governance. By relying on literature on digital governance as well as on public sector governance and using various qualitative methods, this on-going research focuses on the public sector reforms and digital government efforts in Estonia. It reveals that the relationships between technology and public sector reforms have been broadly unintentional. Most importantly, policy communities pushing for advancement of digital government and public sector reforms are different and there is a considerable mismatch in policy-making. One hand, this divide stems from emphasis on different ideas. Some policy-makers are highly technology-centric while other assign primary role to institutions. On the other hand, considerable barriers for interagency cooperation exist as well as cooperation between public and private sector. The latter is particularly challenging as the bottom-up cooperation between private and public sector has been a particular strength in the development of digital governance in Estonia. Furthermore, relative de-centralization of online public sector services has been a source of innovation. At the same time, public sector governance has been highly centralized. These mismatches between digital governance and overall public sector governance has contributed to institutional complexity and lead to bottlenecks in advancing public sector governance and digitalization of governance.

CCS CONCEPTS

• **Social and professional topics → Commerce policy**; *Governmental regulations* • **Computing in government →** E-government

KEYWORDS

Digital government, public sector reforms, transformative government, interagency cooperation

1 INTRODUCTION

The Estonian digital government in general and its various components have received a considerable attention in policy circles as well as in academic and policy literature [1] [2] [3] [4] [5] [6] [7] [8]. The accomplishments of Estonia have been often served as an example of best practices that other governments can learn from. However, implementation of digital governance in Estonia has also shortcomings which must be considered. This paper is a part of larger ongoing research project on the future of (e)governance in Estonia with the aim to increase awareness of potential future developments and highlight main critical junctures for decision-makers in the Estonian Parliament as well as in the executive branch. In order to do so, alternative scenarios about the future of (e)governance in Estonia by 2030 will be created. The scenarios rely on interaction of both institutional and technological factors affecting potential developments in the future. The project aims to answer to the main question: "How to create efficient, equitable and agile governance model in Estonia by combining interaction of institutional and technological factors?" In order to do so, the project will identify key drivers for future developments on the basis of literature review, interviews and focus groups with experts. The digital government (or e-government) has been fundamental for public sector governance in Estonia. It goes without saying that digitalization has allowed Estonian government service delivery to be more efficient and transparent. It has created an open and business friendly environment, where entrepreneurs and regular citizens have been able to reduce transaction costs in their daily

undertakings from declaring taxes to voting. However, the possibilities offered by e-government in service delivery and enhancement of political participation has not been sufficiently and explicitly considered in the efforts to reform public sector. Different policy-makers and stakeholders are involved in public sector reform than in e-government policy formulation. Hence, there is often mismatch in two perspectives and insufficient policy actions to integrate them and highlight potential synergies. Furthermore, the adoption of information and communication technology (ICT) and diffusion of various ICT solutions throughout public sector has not been as uniform as it is sometimes perceived in Estonia and abroad. While online tax declarations have been a reality since 2000, the digitalization of health care and social security services have made a slow progress. Different government departments operate in their own silos. This narrows the approach in delivering broad-based digital solutions. While the decentralization has been a source of innovation in the Estonian e-government, there is a need for greater interagency cooperation. The importance of these departmental constraints reveals clearly that the adoption of ICT does not depend only on the availability of new technical solutions, and is not as linear as it is often perceived. In fact, the ICT adoption as adoption of any other technology is epistemological by nature [9] [10] [11] [12] [13] [14]. This implies that in different institutional, social, political and economic context we should expect to witness different levels of ICT adoption and the nature of ICT use. Hence, the ICT adoption and the use in government requires a consideration of broader institutional, economic, social and political setting. The e-government and its potential for public sector governance must be seen in the broader context of institutions and their change. Institutions are understood as both formal and informal rules of the game [15] [16]. As the public sector governance has a direct impact on formal institutions (rules, regulations et al) and its interdependence on informal institutions (habits, norms, customs) is indirect, then the focus in this paper is primarily on formal institutions. Formal institutions matter because through them political, economic and social preferences are channeled. As Milner points out "…political institutions in particular matter for the adoption of new technologies because they affect the manner and degree to which winners and losers from the technology can translate their preferences into influence. Groups that believe they will lose from the Internet try to use political institutions to enact policies that block the spread of the Internet. These "losers" hope to slow down or stop its diffusion, and some institutions make this easier to do than others" [17]. The importance of formal institutions is particularly important for inter-agency cooperation and cooperation between private and public sector. It goes without saying that ICT can be used as a way to enhance this cooperation in particular and good governance in general. As Fountain points out in the context of policy-making in the United States "the future of government relies not simply on greater efficiency, but also on increasing capacity to work effectively across agency boundaries to gain traction on pressing, inherently cross-boundary challenges" [18]. Similarly, the widespread cooperation in governance is considered crucial in the European Union as it can lead to so-called invisible government, where distinction between public and private services becomes blurred. Public sector services can be delivered in the context of existing work flow and pattern which can considerably reduce transaction costs in their use [19].

