

The Impact of E-Government Development and Public Sector Transparency on the Manifestation of Electronic Voting Procedures



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I hereby declare that the present thesis with the title “*The Impact of E-Government Development and Public Sector Transparency on the Manifestation of Electronic Voting Procedures*” is my own work, was written in my own effort and has not been accepted anywhere else for the award of any other degree or diploma. Where sources of information have been used, they have been acknowledged.

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Abstract

Objective. The digitalisation of public sector services, commonly referred to as *e-government* disseminated rapidly in the 21st century. Discussions in both the developing and developed world revolve around whether the electoral process should be part of this trend. This research aimed to define the most significant factors that lead governments to introduce e-voting while trying to understand the causal process of the continuance or abolition of the technology in the long-run.

Methodology. A mixed methods approach divided up in three research stages analysed data on one dependent and five independent variables between the years 2002 and 2018. The first research stage is a large-N, cross-country study of 162 countries which determined the two most significant variables for the introduction of e-voting. The second research stage is a medium-N, longitudinal analysis that distilled nine countries of the large-N dataset and served to choose two typical cases for the final research stage. Research stage three conducted a small-N, within-case analysis of the two cases chosen. Theory-testing process-tracing was applied to identify whether the Social Construction of Technology theory can help to comprehend the manifestation of e-voting.

Results. The results of research stage one indicated that e-government development and public sector transparency are the most significant variables to predict whether a country has e-voting in place. Research stage two confirmed this finding and chose Argentina and Germany to adequately represent the developed and developing world in the final research stage. The two cases chosen showed similarities in the structural set-up of their election system and the way that e-voting was introduced, yet the technology was continuously used in Argentina while being rapidly abolished again in Germany. Research stage three revealed that civil society actors exercise a decisive influence on whether countries continue with or abolish e-voting in the long-run. The formation of a discourse in support of e-voting in Argentina and against the technology in Germany explained the different manifestations of e-voting respectively.

Conclusion. The research illustrated that one-size-fits-all approaches which classify e-voting as either a panacea or threat for the electoral process are not valid. Instead, the way that e-voting manifests within a country is highly context-dependent and requires a case-by-case analysis. Factors in the pre- and post-implementation phase of e-voting and an emphasis on the agency of civil society are important in this context. The mixed methods approach applied in the research allowed to grasp the intricate nature of e-voting as a highly complex socio-political issue. The findings shall incentivise more interdisciplinary research and foster dialogue between computer science and social science research which would allow to better make sense of technological innovations in the future.

Keywords: digitalisation, e-voting, e-government development, public sector transparency, mixed methods

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1. Introduction

The advent of the internet in the past century has incentivised technological changes in the economic, political and social realm (Lupu & Lazar, 2015). Suddenly, public and private sector entities were facing the challenge to implement the use of Information and Communication Technologies (ICTs) to innovate traditional work processes. Amongst other necessary reforms, this novum entailed for governments the digitalisation of public services (Lupu & Lazar, 2015). The development of electronic government, commonly referred to as “e-government”, has several implications. On the one hand, e-government poses an opportunity for the public sector to speed up processes and reduce costs because the delivery of services online partly renders human resources unnecessary (Bayona & Morales, 2017; Braun et al., 2003). On the other hand, e-government processes can pose a threat if democratic principles such as the accountability and transparency of governments towards their citizens are neglected (Hilbert, 2009; Gauld et al., 2006; Card & Moretti, 2007). The latter concerns especially the digitalisation of the voting procedures, so-called “e-voting” (Toapanta et al., 2019, p. 106). Consequently, governments face the pressing need to balance between these factors and be aware of the trade-offs in the process of innovating public services.

The implications of e-government development for public sector transparency are contested (Sá et al., 2016; Kumar & Best, 2006; Lau et al., 2008) and even more so how these dynamics play out in the electoral process (Alvarez et al., 2011; Stewart, 2011; Baasanjav, 2008; Gauld et al., 2006). E-voting remains a new paradigm in governance and more research is needed to better make sense of its nature. By the same token, given its complexity and the way that e-voting translates in the economic, political and social realm, sophisticated methodologies and theories to study the phenomenon are required. Hence, this work applies a mixed methods approach which allows to adequately tackle the intricate nature of e-voting. Moreover, a social constructivist understanding of e-voting is adopted which enables a more nuanced analysis of its implications. The intention in this context is not to make a normative statement, meaning that this research is neither placed at the supporting nor at the opposing end of e-voting. Instead, it aims to shed light on the underlying dynamics as to the introduction of e-voting in countries and why some decide to continue with the technology whereas others abolish it again. The findings help to gain a better understanding of how varying levels of e-government development and public sector transparency contribute to the aforementioned. Likewise, the research results allow for a more nuanced judgement about the

digitalisation of public sector services as an inexorable trend in the present and future.

