Digital voting, unsafe or unwanted? Qualitative study of digital voting in the Netherlands, Belgium and Estonia

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Citation

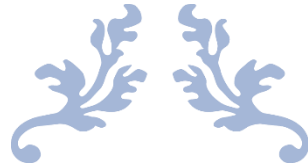# DIGITAL VOTING, UNSAFE OR UNWANTED?

Qualitative study of digital voting in the Netherlands, Belgium and Estonia.

Abstract

In every democratic country in the world, elections are a very common occurrence. In modern times, the electoral systems change too, resulting in the emergence of electronic voting. This research distinguishes voting on voting machines and Internet voting and compares the cases of the Netherlands, Belgium and Estonia to understand the most important factors to drive implementation of digital voting initiatives. The technological aspects of this have been researched enough by other authors, so this research focusses on the success factors generated by the Enacting Electronic Government Success (EEGS) framework. To place it in a historical perspective, the Historical Institutionalist view is added. The unique contribution of this research is to derive success factors of digital voting from the perspective of frameworks closely related to e-Governance, that have not yet researched digital voting.

Keywords: *E-Voting, Digital Voting, Election, Trust, Electoral Systems*

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1. Introduction

In all democratic countries around the world, elections are a very important aspect of the politics in a country. Elections started small in Athens, but have evolved to events where all eligible individuals in a country vote to be represented (Gibbins, Eulau, & Webb, s.d.). In the age of technological advancement, governments also started seeing reforms. Something that was used more and more often are digital government policies. This is how electronic government emerged. And in contemporary times, it has become pivotal for establishing effective, accountable, resilient and inclusive institutions. This strategic role aligns with United Nation's Sustainable Development Goals 16 and 17 (United Nations Department of Economic and Social Affairs, 2022). Part of this new emerging electronic government is digital voting. In an attempt to prevent malpractice in manually counting elections and in an aim to receive the best possible turnout and representation, multiple countries around the world have started to experiment with the use electronics to improve the counting and voting system (International IDEA, 2023). Some countries only use electronic tabulation systems whereas other countries use voting machines or even implemented internet-voting.

During this thesis, the method using voting machines will be called electronic voting or e-voting and the method of using internet will be called internet voting or I-voting. When addressing the realms of both electronic voting (e-voting) and internet voting (I-voting), the encompassing term "digital voting" will be employed. This overarching denomination is chosen to establish a distinct and inclusive categorization for the various forms of electronic voting mechanisms being discussed. As a research domain, digital voting has attracted researchers from different disciplines from Computer Science (system design and security protocols), Public Administration and Political Science (voter behaviour, participation, representative democracy) and Information Systems (technology adoption and efficiency) (Choi & Kim, 2012) (Adeshina & Ojo, 2020). Different authors have written on several topics ranging from the effects of digital voting to concrete case studies to studies about its safety.

This research will test the feasibility of digital voting implementation and uncover what is necessary for the implementation from a Public Administration point of view. Technological variables are really important for this implementation, will be considered as such, but will not be researched. This thesis will research the drivers of digital voting implementation apart from technological ones by interviewing several experts from different countries to compare the differences between those countries.

The three countries that will be investigated are the Netherlands, Belgium and Estonia. These countries are selected based on multiple criteria. First, they are in different stages of implementation of digital voting (Risnanto, Bin Abd Rahim, Herman, & Abdurrohman, 2020). Second, these countries are all EU countries with good access to information, a quite similar government form (Montesquieu Institute, s.d.) and similar levels of digitalisation in their government (United Nations Department of Economic and Social Affairs, 2022). Estonia is chosen as country that is currently using I-voting (Clarke & Martens, 2016), Estonia is in fact the only Western country that implemented I-voting nationwide (Darmawan, 2021, p. 490). The Netherlands is the country that has not used digital voting since the scandal with voting computer fraud in 2006 (Loeber, 2008). Lastly, Belgium is a country that uses voting using voting machines and is comparable to the Netherlands and Estonia (Dandoy, 2022).

The main research question will be:

What factors should be considered as drivers for the implementation of digital voting?

Many statistics have been compared in all kinds of studies to show possible advantages and disadvantages, but this research will put digital voting in the perspective of the Enacting Electronic Government Success (EEGS) framework (Gil-Garcia, 2012) and apply these measures of success to the digital voting initiatives in the Netherlands, Belgium and Estonia. The second theoretical framework applied is that of Historical Institutionalism, which explains the influence of history in decision-making processes. The Dutch, Belgian and Estonian system will be compared using interviews with expert on digital voting from each respective country.

This thesis will commence with an extensive Literature Review, reviewing present literature that could help in answering the research question and expand on the frameworks that will be used. Subsequently, a Methods chapter will explain the research strategy and elaborate on each specific case. The following Results chapter formulates what the experts mentioned during their interviews. In the Discussions chapter, the results will be compared to the literature to the results. Finally, the conclusion will summarize the entire research and answer the research question.

2. Theoretical Framework

2.1 Literature Review

The question whether digital voting, is a suitable alternative to traditional paper voting has been a serious concern ever since its initial implementation. The first trial of Electronic Voting Machines during the 1982 elections in Kerala, India, necessitated a re-polling and resulted in a reversal of the verdict (Paul, 2017). Ever since that initial moment, plenty of research papers have been published, exploring diverse facets of digital voting. The "E-voting-ID" conference (E-Vote-ID, 2023) identifies four key areas of interest in this domain, namely:

- Security, Usability and Technical Issues;
- Governance Issues;
- Election and Practical Experiences;
- Posters and E-voting Systems Demo.

Governments seek to assess whether the advantages outweigh the disadvantages, while technology experts endeavour to ascertain the safety of digital elections, a concern shared by other stakeholders involved in the process.

A trio of Nigerian researchers claim that they have discovered the missing link that can complete the e-voting puzzle. Their proposal centres around a secure electronic voting system utilizing fingerprints and visual techniques, aiming to address previously recognized limitations and meet the requirements for functionality and security (Adewale, Olutayo, & Adekunle, 2020).

Concurrently, researchers largely converge on certain key requirements for digital voting success. Foremost among them is the imperative for robust technological equipment. While the author of this thesis does not possess a specialization in computer science to contribute directly to this aspect, a critical takeaway is that any form of digital voting must prioritize imperviousness to tampering, both at the hardware and software levels. To unravel the broader question of other crucial factors influencing digital voting success, this research delves into diverse academic contributions and explores alternative methods to gain deeper insights into the prerequisites for initiating a digital voting election. To consider which factors are important to digital voting, the first thing to do is look at what are considered to be the advantages and disadvantages of digital voting.

2.1.1 Digital voting effects

One of the main arguments that is always first mentioned is voter turnout. What is remarkable is that some papers found results that researched turnout did this by asking voters if they thought turnout would improve, they acquired positive results (Musial-Karg & Kapsa, 2019, p. 159). But other research has questioned voter turnout improving because of digital voting (Allers & Kooreman, 2009) or even has it debunked (Dandoy, 2014). In some cases, this is indeed true, but those are mainly citizens voting abroad or people voting from scarcely populated areas (Petitpas, Jaquet, & Sciarini, 2021).

Another effect of digital voting which has some arguments whether or not it is favourable, is the costs. The costs of implementing digital voting are a lot higher than with regular elections. But if digital voting is the only method, then it could be cheaper (Halderman, 2014).

But not all advantages are so questionable. Researchers can generally agree that there are far fewer invalid votes because on a computer voters can simply not choose too many people or a wrong candidate (Dandoy, 2022). The process of counting votes will also be simplified and have less error if it is done by machines (Allers & Kooreman, 2009). Their research yielded another significant finding: the implementation of digital voting does not have any influence on election results. "Of course, this is as it should be.". Other advantages of e-voting and I-voting are that it is less labour-intensive and more accessible (Bokslag & de Vries, 2016).

The primary challenge linked to digital voting pertains to its susceptibility to cyberattacks from malicious hackers (Halderman, 2014) (Bokslag & de Vries, 2016). Addressing this issue predominantly involves establishing a system incorporating end-to-end verification mechanisms (Heiberg, Krips, & Willemson, 2020). However, a key concern arising from end-to-end verification is the potential compromise of voting secrecy. Thus, the central security dilemma in digital voting revolves around the trade-off between safeguarding against hacking vulnerabilities and maintaining transparency.

A foundational paradox emerges from the demand for transparency in most governmental processes, often achieved through measures like providing receipts, revealing code, or implementing processes to enhance control. However, elections present a unique difficulty due to the fundamental requirement of maintaining ballot secrecy. Hence, the system must be designed in a manner that precludes any possibility of retracing an individual voter's chosen candidate, ensuring the preservation of anonymity and the integrity of the democratic process.

A secondary concern is the transparency inherent in digital voting. Frequently, countries refrain from disclosing their open-source code until after the elections. Moreover, the utilization of direct-recording electronic voting machines (DREs) eliminates the possibility of paper-based vote recounts. An additional complication arises with internet voting due to its uncontrolled environment. This context renders voters more susceptible to external coercion, while the safety of voters' devices for casting votes remains uncertain (Bokslag & de Vries, 2016).

Multiple countries have wanted to try and implement digital voting, but the concern is that real problems will only surface if a system has been tested by a lot of users. And pilots or trials for voting machines are hard to do since elections are too important to mess up. So, a system will always be vulnerable in its testing phase (Stark & Xie, 2022). Nonetheless, within each country that integrated a variant of digital voting, an initial testing phase was invariably undertaken. Following an examination of the various impacts stemming from e-voting and I-voting, the following section will delve into existing research focused on identifying the essential factors requisite for the implementation of digital voting.