The capacity to cooperate and work effectively across boundaries is particularly important in the emerging platform economy. The recent literature has emphasized the importance of the rise of platforms in economic, social, cultural and political affairs and interactions [20]. This set of literature refers particularly to private sector created systemically important platforms such as Facebook, Amazon, Uber and others which have gained dominant market positions. Platforms are also crucial in governance as e-government scholars have increasingly started to discuss e-government as a platform and emphasized the importance platform-based governance [21].

Most importantly, both market-based and government platforms are interacting which leads to interdependence of platforms. As will be discussed below government platform may be built on market based platform and vice versa. For successful collaboration it will be crucial to reduce institutional complexity [22]. Smaller degree of institutional complexity lowers transaction costs and allows for both policy entrepreneurs and private sector entrepreneurs find opportunities for collaboration and strive towards what Mazzucato calls "entrepreneurial state" [23]. Indeed, such entrepreneurial discovery processes can take place in both private and public sectors as smart specialization literature has emphasized [24] [25]. What Crouch calls "institutional entrepreneurs" [26] can shape the institutional design of governance with benefits of enhanced collaboration and lower transaction costs in mind.

The paper is a part of on-going research project and is structured as follows. The next part will give an overview of research methods. This is followed by empirical part discussing the connection between digital government and governance in Estonia. At last, conclusion highlights key findings and implications of the paper.

2   RESEARCH METHODS

Several qualitative research methods are combined in this paper. First, eight exploratory and unstructured interviews were carried out from April 2017 to June 2017. Six interviews were with key policy-makers from both executive and legislative branch. Two interviews were with a key stakeholder. Interviews were coded to from 1 to 8 and references are made to them in the text and they are listed in Appendix A. Interviews focused on current state of digital governance and public sector reform efforts with aim to identify key drivers and main challenges.

Second, the author observed meetings of the parliament's special committee on state reform on April 2017. Third, two parallel focus groups discussions with key policy-makers and experts were organized on June 14, 2017 at the Estonian Parliament. Total of 20 experts and policy-makers participated in the focus groups, 10 in each group. The discussion was semi-structured as questions were prepared in advance but participants had impact in shaping the flow of discussion. The main purpose was to facilitate open discussion and brain-storming to see differences in goal-setting and priorities. The focus group questions focused on how public governance in Estonia in 2030 might look like and then tackled what are key drivers that may lead to various governance model.

Fourth, online network analysis was carried out with issuecrawler.net. The purpose of online network analysis was to demonstrate how different websites relate to each other in the ecosystem of digital governance. At last but not least, the research relies on document analysis and secondary sources. Comparison with other European countries are made to emphasize key points. The following analysis is structured by key themes, not by methods. As multiple and diverse set of methods were used, then structured based on methods would not have allowed for a sufficient flow in discussion.

3 PUBLIC SECTOR REFORMS AND DIGITAL GOVERNMENT IN ESTONIA

On basis of interviews and focus groups three main themes emerged. First, different emphasis on understanding public sector governance as some policy-makers and stakeholders are technology centric and others emphasize more institutional design. Second, interagency cooperation was emphasized in both interviews and focus groups. Third, an important issue was centralization and decentralization in public governance. The following parts will discuss each of the topic.

3.1 Emphasis on Technology or Institutions in Public Sector Governance

One of the main criticism articulated through interviews was that the Estonian public sector is lacking a long-term vision and direction where it is heading. Currently, the executive branch is carrying out significant public sector reforms. However, as one government official pointed out when ministers are criticized for a lack of vision, then they ask civil servants "where is the vision" (interview 3). Hence, in the focus groups policy-makers where asked about their vision of public sector governance in Estonia in 2030.

There are clearly two groups in policy-making. The first group is technology centric and emphasizes the role of technology in governance. When asked about how governance might look like in 2030, it is primarily about automation, the use of artificial intelligence and digital platforms which allow constant interaction between citizens and policy-makers. Citizens have time to participate as robots to most of the work. This group points out that the use of ICT allows to ensure better quality in public sector service delivery. The use of ICT will allow to reduce the cost of governing. Instead of current 101 members of Estonian Parliament 50 members would be sufficient in 2030. Artificial intelligence can take over some functions in law-making. The technology allows overcoming barriers in interagency cooperation which contributes to flexibility in governance. The elections should not be cyclical but should take place constantly.

The other group of policy-makers sees technology as a means for governance and emphasizes other issues such as how to make government more transparent, more citizen-centric, how to use best the principle of subsidiarity and so on. This group is not necessarily against technology use but they do not want to overemphasize its importance and see potential risks (security and privacy concerns

for instance). Their view of governance in 2030 emphasizes that the trust in government has increased resulting from greater transparency and political participation. Citizens will engage in collective decision-making which is based on ethics and contributes to the greater good. The governance will be transparent and participatory which also considers the views of those who will not engage in politics on a regular basis. The wealth of society has increased which allocates additional time for political participation. The changes will require constitutional reform which can be carried out peacefully.