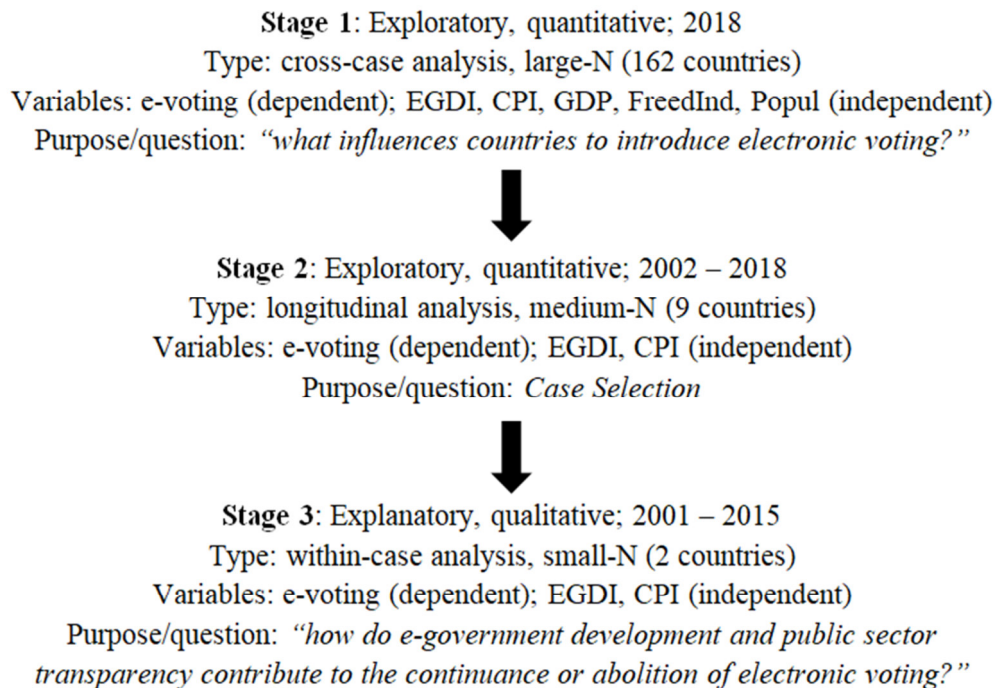
1.1 Research Questions, Aim & Design

In light of the above, the research will address two questions. The first question is generic and broad in nature by asking “what influences countries to introduce electronic voting?” It aims to set the empirical basis for the second research question which builds the core of the research: “how do e-government development and public sector transparency contribute to the continuance or abolition of electronic voting?” Two remarks are important to highlight with regard to research question two. Firstly, e-voting is defined in broad terms for the scope of this research and includes voting via voting machines at official polling stations but also voting from home via the Internet. Secondly, even though they are related, e-government development and e-voting are measured separately for the scope of this research. Both of these remarks will become clearer in chapter four which conceptualises the terms.

With this in mind, the focus of this research is on question two with the goal to open the causal black box of what leads governments to continue with or abolish e-voting once it has been introduced. In other words, the research will trace the process of how e-government development and public sector transparency trigger a discourse which then contributes to the likelihood of e-voting continuance or abolition. In order to scrutinise how this causal mechanism unfolds, the research is divided up in three stages, illustrated in Figure 1. Each stage is tackled consecutively, starting from research stage one and the “macro level”, continuing down to research stage three and the “micro level”. “Macro level” in this context refers to the broad e-voting landscape in the world and highlights which countries do and do not have e-voting in place whereas the “micro level” makes reference to the e-voting continuance or abolition of merely two countries.

Figure 1

Overview Research Stages



Note. Research stages from top “macro-level” to bottom “micro-level” (source: author).

Research stages one and two are exploratory, whereas research stage three is explanatory in nature. Stage one is a large-N screening which sets the empirical basis by addressing the first research question. Based on the results of stage one, stage two will exercise a longitudinal analysis of nine countries which are representative of the large-N dataset. The second stage serves to choose two cases which are subsequently analysed in-depth in the final research stage. Stage three conducts a within-case analysis of the two cases chosen both for which the causal back box will be opened and the second research question answered.

The subsequent chapter will review current and past literature on e-voting. Chapters three and four provide for the theoretical and conceptual framework of the research before chapters five and six operationalise and analyse the empirical data. The final chapter places the findings in a broader context and gives impetus for future research.

2. Literature Review: E-voting as a Contested Development

According to the Institute for Democracy and Electoral Assistance (IDEA), a total of 30 countries worldwide currently make use of e-voting procedures (IDEA, 2020). Within only nine years, this number has tripled and e-voting disseminated rapidly in both the developing

and developed world (Alvarez et al., 2011). In spite of a growing academic interest in the use of new voting technologies, e-voting as a new paradigm in governance remains contested (Alvarez et al., 2018). At one end of the continuum, e-voting is perceived as a panacea for more democracy which makes elections more transparent, less time consuming and more convenient (Mistry & Jalal, 2012; Rojko et al., 2011; Singh et al., 2010; Graham et al., 2009). At the other end of the continuum, e-voting is a scapegoat which compounds longstanding irregularities in traditional voting procedures and is too costly to set up (Alvarez et al., 2018; Johnson et al., 2017; Stewart, 2011; Gauld et al., 2006). Contributing to the academic debate about the modernisation of electoral procedures, the subsequent literature review will analyse the driving factors that stipulate discussions. By the same token, the research fills a void in literature that recognises the effectiveness of e-voting in developing countries and a lack of cross-country studies which compare the developed with the developing world. First, the arguments brought forward by supporters and opponents of e-voting are examined, divided up in the economic, political and social realm. Then, the contribution of this research as an answer to both camps will be delivered and identified gaps eventually filled.