2.1.2 Digital voting factors in other research
In different countries, the exploration of digital voting implementation possibilities has been approached through various methods. An illustrative instance involves research conducted in the Indonesian Jembrana Region, where Hartami and Handayani (2012) delved into critical success factors vital for e-voting success. By drawing on prior e-voting implementation studies and relevant literature, essential factors were identified and tested through interviews with the local e-voting project team. The main critical success factors that emerged included leadership, development of identity cards, law and legal aspects, training programs, and human resources. These factors were deemed vital in minimizing risks and fostering public acceptance, particularly given the susceptibility of the previous system to fraud (Hartami & Handayani,

2012, p. 339). It is important to note that the Indonesian success factors may not be directly comparable to those in European countries with established systems.

A more comparable case comes from Poland, where researchers surveyed over 1700 individuals to gauge opinions on e-voting and I-voting (Musial-Karg & Kapsa, 2019). The study found that respondents' views were statistically dependent on their support for political parties. Supporters of pro digital voting parties were more likely to back digital voting initiatives, as they perceived the associated threats to be of a lesser extent.

A different methodology for investigating countries involves the application of various theoretical frameworks. One such approach encompasses the use of systems theory, as demonstrated in Moynihan's work (Moynihan, 2004), wherein recommendations for paper trials concerning voting machines were put forth. Furthermore, a comprehensive study by Risnanto and colleagues (Risnanto, Bin Abd Rahim, Herman, & Abdurrohman, 2020) encompasses multiple countries and presents a framework for digital voting success. In their study, they initially assessed the success of digital voting initiatives across countries and subsequently endeavoured to identify pivotal factors contributing to this success. Their findings highlighted four crucial aspects that necessitated readiness for digital voting:
- public trust readiness;
- law & policy readiness;
- human resource readiness;
- ICT infrastructure readiness.

These factors are similar to factors in the EEGS theory and are therefore relevant to this thesis will be duly incorporated and examined. This research explained that it is not only technological variables that need to be sufficient to implement a digital voting election. Apart from technology, user requirements need to be on par and there needs to be a distinct procedure mapping showing what steps will be taken before finalizing the implementation.

2.1.3 Gap in the literature

In conclusion, numerous academics have examined the potential of digital voting within their respective countries, ranging from Poland to Indonesia, Nigeria, and Belgium. However, to enhance the external validity of research, a comparative approach across countries becomes essential. Consequently, this study will compare the Netherlands, Belgium, and Estonia. This increases its generalizability to various Western countries, particularly those in Europe.

Furthermore, an observation of numerous countries and their endeavours in comprehending the principal determinants of digital voting has surfaced. This research endeavours to bridge a gap in the existing body of literature by investigating the factors influencing digital voting within the purview of the EEGS framework (Gil-Garcia, 2012). Originally devised to assess the triumph of electronic governance, this framework will be adapted in this study to gauge the efficacy of digital voting instead. Additionally, the research will draw on the theory of historical institutionalism, highlighting the significance of history in shaping decisions in institutions (DiMaggio & Powell, 1983). By employing these theories, this study seeks to shed light on the crucial drivers of digital voting implementation.

2.2 EEGS Framework

To add a new perspective to the consideration if digital voting can ever be successful, this thesis uses the EEGS Framework: Enacting Electronic Government Success (Gil-Garcia, 2012). Related to this framework is the utilization of e-government services (Carter & Bélanger, 2005). The EEGS theory explains what characteristics a successful electronic government policy

should possess. The three main ingredients to electronic government success are considered to be organizational structures and processes, institutional arrangements and environmental conditions (later named contextual factors) (Gil-Garcia, 2012, pp. 23-29). Two other categories that can be added to this mix are "data and information factors" and "technology-related factors". Those two categories will only be briefly discussed in this thesis, as Gil-Garcia also looks for success factors excluding technological ones. However, e-governance is always considered as a phenomenon more complex than just these indicators. The e-governance success is the combination of different factors impacting or transforming government information technology and hereby the resulting organizational outcomes and can not solely be contributed to three factors.

To start with organizational structures and processes, this looks at what the users involved look like and the size of the IT project (Gil-Garcia, 2012, pp. 26-27). The IT project is in this case a digital election, so the size depends on what kind of election. This can be municipal or region-wide, but it is often national. It's harder to overcome organizational politics in bigger projects if there are diverse personal interests that can lead to conflict. However, there is a positive direct effect of government-wide website functionality (Gil-Garcia, 2012, p. 153). An attempt will be made to see if nation-wide election is better organized than regional elections in Belgium. The two main problems Gill Garcia (2012, pp. 26-27) finds that are the most important are the lack of alignment between the project and the organizational goals and the existence of conflicting goals. But other factors are the lack of implementation guidelines, length of the project the extent of change in business processes and the management approach taken in the project.

Institutional arrangements include multiple aspects. One institutional theory that might explain digital voting status in different countries is that of Historical Institutionalism (DiMaggio & Powell, 1983) (Pierson & Skocpol, 2002) and aspect of path dependency (Pierson, 2000). These will be discussed in the next paragraph. But institutional factors that might be very important are the political factors, legislation and regulation (Gil-Garcia, 2012, pp. 27-28). Part of these factors are the informal rules that pair with being politically responsible. The political part means that a new digital voting systems would be prone to the hassle of different institutions and levels of government that would all need enough support for implementation. A second part of the institutional arrangements section is that there need to be laws in order to implement new policy. A new digital voting system can not be implemented straight away after a minister decides that he wants to implement it. Some countries already have some form of legislative basis that would allow for digital voting implementation under the right circumstances and conditions, but in most countries those laws would follow if there were enough political support. The EU (Council of Europe, 2017) set some standards as guidelines for digital voting, which include:

- universal suffrage;
- equal suffrage;
- free suffrage;
- Secret suffrage;
- Regulatory and organisational requirements;
- Transparency and observation;
- Accountability;
- Reliability and security of the system.

Finally, environmental or contextual factors that look at the context of organizations (Gil-Garcia, 2012, pp. 28-29). Different authors have argued that contextual variables can influence the results of IT initiatives, this will be even more so for elections. An example is how a foundation against trusting voting machines in the Netherlands swayed the public's trust in voting machines and ushered the demise of e-voting (Loeber, 2008). External factors outside the initial creators of a policy can influence the final technology results (Gil-Garcia, 2012, p. 29). To refer back to the Dutch case, Oostveen (2010, pp. 216-217) concluded that the outsourcing of the voting machines, initiated the technological safety risk. The government no longer had an adequate understanding of how the voting machines worked and the supplier had no incentive to be open and transparent. Contextual factors that can influence the success of an e-government initiative is vast and encompasses technological, legal, cultural, political, economic, demographic and ecological dimensions (Gil-Garcia, 2012, pp. 28-29). Consequently, the success of IT initiatives should partially be associated with the country in which they are implemented.

2.3 Historical Institutionalism

A big theory seeking to comprehend the institutional background that shape the decision-making process is Historical Institutionalism (DiMaggio & Powell, 1983). This theoretical framework delves into big substantive questions, in this case the question about the best voting system (Pierson & Skocpol, 2002, p. 3). Furthermore, it analyses big contexts and configurations, and historical institutionalists examine this over a longer period. Historical Institutionalism compares why a certain structure or pattern happened in one country but not in another. Such an analysis reveal is why history matters and can explain outcomes that are surprising or that variate from other regions (Sewell, 1996, pp. 262-263). Outcomes can be explained when looking at a bigger timeline. At a certain point in time, a "critical juncture" marks a point where institutions, politicians or administrators need to face crucial decision (Pierson, 2000). These decisions might seem minor at the time but can have enduring consequences influencing future choices. An example is the use of a qwerty keyboard has been proven to be suboptimal in efficiency, but everyone already uses this. However, its adoption is too widespread to change. This is concept is known as path dependency (Pierson, 2000, p. 254).

Digital voting aligns well with the Historical Institutionalists' view and particularly in the context of path dependency because the digital voting implementation process checks of all four path dependency features (Pierson, 2000, p. 263). The digital voting debate consists of the feature "multiple equilibria", as it is unclear whether internet voting, voting machines or voting on paper is superior to one another. Small events that occur at the right moment can have large and lasting consequences, which Pierson classifies as "Contingency". "A critical role for timing and sequencing", because earlier decisions in digital voting are far more important than later decisions. Additionally, "Inertia" plays a pivotal role, once a process is established, positive feedback may render a single equilibrium resistant to change. The process of slow gradual change is called "increasing returns", and have been generated by "setup costs", "learning effects", "coordination effects" and "adaptive expectations" (Pierson, 2000, p. 254).

This notion could potentially explain why the Netherlands could not revert to e-voting, as the election fraud of 2006 led to an irreversible change of public trust and policy (Loeber, 2008).

2.4 Theoretical framework choice

The EEGS framework gives a context to what drivers can be of influence for the implementation of an e-voting or I-voting initiative. This framework gives different possible factors that could explain why there is a difference between different countries when it comes to the status of their digital voting projects. The Historical Institutionalist perspective gives some more insights to this. Using these theories to guide the research, gives some background to what questions to ask government employees during the interviews. The most useful theory apart from these two is the digital voting readiness mapping by Risnanto et al. (2020) .

3. Methods

This research will take a mainly inductive approach, where it will come up with new theories found during this research to answer the research question:

"What factors should be considered as drivers for the implementation of digital voting?"

In the "Literature Review" section, theories have shown a gap in the literature. The EEGS framework explains the success of electronic governance using three main variables: institutional, organizational and environmental (Gil-Garcia, 2012, pp. 68-71). During this thesis, similar research will be conducted with digital voting instead of electronic governance in general. To fill in this gap and to uncover the real drivers that can instigate a fierce political discussion about digital voting, semi-structured interviews with policy makers and experts on the topic will be conducted. These interviews will be conducted with government officials and experts from the Netherlands, Belgium and Estonia. In the next section these case choices will be clarified to a further extent. The interviews will be used to expand on the knowledge that was already available online. The interviewees will be asked for documents that support their claims. Therefore, in the results section of this thesis, the online data found before and after the interviews will be combined with the respondents' answers. This extensive combined rapport will highlight the conditions in which digital voting can be implemented and in turn answer the research question.