Even though visions of public sector governance in 2030 were quite optimistic in focus groups, then in one of the focus groups four alternative scenarios were developed. The first scenario titled "hologram state" emphasized the ability of government to deliver quality services as well as to be government on the basis of citizen-centric participatory model. The second scenario "delegative state" emphasized the importance of central government which delegates tasks to civic organizations on the basis of centralized visions and plans. The third scenario "incapable autocracy" paints the government run by political elites which control essential resources but outside their governance area self-regulation has taken hold resembling anarchy. The fourth scenario "information society totalitarianism" envisions governance model where central government controls all essential services and information while transparency is lacking, freedoms and democratic values has been suppressed.

In these four scenarios, focus group members gave different emphasis to ICTs in various forms of governance. Based on discussions in the focus groups it is obvious that the last two scenarios were created primarily in order to think about possible risks and the first two scenarios are preferred options.

The discussion about visions and scenarios was followed by highlighting key drivers and bottlenecks for achieving the desired state. As many factors were emphasized, then the following sections will try to sum them up under two key themes: interagency cooperation and centralization or decentralization. These are drivers which are primarily broadly possible to shape by policy-makers while discussions of drivers outside the realm of policy-makers are left out of the discussion. Particularly so, as focus groups discussed primarily drivers which can be shaped by policy-makers and left out drivers that cannot be shaped by Estonian policy-makers directly such as globalization, climate change and others.

3.2 Interagency Cooperation and Public-Private Collaboration

Second theme that emerged from the interviews and focus groups discussion is that the Estonian public sector service delivery, including delivery of services through online channels, faces considerable challenges in ensuring efficient cooperation among various public sector agencies, between public and private as well as non-governmental organizations. The question of cooperation is important on a number of levels. First, it is about cooperation in providing in digital services between government agencies and private sector. Second, it is important about all government services

and to what degree some of the can be digitized. Third, it is important issue concerning democratic participation and technology use where cooperation between legislative and executive branch is required.

While collaboration enabling technological solutions have been around for years and Estonia promotes its technological solutions such as e-residency abroad technological opportunities have not received explicit attention in attempts to carry out public sector reforms in Estonia. Different set of policy-makers and stakeholders are involved in two processes. The cooperation has not been sufficient for integrating two perspectives and finding potential synergy between two perspectives.

The focus groups emphasized comprehensive target-setting across agency boundaries as well as experimenting with different policy solutions, encouraging entrepreneurship in public sector governance as well as being more ambitious and avoiding overregulation.

3.2.1. Public sector reform agenda. The public sector reform in Estonia reminds the Indian parable of blind men and an elephant. Blind men are touching different parts of elephant and as a result come to the different conclusion on the nature of animal. Similarly, different stakeholders and policy-makers emphasize different aspects of public sector reforms. For some, it is primarily about local government and merging different municipal governments. For others, it is about centralization of government services such as accounting and IT. Some want to use it for regional economic development by transferring government offices from the capital to the periphery. And then there are experts who discuss role of presidency.

In one version of the Indian parable, the ruler will tell to blind men how the elephant looks like. Similarly, the Estonian government is currently implementing considerable amount of changes in formal institutions stemming from its „state reform" agenda. By "state" Estonian government means primarily executive branch. Although certain activities in the agenda touch also upon presidential elections and constitution.

The government's action plan from January 2017 to March 2019 concerning public sector reforms states that the core principles are balance (as balanced development between regions, balanced service delivery between local and central government), efficiency and openness [34]. Nevertheless, these reforms are primarily efficiency driven focusing on cost-savings in various tasks of public sector services delivery as well as in key functions.

The government has listed about 50 activities in its public sector reform agenda. Of these 50 about 30 are listed under efficiency principle while balance and openness have both 10 activities listed. In addition, some of the activities listed under balance and openness seem to be efficiency driven. For instance, one of the key aims listed under balance is to merge municipalities so that each of them has at least 5000 inhabitants. One goal under openness is to implement efficiency plan in enterprise and innovation policy in order to cut public sector expenditure.

The agenda has also limited explicit emphasis on technological developments which may enhance the implementation of public sector reform agenda. Of the 50 activities in the agenda 6 refer explicitly to the use of technology. Other activities may have technological component but they are not mentioned explicitly.

Under the principle of balance only one activity "improvement of local government IT capacity" concern explicitly opportunities offered by technology. Under efficiency are listed "Development of public sector universal ICT service description and pricing model", "Automatic technological solution for declaring personnel and financial data", "Cross-use of data between registers of Ministry of Defense, Ministry of Finance and Ministry of Social Affairs", "The use of electronic invoices between private and public sector" and "Complete transformation of public procurement to the electronic platform". There are not explicitly technology-driven initiatives mentioned under the principles of openness in the reform agenda.

This document analysis does not imply that government reform agenda must see everything through the lenses of technology and take a technologically deterministic worldview. Rather, opportunities offered by technology should be more integrated into the agenda and explicitly pointed out. For instance, under the principle of balance is a goal to establish "state houses", which are essentially public sector service hubs for delivering public services. Potentially, such hubs can be also virtual or semi-virtual. Explicit references to technological opportunities in the delivery of public sector services are warranted.