3.1 Case Selection/ Data

The selection of three distinct cases to discern the drivers for digital voting implementation encompasses the Netherlands, Belgium, and Estonia. The rationale behind choosing these countries lies in their predominantly homogeneous nature, while a pivotal distinction emerges concerning their respective approaches to digital voting. Specifically, the Netherlands presently abstains from any form of digital voting, Estonia adopts internet voting nationwide, and Belgium employs voting computers. The homogeneity in these three EU countries comes down to them having a similar form of government, with Belgium and the Netherlands being a constitutional monarchy and Estonia being a parliamentary republic (Montesquieu Institute, s.d.), and the level of digitalisation in their governments (United Nations Department of Economic and Social Affairs, 2022).

Additionally, an important factor in this choice comes down to the language proficiency of these interviewees. In these selected countries, English is spoken more proficiently, allowing for a higher effective engagement during the interviews.

3.1.1 The Netherlands

The Netherlands is a really interesting case and is chosen for multiple reasons. Apart from being able to interview more suitable candidates and understanding the language, another reason for choosing the Netherlands is the history this country has with electronic voting. This is mainly because the Netherlands used voting machines in the early 2000s. A lot of literature is written on this period and the period subsequently when they abolished these voting machines a few years later due to election fraud (Oostveen, 2010). Internet voting was also in development during this period, but after the election fraud internet voting was also halted (Loeber, 2008).

The Netherlands presents an exceedingly captivating and compelling case, rendering it a prime selection for multiple discerning factors. Beyond the advantageous prospect of engaging with a more reachable pool of interviewees and linguistic comprehension, the historical context

surrounding digital voting in the Netherlands significantly contributes to its selection. Particularly noteworthy is the country's employment of voting machines in the early 2000s, which has been extensively documented in the existing literature, just like the subsequent period when these machines were ultimately abolished due to election fraud (Oostveen, 2010). Moreover, the developmental phase of internet voting coincided with this period of time, but its progress was promptly arrested following the aforementioned election fraud (Loeber, 2008).

During the Dutch Municipal Elections of 2006, the Netherlands employed voting machines, and an incident in one municipality drew attention when a particular candidate obtained 181 preferential votes in the polling station where he had control over the voting machine. These raised suspicions of potential fraud; however, due to the absence of a paper trail, a recount was not possible. A shadow election was conducted, yielding a vastly different outcome. Though this was a localized incident, it triggered a broader query regarding the possibility of similar, less obvious cases. Consequently, the public sentiment towards electronic voting shifted, influenced in part by the NGO "we don't trust voting computers" (Loeber, 2008, pp. 24-25).

Ever since 2009, the Dutch Government has reverted back to using red pencils and paper ballots for elections, although they explored options to reintroduce e-voting (Dutch Electoral Council, s.d.a.). Notably, Dutch citizens voting from abroad follow a different procedure, casting their votes by letter to the epistolary polling station in The Hague or their country's embassy (Dutch Electoral Council, s.d.b.), which has also faced some controversies discussed in recent Dutch opinion papers (Vermeer, 2023) (Keij & Pannebakker, 2023).

Several Dutch government committees have been dedicated to exploring new e-voting options, mainly "Commissie-Hermans/Van Twist," "Commissie-Korthals Altes" (Commissie Korthals Altes, 2007), and "Commissie-Van Beek" (Commissie van Beek, 2013). In 2015, the Minister of Internal Affairs, Plasterk, established an expert group focused on electronic voting (Dutch Electoral Council, s.d.a.). Subsequent inquiries regarding e-voting in the Dutch Parliament have referenced findings from previous committees and research conducted abroad (Dutch Ministry of the Interior and Kingdomrelationships, 2023).

While the Netherlands has made digital advancements in processing and publishing election results, particularly through the use of the open-source system "Ondersteunende Software Verkiezingen" (International IDEA, s.d.,a), digital voting remains a topic of considerable investigation and deliberation. Another partial digital advancement is in the app used during election day (VNG, s.d.).

3.1.2 Belgium
Belgium presents another captivating and multifaceted case, with distinct election execution methods varying across different regions. In the Brussels-Capital Region, all 19 municipalities exclusively rely on voting machines for electoral processes (Brussels Capital Region, 2017). In the Flemish Region, a combination of voting machines and paper ballots are utilized depending on the municipality. Notably, during the 2019 municipal election, 159 out of 300 municipalities in the Flemish Region employed voting machines. In the Walloon Region, e-voting is limited to the nine German-speaking municipalities, while the remainder cast their votes using paper ballots (Belgian Ministry of Interior, Directorate Elections, s.d.).

Consequently, Belgium's heterogeneous approach results in neighbouring municipalities possibly employing different voting systems. This intriguing contrast provides an excellent basis for meaningful comparisons (Dandoy, 2014). Subsequently, Belgium's electoral system has been carefully scrutinized both by the Belgian Government (Belgian Federal Public Service Interior, 2020) and independent researchers (Dandoy, 2022). In this study, interviews will be conducted with employees of multiple levels within the Belgian government to facilitate an in-depth exploration and comparison of their perspectives on digital voting.

The implementation of voting machines in Belgian elections commenced in 1998, followed by exploratory committees assessing future options that ultimately led to the introduction of new voting machines with paper trails. These innovative machines underwent testing in select municipalities in 2012 and were fully adopted in 2016 (Brussels Capital Region, 2017). Presently, Belgium employs Electronic Ballot Printers as their mode of e-voting, conducted within the controlled environment of polling stations (International IDEA, s.d.,b).

The way a voter votes is by clicking the desired candidate on the Ballot Printer. Once the vote is confirmed, a ballot is printed displaying a digital code and the candidate's name. This ballot is scanned by the voting counter and subsequently deposited in a ballot box.

3.1.3 Estonia

Estonia is the only country in the western world that uses a significant amount of internet voting and has one of the most established digital voting systems in the world (Clarke & Martens, 2016). This makes it the most interesting case to compare to other systems. In some countries like France or New Zealand internet voting is used for citizens living abroad, but Estonia is the only country using internet voting for all of its citizens (International IDEA, 2023). The internet voting system in Estonia has been tested in 2004 and was first implemented in 2005 (Clarke & Martens, 2016). The system was later reformed, and this reform was completed in 2017 (Valimised, s.d.,a.). From the beginning on, every citizen with voting rights was allowed to vote digitally. Citizens could vote from home without needing to go to a controlled environment like a polling station (International IDEA, s.d.,c).

The organization in Estonia that is responsible for organizing the internet elections is Valamised (Valimised, s.d.,a.). Valamised can be compared to the electoral council in other countries. The Estonian digital voting is done with an electronic ID that Estonian have all had for 20 years and is used for all kinds of transactions in the public and private sectors ranging from signatures, paying bills to travelling (e-Estonia, s.d.).

3.2 Sample selection

This research will be conducted by interviewing different government officials from the three countries outlined in the previous section. The reason why interviews were the chosen method is because there is already a lot of scientific research done on digital voting in general. But for applying the EEGS framework to digital voting, the interpretive method is useful to get an in-depth understanding of the setting in which government officials work and what guidelines they have to follow before ever being able to implement digital voting. In these interviews, these officials can show how the government of their country looks at the topic. These countries are at different levels of digital voting implementation, so might view their own success differently. These interviews can show the viability of digital voting implementation in each country and potentially show which steps are necessary to get to the point of further implementation.

The interviews will adopt a semi-structured approach to facilitate in-depth exploration of specific topics related to digital voting history, implementation, and future prospects. This method allows the research to delve more deeply into the respondents' perspectives on their respective digital voting systems within each country. Given that the thesis consists of two main aspects of digital voting, namely internet voting and electronic voting with machines, the semi-structured nature enables separate inquiry into these distinct components if initial responses emphasize one over the other. In the introduction prior to the interviews, respondents will be informed of this approach. The complete interview protocol can be found in Appendix A, and the interview transcripts will be available upon request. Nonetheless, it is important to note that the interview protocol serves merely as a guideline, and the questions may not be asked in the exact order outlined. Instead, the flow of the conversation may occasionally dictate a different sequence of inquiry for a more seamless exchange.

3.3 Sample strategy

A major role in the research goes out to the interviewees. If any random people had been asked, they could not reflect their government's views on digital voting but merely their own. So, to gather the right interviewees, a combination of purposive sampling and snowball sampling was used. In this process, the governmental institution that was closest related to digital voting implementation was researched and then contacted. These were the Ministries of Interior in each country. However, Belgium and Estonia had already implemented some form of digital voting, so for these countries the institutions executing the elections were also contacted. In Estonia, the Estonian National Electoral Committee and the State Electoral Office combined in "Valimised" execute the elections (Valimised, s.d.,b.). In Belgium, each Region and municipality makes their own choices. In the Netherlands, the municipalities execute the elections, but they don't have any experience with digital voting.

So, in each country, the initial experts are government officials with a lot of expertise on digital voting. Some having experience with the concept or idea, others having experience in actual elections. From those initial interviews, some other experts could snowball. These were sometimes university professors or experts and at other times co-workers in different institutions of the same country. For ethical reasons and to remain their anonymity, the respondents will not be named during this thesis. The number of interviews conducted was three for each country to a total of nine interviews. This was chosen to achieve enough response, but not to have too much saturation and double answers. The respondents will be named Respondent 1 up and until Respondent 9 according to this table below.