Implicitly or explicitly, the public sector reforms affect democratic aspects of governance as well. Efficiency may not always go in-hand with democracy. Considerable trade-offs between efficiency and equity may appear as the efficiency driven reforms will be implemented. The centralization of government services and functions may cause further alienation of government from citizens as was also emphasized in some interviews and focus group discussions. These are the issues that government state reform agenda does not address as it is primarily focused on efficiency of public sector service delivery and is executive-branch centric. The agenda explicitly points out that "Only parliament can take a lead position on issues of democracy and public involvement".

However, the reality is that parliamentary discussions in the special committee on "state reform" have focused solely on executive branch agenda and reacted to the goals of government. Through interviews and focus groups it was articulated that government lacks the long-term vision of public sector reform and this is something to be articulated by the parliament. Therefore, a more pro-active approach by the parliament and asking more fundamental questions about public sector governance and its reforms is crucial for establishing a proper balance rather than articulated balance.

For instance, from the perspective of members of parliament, it is crucial to think how the reforms will affect the balance between legislative and executive branch. As members of parliament represent different areas from all over Estonia, then it is fundamental to explore how different governance models accommodate involvement of municipalities, local communities and individuals in decision-making processes of public sector and how ICT solutions can be utilized in these processes.

This leads to the question to what extent can adoption and use of ICTs contribute to the reforms of public sector, among other things compensate for alienating effects of centralization and which ways it will take place. Since the ICTs and governance reforms should not be mutually independent but can rather be seen as interdependent, then it leads a question how different how ICT can improve public sector governance in Estonia. One thing that most policy-makers and stakeholders in interviews and focus groups agreed on was the need for a greater synergy between digital government initiatives and public sector reforms.

The following section will discuss the importance of public-private collaboration in the development of digital governance on the basis of secondary data and online network analysis.

3.2.2 Public and private sector collaboration in digital government. This emphasis on the private and public sector cooperation is particularly understandable in the broader context of Estonian digital government. Estonian government carried out comprehensive and rapid reforms in the 1990s which encouraged market developments, reduced the public sector involvement in the economy and contributed to the diffusion of ICTs. Unintentionally, a certain synergy emerged between government use of technology and public sector reforms. The following section will offer an overview of key changes that took place as a result of public and private sector cooperation. The rapid and comprehensive changes in the rules of the game encourage bottom-up initiatives where both private and public sector organizations introduced new innovative solutions. Often, these online services were complementary.

The most important development was the introduction of internet banking in 1996 by Estonian banks Hansapank and Ühispank. Often scholars fail to grasp the Estonian context where internet banking is not just about providing one service but providing a platform for many services, including e-government services. Essentially, internet banking emerged as a platform in Estonia already in 2000 – a long before e-government scholars started to write about e-government as a platform.

Estonian new banks in the 1990s were effectively start-ups because there were no old legacy banks. The Soviet banking system was undeveloped. To great extent it was cash-based system. The use of checks was not widespread. Hence, it was possible to start from blank sheet and avoid the same development trajectories that were experienced by more advanced countries. This provided a critical juncture because Estonian banks did not have to deal with legacy costs and path-dependencies of old banking systems. It was possible to move from cash-based system to internet banking without ever introducing checks and other old technologies.

The quality, security and simplicity of internet banking service attracted the majority of Internet users as its customers [27]. In 2005, 35 percent of Estonian people used Internet banking. In 2015, the use of internet banking was almost universal among internet users as it reached 79 percent of total population. As the Fig. 1 below shows clearly, Estonian lead in the internet banking is exceptional among the CEE countries that joined the EU in 2004 and 2007 as well as in comparison with EU average.

Let's make a comparison with Slovenia, which is the wealthiest country in the CEE and among countries which joined the EU in 2004 and 2007. In 2005, the use of internet banking in Slovenia was almost four times smaller than in Estonia and in 2015 it was almost 2.5 times smaller. Slovenia has not just been a laggard in comparison with Estonia but also in comparison with the Czech Republic, Latvia, Lithuania and Slovakia. Only 4-5 percent of internet users used internet banking in Romania and Bulgaria in 2016.

The huge variance of outcomes can be understood in the context of epistemological nature of technology and role of local context in internet diffusion. Even various internet banking solutions have been available for 20 years, these solutions have not diffused evenly to countries characterized by relatively similar socio-economic development (as countries which joined the EU in 2004 and 2007 are).

It is important to keep in mind that most people do not need to interact and make transactions with government often. At the same time, the use of banking services can be a daily or weekly necessity. According to Alexa.com data on top sites in Estonia in 2015, the government portal eesti.ee, a gateway to different government online services, is ranked 113 among top sites in Estonia. At the same time, the website of the largest bank by market share in Estonia swedbank.ee was ranked 8 and second largest bank seb.ee was ranked 16 among top websites. The websites of smaller banks lhv.ee was ranked 62 and Nordea.com was ranked 110. In other words, even small banks beat the government central portal in attracting users.
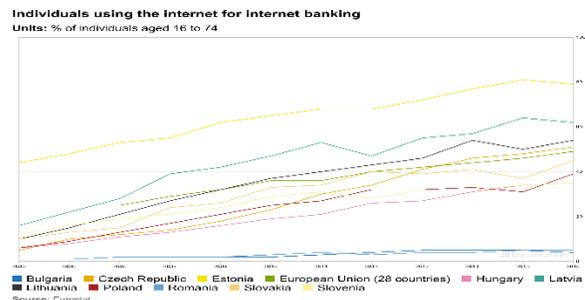

Figure 1: Individuals using Internet for Internet banking in selected CEE countries and EU on the basis of data from Eurostat (2017).

To be more objective, it has to be mentioned that the website of capital city Tallinn.ee was ranked 49 and rik.ee, which provides online access to land, property and enterprise registers, was ranked 65 [28]. Fig. 2 provides historical traffic trends showing that websites of two largest banks www.swedbank.ee and www.seb.ee have considerably higher global rank by attracting number of visitors than three most popular public sector websites www.tallinn.ee, www.rik.ee and www.eesti.ee. This indicates two trends. First, many users go directly to subwebsites of government services rather than access them through government portal. Second, the websites of large banks attract considerably more users than any government service. The data collected by Alexa is based on monthly traffic rank which is combination of average daily visitors and page views over past month. Certainly, monthly data

may not be representative of broader trends and some websites may experience considerable volatility of visits on monthly basis.

Nevertheless, all these websites are well established in Estonia and have loyal visitors. We can assume that most visitors have to access their banking and government services with certain regularity and are not likely to change their bank or government often. Hence, it can be described as a path-dependent process where initial decision to use particular bank and its internet banking services will lead to the regular use of their services.

Many Estonian government agencies started to use the identification verification offered by internet banking, thereby enabling government services online. Estonian Tax Authority developed a new software solution in cooperation with companies Sema Group Belgium and AboBase Systems and started to offer an option to declare taxes online already in 2000. The availability of bank-based online identification system allowed them to do so. In fact, in online banking environments it is possible to enter directly to Tax Authorities webpage and declare taxes online. In 2014 95 percent of people declared their taxes online.
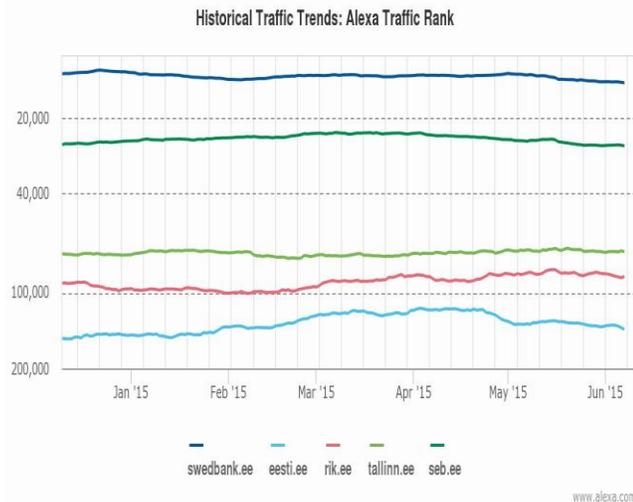

Figure 2: Top government and bank websites in Estonia from January 15 to June 15 in 2015 on the basis of global traffic rank with data from Alexa (2015).

According to Aivar Sõerd, General Director of Estonian Tax Authority from 1999 to 2003, the implementation of online services cost to taxpayers only 85 000 euros [29]. "Cooperation with banks led to considerable cost savings," wrote Sõerd in the leading Estonian daily [29]. Sõerd emphasized that "two largest banks at that time Hanspank and Ühispank offered to government an opportunity to rely on their bank portals for logging into the (tax authority online) environment" [29].

It is obvious from Sõerd's comments that the main focus was on cost saving and control. Since identification tools were made available by the banks, then the tax authority relied on them. Questions whether the use of private sector identification methods is acceptable or not in providing government services were not discussed. It was implemented as a tax authority service project and

it did not require any special legislation and wider discussion in the government. Again, functional focus on implementing a concrete project by specific government department without consideration of broader issues and without general government strategy fits neatly into what Kitsing [30] called "success without strategy" in discussing the development of Estonian e-government. It is also a prime example of entrepreneurial discovery process in delivering e-government services.

Let me recall the literature review which defines entrepreneurs very broadly: policy makers, public universities and research institutes can be entrepreneurial and part of the process. In many ways development of online services by Estonian Tax Authority is also consistent with Mazzucato's concept of "entrepreneurial state" or what Crouch calls "institutional entrepreneurs" [26]. Mazzucato emphasizes that different public sector bodies can contribute towards innovation outcomes. It does not have to be central government and centralized top-down policy-making [23].

Aivar Sõerd of Tax Authority and his employees acted as entrepreneurs by making tax declarations accessible online to public and minimizing costs in doing so. According to Sõerd [29], the project was implemented in two phases: a pilot took place in 1999 and in 2000 full services made available for individuals and companies. 12 000 people used the Tax Authority online services in 2000, which consisted of submitting and correcting income and value-added tax declarations, make inquiries about tax liabilities and other transactions.