The Netherlands	Belgium	Estonia
Respondent 1	Respondent 4	Respondent 7
Respondent 2	Respondent 5	Respondent 8
Respondent 3	Respondent 6	Respondent 9

Table 1: *Respondent distribution*

3.4 Conceptualisation

As previously mentioned, this research is conducted accordingly with the EEGS framework by Gil-Garcia (2012). Most of the concepts used in the EEGS framework need some adjusting to paired with digital voting. The conceptualisation consists of the explanation why the concepts

can not by directly assumed from the EEGS framework, subsequently it will show how they are conceptualised.

Conceptualisation E-voting and I-voting

Where Gil-Garcia had to define e-government or e-governance, this thesis mainly researches digital voting. Electronic government or e-government has lots of different meanings and is hard to border of what falls under this umbrella term. Gil-Garcia argues that e-government is the phenomenon of government information and communication technologies (Gil-Garcia, 2012, p. 2). Digital voting is only one of the several elements that make up e-government according to the definitional approach (p. 15).

According to Encyclopaedia Britannica, electronic voting is "a form of computer-mediated voting in which voters make their selections with the aid of a computer" (Peralta, 2016). As previously indicated, in contrast to conventional research practices, this thesis will abstain from employing the term "e-voting" in an overarching capacity. Instead, the terminology "digital voting" will be adopted. This deliberate choice is aimed at demarcating and distinguishing between the two distinct forms of digital voting expounded upon in this study.

The first of these forms is internet voting, often referred to as I-voting. This mode of voting enables individuals to cast their votes from any computer globally, thereby not confining the voter to a controlled environment. The second, more prevalent form of digital voting pertains to voting through specialized purpose machines within controlled settings, herein referred to as e-voting or electronic voting (Cortier, Galindo, Küsters, Müller, & Truderung, 2016). These dedicated voting machines facilitate the casting of votes, either through ballot printing for subsequent scanning or direct interaction on the machine's screen (Peralta, 2016). It's important to note that the terminology varies, with the Ballot Marking Device (BMD) solely generating ballots for scanning from the voting machines, while the Direct-Recording Electronic (DRE) voting machines record votes, often without generating a paper trail (Verified Voting, s.d.).

Conceptualisation Success

The EEGS framework views e-government success as a combination of multiple factors. These factors are organizational, technological, institutional, information and contextual factors (Gil-Garcia, 2012, pp. 23-24). In a later operationalization success is ranked by comparing the overall state e-government ranking score, number of e-commerce systems, digital state e-commerce score and number of online services (Gil-Garcia, 2012, p. 68). To adapt this concept to electronic voting we have to adapt how the individual factors are operationalized, too. This will be done in the next paragraph.

Concept	Definition
Digital voting	The combination of e-voting and I-voting
E-voting	Digital voting with voting machines
I-voting	Digital voting by means of the internet
Success	Achievement of combined factors

Table 2: *Conceptualization of key aspects*

3.5 Operationalisation

The operationalisation involves translating previous mentioned concepts from the EEGS and Historical Institutional theories into questions to ask the interviewees, which will serve as the primary method for gathering data from the experts.

As mentioned prior, the main problems in organizational factors relate to the lack of alignment between the election organizations goals and conflicting organizational goals (Gil-Garcia, 2012, pp. 23-29). That is why the interviewees will be asked questions about how their organization defines digital voting initiatives a success and whether the organizations were successful in achieving those goals. Additionally, questions about the technological variables, particularly on user convenience will be included to ascertain whether perceived advantages withstand technological challenges. Gil-Garcia's operationalization of organizational structures and processes focusses on general organizational factors like number of people working in IT, the funds and whether there is enough training for employees (Gil-Garcia, 2012, p. 69). To convert this to the e-voting and I-voting context, interviewees will also be asked questions about the resources of the election teams.

Contextual factors pose the hardest challenge in operationalization, necessitating the examination of factors not mentioned previous. Gill-Garcia looks at economic background, voting preference and demographic factors for each state he researches (Gil-Garcia, 2012, pp. 70-71). Thus, interview questions will aim to explore background factors by asking questions about other actors and other contextual conditions. These might include technological, legal, cultural, political, economic, demographic or ecological factors (Gil-Garcia, 2012, pp. 28-29). In addition to the interview questions, demographic data about the Netherlands, Belgium and Estonia will be presented to illustrate these factors.

As mentioned in the theoretical framework, institutional factors consist of political factors, informal rules but also of legislation and regulations (Gil-Garcia, 2012, pp. 27-28). In Gil-Garcia's research the institutional factors are operationalized by looking at the existence of mandatory accessibility standards for state websites, whether the IT professionals are civil servants, whether the state relies entirely on executive orders and whether the state has an IT-specific legislative committee in the Senate (Gil-Garcia, 2012, p. 69). The interviewees will be asked about different agencies involved in an electronic election, including governmental or public-sector entities, to determine which parties are civil servants.

The main important questions to ask to understand if the situation for e-voting and I-voting is in line with Historical Institutionalist framework, are about understanding previous events and experiences in digital voting (Pierson, 2000). Identifying critical junctures where countries made different choices will be pivotal. This will mainly be done with interviews and data analysis to support the claims made in interviews.

3.6 Analytical Structure

Initially, the interviews will be transcribed. Subsequently, during the coding process of each interview, essential elements will be documented in a coding overview. To facilitate identification, specific colours will be assigned to these key aspects, aligning with their respective meanings. Each colour will correspond to its own distinct category, thus enabling the coding overview to effectively showcase the significant points articulated by the interviewees. This method significantly reduces the reading time of the transcripts, allowing for

a more streamlined composition of the Results section, with only slightly more content than the coding overview to write it.

3.7 Ethical consideration

During the interviewing process, numerous ethical considerations demand attention. The introduction of the interview, detailed in Appendix 1, comprehensively addressed these ethical aspects. Prior to commencing the interviews, interviewees were sought for their consent to record the sessions, and they were assured of complete anonymity throughout the thesis. Additionally, interviewees were encouraged to communicate if they felt any discomfort while responding to specific questions. Furthermore, to uphold transparency, all interviewees will receive a copy of the completed research.

4. Analysis

This analysis consists of responses from experts, bolstered by citation from online literature or provided documents from the experts themselves. Initially, the main differences and similarities among different voting methods are explained using respondents' experiences. Then, the main benefits and drawbacks of digital voting will be discussed. Subsequently, to address the main research question about the actual drivers for digital voting, the experts provide their professional insights on several indicators of the EEGS framework and the Historical Institutional framework.

4.1 Differences and similarities e-voting and I-voting

A brief distinction between e-voting and I-voting was established in the conceptualisation. However, in the interview process, every participant emphasized the significance of this differentiation. As discussions progressed, frequent mentions emerged concerning the similarities and perhaps more importantly, the perceived similarities to the public. The two primary differentiators consistently mentioned between e-voting and I-voting centred on the connection to the internet, which exposed I-voting to malicious intrusion. Additionally, the environment in which votes are cast diverged: voting machines are stationed in polling stations, while internet votes are cast from the voters' own homes.

The opinions of the experts on the necessity of a controlled environment, and the effectiveness of safety measures to prevent the associated downsides, varied considerably. The respondents noted that the downside to an uncontrolled environment is the voting secrecy, while pointing out that voting secrecy is always susceptible to fraud in remote voting systems. This viewpoint was further elaborated with a comparison to both postal voting and proxy voting also being in an uncontrolled setting. To address the voting freedom concern in internet voting, Estonia has implemented some systems to combat vote coercion. One of these is their revote system, which means citizens can revote infinitely on the internet and even recast their vote in-person after voting remotely. Notably, internet voting closes a week before paper voting in Estonia. To back up these claims, research supports the effectiveness of revoting schemes in reducing vote coercion (Lueks, Querejeta-Axurmendi, & Troncoso, 2020) and demonstrates the possibility for users not to have to store cryptographic material.

Respondent 1: "*The most important point with voting computers is that they are still in a polling station. Which is a controlled environment, which means voting secrecy is guaranteed more than with internet voting. Because with internet voting, you don't know if someone else is present in the rooming instructing on what to vote.*"

Respondent 9: "*Voting secrecy is a problem in every remote voting system. I mean postal voting has the same problem… You have proxy voting which at the end is something quite similar. It's like okay, somebody is voting on my behalf because I'm authorizing this person to vote. But what if somebody is pressing someone else to give the proxy to him. That is the problem of every remote voting.*"

Respondent 8: "*There is a revote system that gives voters the ability to revote again thereby cancelling the previous vote or revote by paper voting, which can only be cast in a secure environment where the election organisation controls it.*"

A second concern arises from the online connection, making user endpoints vulnerable to malign hacker penetration. The respondents explained all the countermeasure Estonia takes so

it can not be hacked that easily. Internet voters are provided with a virtual encrypted ballot, which is then casted into a virtual ballot box. Introduced in 2017, this reformed system separates personal data from the vote itself. Presently, potential attacks on the Estonian system would be most effective on the user side. Attackers acquiring unauthorized E-ID devices, could re-vote and thereby overwrite a vote, but if something were to happen regular elections could still continue (Electronic Voting Committee, 2016). Suggested countermeasures to this threat are end-to-end verifiability, but this simultaneously increases the risk of vote coercion (Heiberg, Krips, & Willemson, 2020, p. 6). Yet, this trade-off between end-to-end verifiability and vote coercion seems to be a recurring challenge with every digital election. A Belgian respondent noted that printed ballots can be checked in the polling station but have to be scanned immediately and deposited in the ballot box to minimize this trade-off. The paper proof is only visible to the voter between the printing and vote casting. This is what facilitates end-to-end verification and later a manual recount.

Respondent 7: "*The system consists of two big components, vote collecting service and vote counting service. The vote collecting service is securely protected by the state information systems agency and runs on a triple set of servers running simultaneously so we don't lose votes. And the vote counting itself is done on a computer that is not connected to Internet, so this is completely airtight.*"

Respondent 6: "*There is always at least one voting booth equipped with a voting computer that also has a scanner to check the party and name of the candidate he chooses. After checking this he then goes to the urn where a scanner is attached on top. And the voter has to scan his vote himself.*"

The main similarities between e-voting and I-voting are primarily the added risks in safety, security and possibly transparency. The primary advantages of both systems compared to paper ballot voting are the negation of invalid voting, counting improvements and additional accessibility options for handicapped voters.

4.2 Benefits and Drawbacks

Various benefits and drawbacks to e-voting and I-voting were mentioned by the respondents. Even the biggest sceptics can not deny the fact that computer make far fewer counting errors than humans. Apart from not making errors, the counting process is also done a lot quicker in every form of digital voting and a lot less labour power is needed to count the votes. A sidenote to this should be that some digital voting systems are only used for quicker results and still need a manual recount. This can be done because the digital voting system leaves an audit trail (Valimised, s.d.d.). Another upside to digital voting is that invalid votes are impossible. Where a voter can accidentally cross of two spaces in a paper election, a voting machine or software makes this impossible. Another frequently named positive effect to digital voting is the accessibility. Voters that are blind, deaf or have other disabilities or language barriers, these voters all have additional options for help with voting machines. Voters that live in scarcely populated areas or even abroad will also have more accessibility when using internet voting, as they don't have to leave their homes. These are some benefits all respondents can pretty much agree to.

Respondent 7: "*So in Estonia, we do a full second count on paper ballots, again by hand. The population is small so we can do that. And the same goes with internet votes.*"

Then there are some benefits that are disputed. Respondents would agree that Internet voting gives citizens an improved convenience, even though they do not all agree on the trade-offs. But one respondent mentions that voting printers and scanners can add an extra layer of complexity and not improve the convenience of the voters. Multiple respondents noted that turn-out is usually considered as one of the advantages of digital voting but is not necessarily achieved. None of the respondents made any claims that turn-out would be improved, except for turnout in the scarcely populated or overseas areas. A third disputed effect of digital voting are the costs made to implement and sustain the system, apart from discussing if these costs are worth the risks. Estonian respondents claim the initial costs are high, but total costs will decrease over time because polling stations need less manpower. Dutch and Belgian respondents mostly agree that both Internet voting and voting with machines are more expensive than traditional voting.

Respondent 8: *"Because so many people have switched to online voting, it has actually reduced the cost for paper voting… The personnel in the polling stations are the biggest cost. "*

Respondent 5: *"Our system of digital voting computers is secure. It is secure, which is also a big advantage. But it does come at a big cost."*

Then there are some drawbacks on which most respondents can agree and some that are deemed to not be a big issue by a part of the respondents. The biggest drawback is security or safety. Every respondent has to acknowledge that digital voting at least brings extra risks or exposure to malign intrusion or fraud with Internet voting exposing a bigger risk as they are connected to a whole web of people. The best way to protect against attackers is to verify the entire election process, however the problem with that is that it compromised the voting secrecy principle. That brings up the second major drawback, as voting secrecy compromises verifiability, especially in Internet elections. This has been mentioned in Section 4.1, but whenever a vote is casted remotely, we have to trust that a vote has not been tampered with. If an attacker somehow manages to adjust a vote, voters have no way of checking this. And if the system does manage a way to show voters what they voted, the votes are no longer secret and more susceptible to vote coercion.

A third drawback frequently mentioned is transparency. Voters with no IT background should also be able to verify the voting procedures. A way both Estonia and Belgium try to combat a decreased transparency is by publishing source codes. If voting procedures can not be verified, voters have no reason to trust the election results. According to one of the experts, this is what happened in the 2022 Brazilian presidential elections and caused riots and chaos. It is very scary to think a government might be tampering with votes or knowing what you voted. And a ruling government has no incentive to investigate whether the digital voting system that elected them, as that research might lead to unwanted conclusions which could once again lose them their legitimacy. Another important disadvantage relating to this trust issue is that digital voting is more susceptible to reputational attacks. Nothing has to be necessarily wrong with the system, but if voters do not trust it anymore the whole legitimacy behind it is gone too. In the Netherlands, there was a reputational attack on the Dutch e-voting system by the hacker community, even though this proved to be justified.

Respondent 2: *"What is important in terms of transparency, is that it has to be understandable. So, if people don't trust it, then they should be able to do their own research to see if the election was conducted fairly."*

4.3 EEGS

4.3.1 Organizational structures and processes

To derive if there is a lack of alignment between the organizational goals, respondents were first asked about the goals of the organizations (Gil-Garcia, 2012). Then the achievement of those goals and finally about the resources.

The Dutch goals are formulated by the committees Korthals Altes and van Beek in the form of guarantees, a Dutch respondent explains. The voting process is already very safe and trustworthy, without having any form of digital voting. The turnout in some elections is already on par with mandatory attendance. That is because the accessibility to voting is really good, everyone can vote all day and the average distance to a polling station is 400 metres. Respondents mention that the main technological difficulty is the verifiability and voting secrecy trade-off in digital elections. Respondents are not all on the same line about the goal of voting secrecy being too important for the Netherlands to think of I-voting in the short term. Admittedly, a voting printer and scanner is a more likely option, but currently both options lack political support. Ultimately, the trauma of 2006 and 2007 is still too fresh for Dutch people. Digital voting might introduce additional risks to voters losing trust in the election system if it were to fail, however one of the respondents mentions the debate should at least be opened again. Especially for the Dutch people voting from abroad, who currently have a system which does not achieve the formulated guarantees. Postal voting has no paper trail and I-voting would improve transparency and trust in the government and voting system. This would in turn lead to a higher participation from overseas voters.

Respondent 3: *"The current voting system (*for Dutch voters overseas*) is unreliable, unsafe, untransparent and too difficult."*

These claims are a big contrast with the responses from their Belgian and Estonian counterparts. In Estonia, one of the first goals of implementing I-voting was an increase in turnout, this did not happen. But the Estonian government noticed the voter convenience improving instead and every election the number of people voting through the internet increases. Another initial success factor was to beat Switzerland and become the first country to introduce internet voting nationwide, in that they were indeed successful. Years later, respondents mention Estonia is really proud of their e-estate and success is also to set an example for other countries. Showing that "their flagship" also holds up to the EU standards but add voter convenience as an additional successful effect. Respondents first mention some factors to the Dutch guarantees, the legitimacy of Estonian election is only reached if those same universal principles are reached. However, I-voting also provides accessibility and more voter convenience. Finally, Estonian success also brings an extra risk to it, as respondent 9 mentions: *"I think that success has this double-edged sword. It's good for the projection but at the same time it can be problematic because it's one of the pillars of the e-estate."*

Belgian respondents state that digital voting is so successful that all committees and parliamentary meeting plead for more digitalization in the election process. Voting computers are so popular that municipalities even hire extra voting computers from their own budgets. Digitalization is a popular trend in government all over Europe in general, so there is lots of local support for digitalization in elections too. However, the distinction between the Flanders, Walloon and Brussels Regions should be made. Whereas Brussels and Flanders Region love their e-voting systems and can't get enough, the Walloon Region has political parties that

oppose every form of digitalization and see success as keeping elections secure and free of digital solutions.

Respondent 4: *"In 2018, we had 10 municipalities that purchased computers themselves. All the others we self-financed. Those ten municipalities did that themselves, because they really wanted to do it. And now we have two municipalities back, who will rent the equipment at their own costs. So, the drive for more digitisation is definitely there, both in parliament and locally."*

Respondent 5: *"I think it also frames the general positive image people have about digitisation. The government, when they say they have digitised something, that's something they like to show off. I think local governments do like to do the same. We as a government will also vote digitally in the next elections. And there are very few negative reactions to that."*

Resources

Dutch respondents talk about how much it would cost to implement digital voting systems, because this can only be speculated about. Currently, there are no funds available for digital voting initiatives because they are not even discussed yet. It is, of course, hard to rate the cost of digital voting initiatives that don't exist. Even if voting machines would be introduced, the municipalities would have to pay for them. The budget they received for e-voting machines in the early 2000s was never taken away, so the municipalities need to re-arrange their finances to pay for voting machines. Also, when considering the purchase of voting machines, the Netherlands has much higher costs compared to other countries. This is because they still have to worry about TEMPEST-standards, which are almost military grade. These standards have to be met because of a laboratory test in 2007 exposing voting secrecy to radiation.

Respondent 1: *"In a laboratory setting in 2007 it was shown that you could determine, based on the electromagnetic radiation of a voting computer, whether someone had voted for the CDA, for example."*

In 2014, the Belgian system had already existed for over 15 years. The voting machines they used had already aged a lot. Respondent elaborated that 15 years is actually too long to use voting machines, but in those 15 years they only used them during seven elections. Writing the costs of those machines off would make them even more expensive. Basically, all batteries of the voting computers had already died. So, when the system had to be renewed in 2014 each Region made their own choices. The Brussels Region paid for the voting machines for all municipalities, the Flanders Region made municipalities choose for themselves if they wanted to use voting machines or vote by paper and in the Walloon Region all municipalities apart from the German-speaking ones vote on paper. Some respondents think there are municipalities in the Walloon Region that want to vote with voting machines but can not do so under the current rule.

Respondent 4: *"There are two things, the "Parti Socialiste" and PourEVA that undermine trust. And you can't get rid of that, and the public ultimately turns against it (*e-voting*). Liege used to vote digitally, and they actually still want to go back to voting digitally."*

In Estonia, the respondents mentioned concerns about being understaffed. There were no resource shortages in budgets for the elections, as Estonia has spent more than other countries have on elections. They mention the relative costs of internet voting is going down as more people vote by internet, but the relative costs of polling stations increase. The budget stays

more or less the same because of this. This claim can be backed by research concluding that e-voting is currently the cheapest option in Estonia (Krimmer, Dueñas-Cid, Krivonosova, Vinkel, & Koitmae, 2018).