Sõerd argues that in principle the online services of Tax Authority have remained the same from 2000 to 2015 and it should serve as a model for optimization of the government services. Again, his focus is on optimization and for him public sector "is by nature a large organization which offers public services" [29]. Again, focus is on functionality and tax declaration services are seen as any other service available in the private sector.
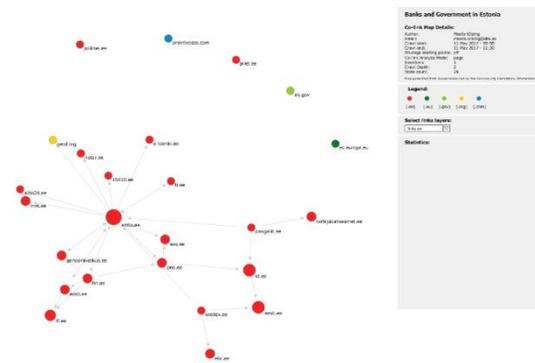

Figure 3: Online network analysis of Estonian e-government websites conducted by author with issuecrawler.net (2017).

Fig. 3 shows online network analysis of Estonian e-government websites carried out by inserting key websites of Estonian e-government services into issuecrawler.net. It shows relatively centralized network where the central point is emta.ee – the website of Estonian Tax Authority. Quite tellingly eesti.ee – a central e-

government portal is featured less prominently in the periphery of network and is connected to the Tax Authority through several network nodes. Basically, by using internet banking as a platform the Tax Authority has managed to establish itself as the most important e-government service in Estonia. However, instead of leveraging already existing Tax Authority platform several agencies prefer to develop their own systems which is an important bottleneck for inter-agency cooperation. For instance, welfare information system of Ministry of Social Affairs known as SKAIS2 could have relied on the Tax Authority platform, but was developed on its own and has resulted in overspending and massive failures so far.

3.3 Centralization and decentralization

The third theme is in many ways connected to the second theme but it has its own nuances depending one a perspective of policy-maker and stakeholder. This is the degree of centralization in public governance (principle of subsidiarity was also used). Usually, in the debates of Estonian public sector reform it is understood as an issue of balance between local and central government. This was also focus on interviews with some policy-makers involved in public sector governance.

However, in other interviews and focus groups the issue is defined more broadly. The decentralization does not stop at local government level but should go all the way to the individual. In other words, it is a question of how much individual decision-making is allowed in governance and to what extent government will be able to consider the input of individuals in decision-making. It is also about to what extent can public sector services outsourced to local communities (not the same thing as local government) and private sector.

Furthermore, there was considerable debate on decentralization in the focus groups as decentralization of governance is not necessarily the same thing as decentralization of digital government platforms. One view was that digital government platforms can be centralized while they can take into account decentralized preferences of citizens. Each citizen can have an account of public sector services and they can constantly view this account. All public services would rely in kind of voucher system (similar to school vouchers) where citizens can choose at which vendor they will use their government provided vouchers. In a way it would be kind of "uberization of government".

Alternative view was that centralization has considerable risks and bottom-up approach in both governance and digital government is preferable. Particularly, as this is something that has proved to be workable model in Estonia. I will discuss the second and third theme together in the context of evolution of Estonian digital government on basis of example of X-Road and ID card.

The cooperation between private and public sector is faciliated by de-centralized X-Road system that forms the backbone of Estonian e-government as shown in Fig. 4. The X-Road system was outlined in the Master of Science thesis of Arne Asper in 2001, a programmer working for small Estonian IT firm Cybernetica employing about 100 people. The distributed nature of X-Road

makes it more secure than centralized system and allows to exploit the benefits what was called "stupid network" by Icenberg [32].

The X-Road can route queries with different databases in the public and private sector as demonstrated in the Fig. 4. As systems are technologically different, then they have to use adopters to send and receive information through X-Road. Each computer system uses its own secure server for encryption to protect sensitive data. The Fig. 4 demonstrates how public sector registries, telecom and energy companies, banks, government portal as well as electronic ID infrastructure are all connected through a decentralized network. The cost of X-Road has been up to 67 million dollars over lifetime, including all maintenance costs, salaries, investments and all other costs [33]. Usually, countries spend more than that per year for their e-government information systems with significantly more modest results.
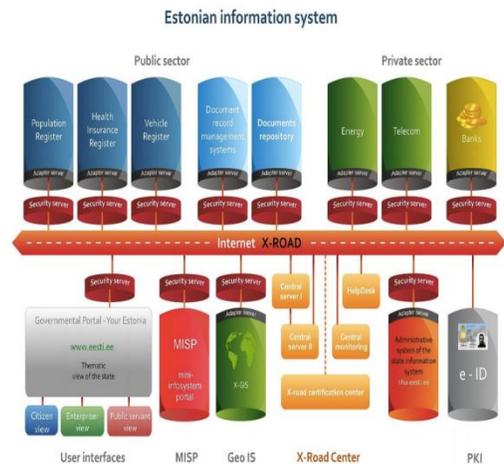

Figure 4: **Estonian Information System based on X-Road adopted from the State Information Agency [31].**

Another example of de-centralized system which has been progressing towards greater centralization is the authentication of online identities. It is directly connected to bottom-up approach to authentication delivered by internet banking which was discussed before. The authentication system introduced by Estonian banks was more sophisticated than the system used by many American or Western banks today, for example, where only password and username is required for authentication purposes. This system introduced already in 1996, is still in use – even as its role has been gradually decreasing making ways for newer identification methods such as ID card and mobile ID. By 2009, one million bank password cards were issued, 50 000 pin calculators were in use and about one million government ID cards were issued [8].