4.3.2 Institutional arrangements

In this section the political and legal factors are explored, questions to the respondent were about political support, legal framework and about the actors involved in the decision-making process and digital elections itself. This is done to explore the degree to which the actors could cooperate and whether they were civil servants or active in the private sector.

In Estonia different parties have governed since the introduction of I-voting in 2005, but this has not impacted the political support (Belgian Federal Public Service Interior, 2020). Respondents mention the Reform Party has always remained as governing party, but there has always been a majority backing internet election. Being the first in the world and currently only Western country to have nationwide Internet voting means Estonians are really proud of their system. Respondents think it's even partially shielded from criticism because of the way it was introduced. The internet voting system is Estonia's 'Holy Cow' or 'flagship of the e-estate' or 'source of national pride'. This illustrates how much Estonians praise this system.

Respondent 8: *"This* (Internet voting) *is deemed in some quarters to be a 'Holy Cow' that cannot be touched because of the historical circumstance, how it was introduced."*

In Belgium, the respondents noticed the political support is not present everywhere in the country. There is a legal basis all over the country to use e-voting systems, but in the Walloon Region the Parti Socialiste is currently ruling and they politically oppose to any form of digitalisation under Elio Di Rupo. This party undermines the trust in digital elections in the Walloon Region. The interest group PourEVA can be compared to the Dutch foundation "WijVertrouwenStemcomputersNiet" and the German "Chaos Computer Club" or CCC. What all these interest groups have in common is that they consist of ethical hackers that don't want the election process to be digitalized. However, in the Brussels and Flanders Region the opposite is happening. In the Flanders Region, more and more municipalities introduce the e-voting system and in Brussels all municipalities are provided with voting machines. In Brussels, the main goals of the election had shifted to safety, speed and user convenience while still maintaining efficiency according to some of the respondents. The source codes are always published after the election to remain transparent. The Brussels Region tried to be even more digital by digitalizing their voter lists too. Respondents tried to illustrate how much some Belgian institutions were improving on digitalization. Internally in the Flanders Regional office, one of the slogans was "Maximally Digital" and at the same time, the federal government had the slogan: "Digital by default".

The Dutch political situation is apparently not this supportive of digital voting. Respondents mention how members of parliament are not proactive towards researching the options of digital voting. They will sometimes ask questions but won't do their own research. The discussion on digital voting needs to be started so that newer alternatives can be reviewed too. The most recent questions asked were by parliamentary member van Haga about voting with DigiD (Dutch Ministry of the Interior and Kingdomrelationships, 2023).

Respondents mention that political support and a legal basis are intertwined. If you want to adjust legislation, you need political support first. And to get that political support, the

respondents refer back to the guarantees from the committees and the EU standards. Some countries have the legal basis to implement a digital voting system under the right conditions, but currently don't experience those conditions.

Respondent 1: *"The political support and legitimacy are naturally provided with an amendment of the law, and if there is none, you cannot amend the law. So, in that sense, these are intertwined. I think it will also simply have to do with the costs of safeguarding the secrecy of the vote and the degree of verifiability of such a system. So, I think you end up with the guarantees, as formulated by the Korthals Altes Committee."*

Respondent 5: *"In many countries the basis and regulatory framework is there, but very few are implementing it* (Internet voting) *in practice."*

One of the Dutch experts highlighted that one of the Dutch political parties voted internally about whether they would like a trial for secure digital voting for Dutch nationals abroad and that party decided they do indeed want to make that first step.

To analyse which part of the involved actors are governmental, one of the questioned the respondents were asked about which actors collaborates during elections and how well. Some of these were very obvious governmental institutions but some of these were surprising. Obvious institutions were the Electoral Offices of each country and the Ministries of Interior Affairs. As mentioned in Section 3.3, the institutions executing the elections were the municipalities in the Netherlands, the Regions in Belgium and Valimised in Estonia. But more surprising was that every country actively involved ethical hackers in either their decision-making process or when testing their digital voting systems. In the Netherlands these moral hackers' advice on the risks of systems. The cooperation between the foundations of ethical hackers "Stichting tegen Hackbare Verkiezingen" and "WijVertrouwenStemcomputersNiet" has a historical basis but is very intimate right now. One of the board members of the first foundation even transferred over to the Electoral Office. On the other hand, Estonian hackers were asked to test the system and see if they could find any security vulnerabilities.

Respondent 9: *"After every election cycle they (*Valimised*) make a full renovation of the system but before every election they are testing that it works and they are opening important parts of the code for local hackers that they can see if there is anything, any flaw, anything that they can report in order to secure the system."*

In Belgium, respondents mentioned a very good cooperation between universities and institutions executing elections. Belgium has a panel of experts for elections and have ordered a study to explore internet voting possibilities in the future. Other semi-public actors involved in all three countries are the IT professionals, in Belgium the IT community is asked about their opinions. In the Netherlands the academics are very important in informing the Electoral Office and in Estonia the RIA is the Information System Authority which is a governmental structure providing IT support during the elections. In Belgium a similar authority in the Centre for Cybersecurity (CCB) helps them out.

The sceptics in Estonia and Belgium are partially governmental in the Conservative Party and Parti Socialiste, which both oppose digital elections. In Belgium there is also an interest group called PourEVA that strongly opposes digital elections. A last group which is important during the elections are the suppliers of the systems. In Estonia the suppliers of the systems and technology providers are outsourced to private corporations, one of the respondents recognizes

the additional risk this brings. In Belgium the producer of the voting machines is also a private party.

Respondent 9: *"As soon as you start making more and more technological layers, there is the tendency to outsource part of the process and then you are putting more and more actors. And a company that is just making the vote tabulation might not pay so much attention to security as the state."*

4.3.3 Contextual Factors

Contextual factors have partially been discussed in previous sections in the form of politics, technology and legal factors. But there are mainly cultural and demographic differentiations between the countries that really have impacted the current digital voting status in each country, according to the respondents.

The Dutch respondents mention that the culture in the Netherlands shows that if aspect of a process is not safe, a lot of backlash is to be expected. Another thing is that there is a really big hacker community in the Netherlands, that also gained some political recognition after the 2006 incidents. One of the Dutch experts explains Estonia is not used to the high safety standards, as they have not been independent as long and are easier to satisfy. In the Netherlands, such a system would not have the political backing and public trust it has in Estonia. Another thing is that in Estonia and Belgium the hacker communities are not as active in informing the government during elections, says one of the Dutch respondents. Another adds that digitalisation in the government has grown a lot in recent years, especially during Covid. But digitalisation in any election process was non-negotiable prior.

Belgium has a unique political situation according to their respondents, one of which clarifies he could fill a whole new interview explaining that. But the main take-away is that the Walloon Region has an entirely different culture compared to the Flanders Region. This also explains the differences in choices they make concerning digitalisation. Whereas some Dutch experts highlight the importance of safety, even if it is for a relatively small part of the electorate such as overseas voters, one of the Belgian experts is not as concerned. The electorate of overseas voters is so small, it could make the accessibility improvement more prominent than the risk of manipulated results. The share of those voters is so small, the results would be negligible.

Respondent 5: *"Actually the gain in accessibility you make with it* (letting overseas citizens use internet voting) *is greater than the risk you run that the results can be manipulated incorrectly. You then have a bigger gain in accessibility."*

The Estonian situation is a unique one, according to the Estonian respondents. Prior to the implementation of Internet voting in 2005, every citizen already had an electronic ID. This E-ID is a key feature towards implementing Internet elections according to the respondents. Estonian citizens used this E-ID for digital banking, or various Internet services provided by the government. This made citizens very experienced with a digital government before the elections. Because the E-ID is so deeply imbedded in the Estonian system, internet voting was seen as just another service provided to them. This meant that Estonians have a higher trust in their government and their elections. Estonia has only been an independent country since the 1990s and wants to make their election system resistant to foreign intrusion. There is no reason for Estonians not to trust their government to fulfil that.

Respondent 7: *"Another condition is voter education, so the voters need to be able to use internet voting. Again, this has a lot to do with E-ID. So, in Estonia the large majority of people use Internet* (services) *on a regular basis because it benefits them to do so."*

A very important aspect the respondents of every country mentioned is trust. Trust in the politics, trust in the government, trust in the elections. Trust is a key consideration when implementing any form of digital voting. If citizens distrust new systems, the whole legitimacy of the outcome of the elections is gone. This is not only about trusting that their own vote is casted as intended, but also that they have to be willing to accept the results, whether they like them or not. In the Netherlands, there seems to be no trust if the ballot secrecy is not preserved. In Estonia there is a high trust environment in general because electronic services have always been provided by the government and the Belgian political situation is very hard to pinpoint and differs for each region. But every respondent mentions that political support and public trust are always necessary to implement, hold or improve digital elections.

4.4 Important historical events and stability

The theoretical framework, as previously discussed, illustrates the core focus of Historical Institutionalism, emphasizing the prolonged periods of stability caused by critical junctures in a timeline, which in turn influence future decisions (Pierson, 2000). Each country has encountered its own critical junctures, and the respondents' answers will show if there are similar patterns to this Historical Institutionalist literature.

The Dutch respondents were all on the same page about historic events that paint the Dutch picture. Of course, there is the introduction of the voting machines in the 1990s, but what is generally the most important is the period around the 2006 municipal elections. Respondents noted multiple incidents that led to a big controversy in the Netherlands and ultimately to the end of the voting machines. One of these incidents was a polling station chairman that misled voters to think they had voted. Once the voter left the polling booth, the chairman of the polling station would come in and vote for himself, as he was one of the candidates on the list. This led to the chairman getting an incredible number of preferential votes in only this one polling station. Because this was so obvious, it finally came to light. But this also raised the question if there had been any other voting fraud during this election, and it was impossible to check because there was no paper trail to these machines. A second incident multiple respondents mentioned was a laboratory experiment, which showed that electromagnetic radiation could show for which party someone voted (Commissie Korthals Altes, 2007, pp. 50-51). Pressing a certain button on the voting machine would radiation different types of radiation than other parties. Even though this was done in a laboratory setting, voting secrecy was now at risk and it would take military grade countermeasures to safeguard against this problem. A third incident was a notorious Dutch hacker demonstrating how he could change the chips in a voting machine within a minute and manipulate the elections if he did. All of these incidents combined led to a foundation called "WijVertrouwenStemcomputersNiet", which were very active in media and politics and ultimately swayed the public opinion. The respondents mention that the citizens still remember these incidents, but it is mainly the politicians that are very sceptical of any new change. They remember how their former colleagues were flamed for these incidents. Other historical events that were mentioned were the Committees researching future digital voting possibilities and the CDA list leader elections, but it was stated these were not as important as the previously mentioned incidents.

Respondent 2: *"The* (polling station) *chairman then walked back to the voting computer and then cast the vote himself, so he hijacked the voters' vote and that came to light purely because all the votes went to his party. You need a full audit trail make voting machines verifiably."*

In Belgium the respondents answered that the most important historical events were the initial 1994 introduction of e-voting and the renewing of the system. This renewing of the system had to take place after the voting machines were deemed to have aged too much. This led to a differentiation between different Regions as the Brussels Region facilitated all voting machines and the Walloon Region abolished them altogether. The respondents interviewed in this study thought all civil servants wanted the elections to be on voting machines, but the Walloon politicians were too much against this digitalization.

Estonian respondents mention how important the introduction of their voting system was. In 2005 they were the first ever country to implement nationwide elections. In the early 2000s there were feasibility studies and the E-ID had just been introduced. So, when the race with Switzerland commenced, Estonians were very eager to implement a full Internet voting system. It was very small at first, with only a few percent of the population using internet voting during the first election, but everyone had the chance if they wanted to. This has slowly been building up and in the latest election, more than 50% of the votes were cast over the internet. As mentioned in the political section, the Estonians labelled their voting system a reason of national pride. The respondents say that means it is harder to criticize this system because of it. In 2011 there was a malware revelation, which led to criticism. In other countries, such criticism could lead to the downfall of a system, but Estonia introduces a renewed verification system during the next elections. Cyber security issues are much more on the present today compared to 2005 and respondents wonder if the 2005 system could have been introduced in a landscape like today's digital world.

Respondent 7: *"And the cyber security issues, national security issues are much more on the foreground. So, I wouldn't really know if Estonia didn't have internet voting, what would the debate be today. It would probably be a little more varied than it was in 2005, when there were not many people were talking about the risks."*

Something else that was mentioned by respondents of all countries was that once the public and political opinion was made up, it becomes very hard to change it. Experts may have their own opinions, but as long as there is no legitimacy or public trust or political support for a change it will never happen. This can be seen in both the Netherlands and in Estonia, but in different directions.

Respondent 3: *"The politicians think in fear, then a compromise and then in possibilities. I blame the politicians for that, because the moment you start talking to people, "WijVertrouwenStemcomputersNiet.nl" still comes up."*

Respondent 9: *"One of the main problems for the implementation of internet voting is generally what we name the middleman paradox, that the person who is the decision maker normally has lots of pressure on him or herself to make this decision and finally, generally they decide not to implement it, to not take this burden on them."*

5. Discussion

During this investigation the main important aspects have been the factors that influence the implementation of digital voting. The goal was to expose those drivers in an attempt to show countries what is necessary if they want to consider implementing some form of digital voting. Three countries with currently each a different type of voting system were researched to find out what decides whether a system is implemented or not. This was discussed with interviews and a literature review following the main research question: *"What factors should be considered as drivers for the implementation of digital voting?"*. The results are gathered by interviewing a total of 9 experts that each have their own expertise surrounding digital elections in the Netherlands, Belgium and Estonia.

In this chapter, the key outcomes of this study will be employed to answer the research question (Section 5.1). Subsequently, the practical implications and recommendations will be presented (Section 5.2), followed by a discussion of the limitations of this research (Section 5.3). Lastly, suggestions for future research directions will be provided (Section 5.4).

5.1 Interpretation Results
EEGS

The conducted interviews give several different factors that have influenced the success of digital voting initiatives and can be considered as drivers behind digital voting implementation. Some of these factors were mentioned in EEGS and Historical Institutionalist literature and others, can be seen as additional factors.

Prior to the interviews, the Enacting Electronic Government Succes (Gil-Garcia, 2012) Framework had been modified to fit digital elections instead of regular e-governance initiatives. The main factors to consider were organizational, institutional and contextual. This research has acknowledged the importance of technological factors, but not focussed on them.

The main aspects of the organizational factors lie within the goals and the achievement of those goals. The Dutch goals are formulated by the committees Korthals Altes and van Beek (Commissie Korthals Altes, 2007) (Commissie van Beek, 2013) in the form of guarantees, these guarantees are mostly similar to the priorly mentioned EU standards (Council of Europe, 2017). The Dutch standards include:

- Unicity;
- Accessibility,
- Transparency;
- Controllability;
- Voting Freedom;
- Voting Secrecy;
- Integrity.

"Commissie Korthals Altes 2007" and "Commissie Van Beek 2013" both implicate that the system with a voting printer and a ballot scanner would make the counting faster, more reliable and more accurate. This would improve voter trust in the election results positively and decrease the workload for members of the polling stations significantly (Commissie van Beek, 2013). However, during the analysis respondents made it perfectly clear that right now the Dutch government does everything to achieve these goals and has no place for additional goals like voter convenience. Respondents elaborated that within the Netherlands these goals are mostly

met, however voters voting from overseas have limited accessibility. Because of this, other guarantees like transparency, controllability and integrity are falling short too. Some document analysis shows some parties are working on researching or debating digital voting with D66 asking its Parliamentary fraction to file a motion to consider a I-voting trial for overseas voters (D66, 2023) and VVD 2017 party programme mentioning that "Voting should be electronic again, as there are safe way to do that nowadays" (VVD, 2016). In the Netherlands there is currently no budget for digital voting initiatives, e-voting computers would need to be paid by municipalities that have real budget for them (Dutch Ministry of the Interior and Kingdomrelationships, 2023).

Belgian goals seem to not be uniform across all executive institutions. The Walloon Region had a committee analysing options for the 2012 election, they thought a new system of e-voting was easy, fast, reliable and transparent, but Minister Furlan mentioned the costs were too much of a burden (Doucet, 2011). At the same time, the Brussels Region decided to buy the voting machines for all of their municipalities (Dandoy, 2022, p. 50) and their goals shifted to safety, speed and user convenience. These differences in resources could be explained by the contextual differences in culture and economics between the Regions. Another reason for this difference could be the levels of public trust. The Parti Socialiste and PourEVA in the Wallon Region undermine trust in digital elections. At the same time the Flanders Regional office used the slogan "Maximally Digital" and the federal government, albeit not in election circuits, used "Digital by default".

Estonia has similar guarantees to the EU standards (Clarke & Martens, 2016), but also add convenience and accessibility (Vinkel & Krimmer, 2017, pp. 178-179). The accessibility in the Estonian context is enlarged as they adjusted their turnout rating to include overseas voters (Wright, 2023). The 2011 update with verification improved the success of the goals. A critical sidenote is that experts think the increase in I-voting shares might make the Estonian system a more likely target for attacks. The budgets for Estonian I-voting are bigger compared to other countries, but after initial costs the I-votes are now relatively cheaper compared to paper ballot votes. The political support for I-voting has always prevailed in Estonia, with it being called their 'Holy Cow', 'flagship of the e-estate' and 'source of national pride', another keynote this incorporates is the trust in the system. In 2011 research, the public and political approval in Estonian I-voting system improved, even after the malware detections (Clarke & Martens, 2016, p. 11) (Office for Democratic Institutions and Human Rights, 2011, p. 8). Contextual reasons for the self-called success of I-voting are the E-ID system and the use of digital governmental services within their population. Estonia is a small country that aims to engage as many voters as possible (Vinkel & Krimmer, 2017).

The collaboration within every country was interesting to see as all countries used a combination of public and private sector parties. In the Netherlands moral hackers are more actively involved in advising the government on digital elections after exposing them in the past (van Soest & Sakkers, 2017). In Belgium and Estonia IT-experts and academics are consulted to advise on their current systems. Other private sectors parties involved in these countries are the suppliers of the voting software or machines. Respondents mention the tendency to outsource part of the process as more technological layers are added. Just like the literature, they advise government to remain in control due to the security risk this could cause. In the Netherlands, outsourcing led to a loss of control on digital voting goals, which ultimately led to the Dutch scandals (Oostveen, 2010).

Historical Institutionalism

In the Dutch context, the crucial historical events trace back to the years 2006 and 2007. Voting secrecy's significance to the Netherlands stems from the lack thereof in various 2006 and 2007 incidents (Binnenlands Bestuur, 2007) (Ikink, 2006) (Loeber, 2008) These continue to cast a shadow over Dutch political discourse concerning digital voting. Despite these incidents primarily involving voting machines, the Netherlands also terminated its internet voting pilot for overseas citizens (Loeber, 2008). The period since then in which Dutch politicians are very careful about new digital voting initiatives is indicative of the longer period of stability posited by Historical Institutionalism.