The relative role of bank based ID in comparison with government issued ID card in online environments cannot be verified because the data is not available publicly. However, the leading authentication expert Tarvi Martens wrote in an article in 2010 that bank based ID system is still more widely used

accounting for 80 percent of all online transactions than government issued IDs [8].

In 2002, the government introduced electronic identification cards that can be used as identification method for online transactions. One reason why the government introduced ID cards in 2002 was to provide a more secure and sophisticated substitute for online identification method provided by the internet banking where cards with numerical codes were used. [13]. The decision led to establishment of private company AS Sertifitseerimiskeskus by two largest banks and telecom operators in 2001. The company was essentially the certification center for ID card and in the center of network of apps and businesses built around it. In the early years ID card received considerable public criticism and there was initial outrage over investment of 20 million euros in the project [8].

Martens emphasizes that initially government agencies were not active promoters of ID card but gradually they started to promote and procure new generation software for their use. Since important private sector players were behind the project by becoming shareholders in the company responsible for certification process, then the ID card gradually took off and public attitude became for "This unique setup of private and public cooperation with strong players enabled to build a uniform platform," writes Martens [8]. Even though it was made obligatory to have the ID card, they did not become widely used immediately in online environments. Overall, only 25 000 ID card owners used their cards online in 2006 – four years after the launch. In 2009 the number of online users of ID card had increased ten-fold to about 250 000 [15]. Between 2002 and 2012, 500,000 people had authenticated themselves electronically with the ID card at least once. Total number of authentications reached 131 million, which makes 260 authentications per average user in this 10-year period. Out of these 131 million transactions 78 million have been digital signatures, which implies that 156 digital signatures have been given by average user.

Obviously, this is just indicator of abstract averages. In reality, some people are heavy users, some light users and some do not use ID card at all electronically. In 2011, 86 percent of Estonian citizens had ID card but only 40 percent of the ID card holders used the digital options of the card – either to authenticate their identity online or to give digital signature [16]. This implies that most citizens use ID card offline as a regular ID. Ownership of ID card is mandatory by law. However, law does not specify any penalties for not owning the ID card and nobody has not been penalized for not owning the card. Ownership of ID card can make life more convenient. For example, the card can be used as a substitute for a passport for travelling within the European Union.However, Czech computer scientists discovered a technological flaw in the ID card in 2017, which created security risks once their research was made publicly available in October 2017. Essentially, it allows capturing digital identities by sophisticated use of cryptography. Estonian government closed down security certificates of about 700 000 ID cards on November 3. Government agencies have worked out potential fixes and ID card owners can update their security certificates either online or offline until March 2018. The research findings have certainly generated some uncertainty about the

reliability of ID card. As a result the use of mobile ID has grown which does not suffer from the potential security flaws. The Fig. 5 gives an overview in the growth of digital signatures and authentication made by ID card.
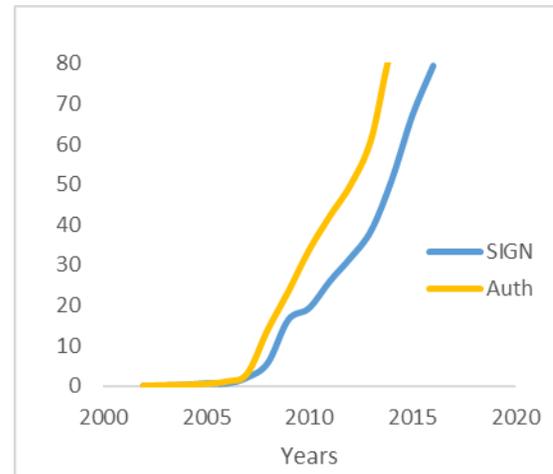

Figure 5. Digital authentications and digital signature made in millions compiled by author with data from Sertifitseerimikeskus (2017).

In 2009, Estonian government also introduced the mobile phone based identification method called mobile ID. The mobile ID does not imply that people can transact on any mobile phone. Rather it is a mobile phone based identification method alternative to ID card, which allows conduct transactions in online environments using smart phone as a substitute for ID card. Prerequisite for activating mobile ID is existence of ID card. It also requires a special Mobile ID compatible SIM-card in the mobile phone which is provided by all mobile operators in Estonia. The cost of changing regular SIM-card to Mobile ID compatible SIM card is about 12 dollars.