In Belgium, significant milestones were the initial introduction of the system in 1994 and the subsequent replacement of outdated voting machines in 2014. Belgium's legislation has allowed voting machines from 1994 onwards, with individual cantons deciding on their adoption (Dandoy, 2022). Political support differentiates between Regions with Walloon governing party "Parti Socialiste" opposing every form of digitalization. Conversely, the Brussels-Capital Region enjoys extensive political backing, even funding all voting machines and thus exclusively adopting e-voting. The second critical juncture has split the Belgian response. When confronted with outdated voting machines in 2014, the Walloon Region abolished e-voting all together and the Brussels Region completely renewed and replaced all old voting machines (Dandoy, 2022, p. 50). To this day, 9 years later, there is no paper voting in the Brussels Region and no e-voting in the Walloon Region. This legislation is still present, so the Regions are not that far apart on their respective timelines.

Estonia's pivotal critical juncture revolves around the race they had with Switzerland. The rivalry with Switzerland peaked in 2005, with Estonia achieving the pioneering status for nationwide digital elections. Respondents emphasized the significance of this victory. During the initial digital election only a small portion of voters used this service, but this gradually increased since. Presently, over half of all voters uses Internet voting (Valimised, s.d. c.). This conforms with the longer period of stability following critical junctures with the 2011 malware revelation not being significant enough to outweigh the increasing returns already made (Pierson, 2000). The status-quo bias of political institutions as Pierson mentioned, finds resonance in Estonia, where no politician would willingly eliminate their flagship I-voting program, and in the Netherlands, where digital voting remains a political taboo.

Trust

One of the factors that is not necessarily included in previous literature is trust. Respondents mention all forms of trust. In Estonia respondents note that trust in the government, the voting system and results is generally very high. In the Netherlands, trust was damaged by the scandals around the previous voting machines and is only slowly building back up again. And in Belgium, the political party Parti Socialiste and the interest group PourEVA undermine digital voting trust in the Walloon Region. Trust is possibly not as prominent in EEGS literature as EEGS literature usually discusses e-government initiatives instead of digital voting. In Historical Institutionalist literature, trust can be converted to the longer periods of stability. If a country and its citizens trust in an initiative, it will be stable for a longer period of time and political support for the initiative will remain and grow. Different literature that does mention different forms of trust necessary for digital voting implementation is that of Risnanto, et al. (2020), who mentions trust in government, technology and the election committee.

5.2 Practical Policy advice / Recommendations

One of the policy suggestions to the Netherlands would be to review if voters living overseas could vote by means of internet voting. The Netherlands has set some really comprehensive goals and are successful in achieving those goals domestically. However, several of the goals are not achieved when looking at the postal voting elections. It is important to compare the current postal system to the internet voting system rather than comparing internet voting to the current domestic paper voting system. And in Germany a comparison was made between postal voting and I-voting that concluded there were shared problems but there was a good argument to implement I-voting for citizens abroad (Krimmer & Volkamer, Bits or Paper? Comparing Remote Electronic Voting to Postal Voting., 2005). Internet voting has a basis for improvement in some areas. In Indonesia, the digital voting system seemed to improve election security and prevent fraud (Hartami & Handayani, 2012).

For Estonia and Belgium, the most important policy suggestion is to review if outsourcing technology is a safe option. An extensive review of could learn if the risks are mitigated. Dutch outsourcing in the 2006 municipal elections ultimately led to the loss of control and expertise over the systems (Oostveen, 2010).

5.3 Limitations

One constraint of this research was the restricted access to interviewees and the time allocation. Currently, a limited number of experts with diverse backgrounds were interviewed. For future research, it would be valuable to extend the interviews to include experts from the Walloon region, enabling a more comprehensive comparison within Belgium. Additionally, interviewing various tiers of civil servants in the Netherlands and Estonia could enhance the depth of insights.

Another limitation pertains to the external validity of the findings. Given that three relatively similar countries were selected, generalizing the results to countries beyond the EU with dissimilar levels of government digitalization might influence the outcomes.

A third restriction arose during efforts to refine the definitions of e-voting, I-voting, and digital voting. To clarify the distinction between e-voting and digital voting, the decision was made to use e-voting to signify voting with voting machines, whereas other literature frequently employs e-voting to encompass all forms of electronic voting. Initially, this led to some confusion during the interviews, prompting the subsequent improvement of the definition to its current form.

5.4 Suggestions for future Research

Extending research to multiple countries with experience in either e-voting or I-voting elections could lead to better insight, especially in practical aspect such as the discrepancy between voting secrecy and verifiability or authentication.

During the interview process, additional research that is in line with the finding in this research surfaced. "To I-vote or not to I-vote, Drivers and Barriers to the Implementation of Internet Voting " (Licht, Dueñas-Cid, Krivonosova, & Krimmer, 2021) and the previously mentioned Risnanto research (Risnanto, Bin Abd Rahim, Herman, & Abdurrohman, 2020) are more in line with findings in this research, as they better incorporate trust as a factor.

6. Conclusion

The technological aspects of implementing digital voting have been known to and been researched by many. This thesis compared the Dutch, Belgian and Estonian cases. That means its external validity is most successful in similar countries with a high level of digitalisation in the government. Using interviews with experts this thesis formulated answer to the following question:

"What factors should be considered as drivers for the implementation of digital voting?"

Based on the aforementioned research, it can be concluded that the main drivers for implementation of digital voting, not considering its technological aspects are indeed organizational structures, institutional arrangements and environmental conditions as well as that history plays an important role in present decisions. Apart from these factors that were already considered in the literature, another important aspect is trust.

The contribution of this thesis is applying EEGS and Historical Intuitionalist perspectives on the digital voting dilemma. The EEGS teaches to find the success of an initiative by looking at its goals, political and legal background and contextual conditions. When deciding on implementing digital voting, a country should consider what goals are more important. Digital voting brings an increase in accessibility and convenience, while risking safety or ballot secrecy. Introducing I-voting means a trade-off between these latter goals needs to be made. This trade-off need to be made for any form of remote voting, so I-voting can still improve upon postal voting.

The role of historical events for the current time landscape plays a crucial role. The historical events in the Netherlands still weight heavily on their political landscape. When the Belgian voting machines had aged by 2014, another critical juncture split the country into two different directions. This can also be appointed to the contextual factors in the Belgian politics between the different Regions. The Estonian pioneering role has put their I-voting initiative on a pedestal, shielding it from criticism.

A special mention needs to be made about trust in digital voting initiatives. A country need a high trust in the election system, its government and the technology, otherwise an election will lose its legitimacy. If an election loses its legitimacy, it will undermine trust in the democracy and the constitutional state.

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Appendix 1 Interview Protocol

Questions Interview Digital voting

(Introduction)

Good morning/afternoon, my name is Joris Swinkels. I am currently studying the Economics and Governance track of the Public Administration track at Leiden University. This interview is for my thesis, with the research question: "What factors should be considered as drivers for the implementation of e-voting?". I will research this through a qualitative study on E-voting between the Netherlands, Belgium and Estonia. I will aim to find out why e-voting is currently implemented in Estonia but not in the Netherlands and only partially in Belgium. During this interview, there is a distinction between internet voting and electronic voting with voting machines. I am interested in understanding both and will ask questions to learn more about the status and views of e-voting in each country. I will also seek to understand what will be or was necessary to implement e-voting in a country. If you have any questions about the study, feel free to ask.

First of all, I would like to record this interview for academic purposes, if that is okay with you? As a participant, you will remain anonymous in the paper. If at any moment you want the interview to pause or don't want a part to be recorded, please let me know. This interview will take approximately 1 hour.

(Participant background)

What is your name and your (educational and professional) background?

What is your role in the organization you work for?

(Digital voting Usage)

What are your experiences with e-voting in your current and past roles?

How often do you get confronted with e-voting?

What type of experience do you have with e-voting?

What are your experiences in your current and past roles?

How do you personally feel about the e-voting system that is currently in place in your country?

(Perceived Benefits and Drawbacks)

What are the main benefits and drawbacks of e-voting?

What are the main differences in the electoral process between regular paper voting and e-voting?

(Historical Institutionalism)

What are the main important events regarding e-voting in your country?

Was there any legislation? (Estonia f.e.)

In your opinion, how have previous experiences in your country influenced the way the government and the people think about e-voting?

To what extent did countries abroad influence the way your organization views e-voting?

How important is public trust towards implementation of e-voting?

How often does your government/ organization evaluate the idea of e-voting?

(EEGS)

(Organizational/ Technological)

To what extent do you think the e-voting initiative has been successful in your country if we measure success by the achievement of the intended goals of the government?

How does e-voting contribute to the transparency and accountability of the electoral process?

How has/can e-voting impacted the efficiency and cost-effectiveness of the electoral process?

To what extent do the organizations that execute elections have enough resources to improve, implement or research e-voting?

(Technological)
What are the most important technological variables that could influence whether an e-voting election could be successful?
And please make them understandable for someone like me, with a background that is not focused on technology.
What would be the hardest technological difficulties for citizens to use e-voting?

What would be/are countermeasures that your government could/ uses during the elections?

(Institutional)

Which governmental agency collaborate during the elections?

How do different (semi-) public organizations collaborate during elections?

(Contextual/ Environmental)

What was/is the influence of actors outside the government on e-voting implementation?

What are some other (contextual) conditions that need to be met to implement e-voting?

What do you think is the difference between the use of technology in e-voting and the digitalization of the government in general?

(Suggestions for Improvement)

What would be suggestions you have to improve the current e-voting system in your country?

What do you think about the role of technology in the governance process in general?

(Suggestions to improve this research)

Do you want to tell me something I did not ask or something I should have asked?

(Conclusion)

Thank you for your time and your contributions, they are greatly appreciated. I will use these results anonymously during the completion of my master thesis. You still have the right to withdraw from this study at any time. If you want, I can update you with my final research. To improve the rest of my thesis I only have two more questions to ask you.

Is there anyone in your organization or network who I should be interviewing too (someone that has a different perspective or opinion maybe)? Do you have contact information of them?

Are there any documents I should be aware of that are very important for your work on e-voting and that could help this thesis?