However, the use of Mobile ID has not become as widespread as the use of ID card as the fig. 6 shows. It is a newer innovation and primarily used by early adopters. As of October 2012, 30,000 people had Mobile ID and about 80 percent of them actually used it. By October 2014, the number of users had reached 50,000 and 1.8 million transactions were conducted by Mobile ID per month. 75 percent of these transactions were banking transactions. The use of Mobile ID as a substitute for ID card is encouraged by the spread of smart phones and tablets. ID card cannot be used with smart phones and tablets because of lack of ID card reader. Mobile ID can be used by both [31].

Over time, the online identification methods provided by banks and ID card have become of prerequisite for using most Estonian government online services as well as services provided by private companies. It is possible to speak of "forced digitalization" as many government services are not easily available without the ID card or the use of other online identification methods. Offline services are still there but their users face significantly higher transaction costs than users of online services. For instance, it has basically become very complicated to submit documents to Business Registry unless

ID card and online channels are used (personal observation). However, some government officials responsible for the digitalization efforts in the Estonian government still complained in interviews that a significant share of online service users rely on bank-based old identification methods and do not use ID card online.
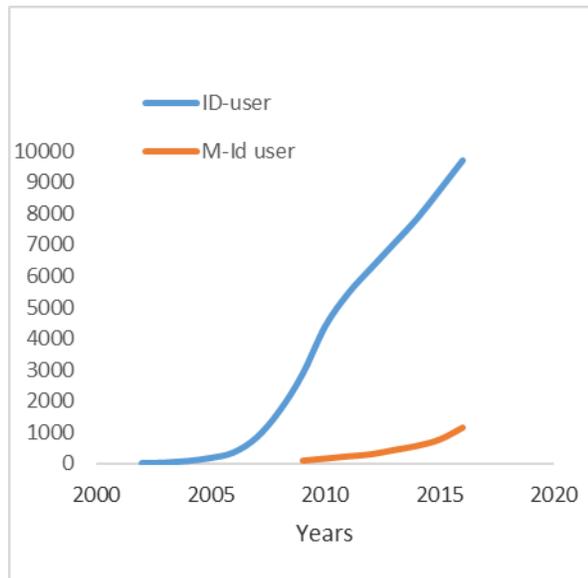

Figure 6. ID card and mobile ID card users in thousands compiled by author with data from Sertifitseerimiskeskus (2017).

In recent years, banks have actively supported the use of ID cards in internet banking by lowering the amount of daily transactions that can be made by old internet bank identification method and price discriminating in transaction fees. In addition to private sector, ID cards have become widely used by municipalities and other organizations. However, these are more recent developments, which build on the initial success of internet banking. From the perspective of long-term evolution the internet banking was more fundamental in explaining the early emergence of e-government services and the ID-card have helped to diffuse the use of e-government services further.

4 CONCLUSIONS

The main contribution of this on-going research project is to place Estonian digital government in the broader context of public sector governance by highlighting synergies and mismatches. Estonian government has made tremendous progress in implementing digital government. A significant factor affecting this outcome has been collaboration between public and private sector. However, this collaboration has been bottom up initiative where various government agencies through entrepreneurial discovery processes have exploited opportunities offered by private platforms. Private sector has also benefited from collaboration from private and public platforms such as X-road.

However, there is a considerable mismatch between current government top-down public sector reform efforts and the way digital government has evolved in Estonia over time. The public sector reforms are short term and primarily efficiency driven. Potential long-term benefits of decentralization and citizen empowerment are not thought through. Opportunities offered by technologies are not sufficiently and explicitly considered. Greater interagency cooperation and collaboration with communities and private sector has not received attention.

The key implication is that government should develop a more robust long-term and coordinated policies in public sector governance reforms. Rather than relying on one vision it would be advisable to develop alternative long-term scenarios where various models of public sector governance are highlighted by varying degrees of ICT adoption and use. Scenario building approach developed by Ramirez and Wilkinson can be used for these purposes [35].

The next steps in the on-going research project are to map in a more detailed way the public sector governance and digital government in Estonia. Additional 30 semi-structured interviews with top and middle-level decision-makers will be carried out by the end of 2017 and beginning of 2018. The findings from interviews will be combined with data from the X-road logs and document analysis. After the mapping of current situation, the research project aims to identify key drivers of public sector governance, including digitalization of governance. The key drivers will be discussed in expert groups in the first half of 2018, which will allow to identify the most important key drivers. On the basis of these key drivers the research project aims to develop 4-8 scenarios about Estonian public sector governance, including digital governance, until 2030.

A APPENDIX

A.1 Explorative open interviews with dates

1. A government official (28.03.17)

2. A civil society representative (29.03. 17)

3. A high level official at Ministry of Finance (06.04.17)

4. A former minister (11.04.17)

5. A member of parliament (03.04.17

4. A high level official of Ministry of Economic Affairs (16.05.17)

6. A representative of service sector association (29.05.17)

7. A high level official at Ministry of Economic Affairs (08-06.17)

8. An official at Ministry of Economic Affairs (08.06.17)

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