2.1 Supporters of E-voting

The main economic factors in support of e-voting discussed by literature refer to cost reduction, revenue growth and efficiency gains. Firstly, the move from paper-based to e-voting is considered to reduce material expenses such as paper and printing cost, but also human resources needed in the pre- and post-election phase, for example to count ballot papers (Bayona & Morales, 2017; Braun et al., 2003). Secondly, supporters state that a growth in government revenue is triggered through the use of e-voting. This is because e-voting is seen as an integral part embedded in a broader e-government structure which moves public service delivery online (Panzardi et al., 2002). The automation of public services, in turn, partially renders human interaction unnecessary which leads to less intermediaries when paying a tax or casting a vote online instead of physically (Singh et al., 2010; Shim & Eom, 2008). Consequently, public officials' monopoly power is limited which translates into a reduction of corruption or bribery and a growth in government revenue (Graham et al., 2009; Kimbro, 2002). The last economic factor in favour of e-voting argues that the use of technology improves competitiveness (Mistry & Jalal, 2012). Competition amongst technology companies for the provision of digital public services incentivises innovation processes that could improve productivity (Gustafsson & Fiedler, 2004). Moreover,

efficiency is increased through better monitoring systems enabled through technology which allows for a better control of public service delivery (Rojko et al., 2011).

Political reasons that support the introduction of e-voting touch upon aspects related to transparency, election turnout and democracy. A great amount of supporting scholars state that e-voting technologies make the electoral process more transparent (Shuler et al., 2010; Garcia-Murillo & Ortega, 2010; Cuillier & Piotrowski, 2009; Mulgan, 2007; Dininio & Orttung, 2005). This is in part due to technology allowing for a faster dissemination of voting results given that no manual vote counting is required which raises the perception of a more transparent electoral process (Kumar & Best, 2006; Baasanjav, 2008). A more transparent election process, it is stated, successively leads to more citizen trust in the government and higher election turnouts (Braun et al., 2003). Additionally, supporters claim that younger people are more willing to e-vote, which further increases the so-called “e-participation” (Sá et al., 2016, p. 272). Consequently, the final political reason in favour of e-voting states that authoritarian regimes are given less ability to suppress society because technology induces a phenomenon called “e-democracy” (Bayona & Morales, 2017, p. 48). The World Bank shares this view and affirms that the advent of the Internet and the subsequent use of technology in public services posed an “insurmountable threat to authoritarian rule” (Panzardi et al., 2002, p. 8).

A final set of arguments in support of e-voting makes reference to social factors concerning inequality and education. With regard to the former, e-voting could close cleavages within society because rural communities are empowered through technology (Bhatnagar, 2003). The set-up of voting computers in remote areas compared to casting a vote in paper at a municipality located far away makes it easier for citizens to make use of their right to vote (Bucy & Newhagen, 2004). Online services could “bring governments closer to citizens” and strengthen the link between the two (Bayona & Morales, 2017, pp. 48-50). With regard to the latter, e-voting could incentivise what is called a “digital literacy” (Panzardi et al., 2002, p. 4) because technology could be used to enable distance learning. More recently and in the context of the spread of COVID-19, supporters have criticised governments that oppose e-voting. They contend, that the move to online learning and working from home would have been much smoother if more countries would have invested earlier in e-government services (Gadhi, 2020; Herszenhorn & Wheaton, 2020; Boorsma, 2020).

2.2 Opponents of E-voting

The first argument brought forward by the opposing camp is concerned with the economic and cognitive costs incurred by e-voting (Vilamala, 2007). On the one hand, governments have to invest in new equipment, hire experts and train poll workers. On the other hand, citizens need to accept a new voting system and learn how to use it (Alvarez et al., 2018). Especially the symbolic act of a “physical vote” in the traditional ballot system is said to have a crucial importance for voters (Vilamala, 2007, p. 8). Even though a physical vote is still cast if voting machines are used, voting via the internet from home or abroad would not serve this symbolic purpose. In other words, the moment of casting a vote reinforces the socio-political identity of voters and is understood as sharing a form of “democratic liturgy” with others (Vilamala, 2007, p. 8). That is why opponents argue that the right to vote can never be confined to a “virtual cyberworld”, since it relies on interpersonal relationships (Vilamala, 2007, p. 11).

Secondly, opponents are concerned with the inherent “black box” nature of e-voting and the political consequences thereof (Alvarez et al., 2011, p. 201). The *modus operandi* of e-voting is degraded untransparent and results not traceable for non-experts (Gauld et al., 2006). In this context, frameworks or methodologies are missing that accurately measure and compare the effectiveness of e-voting (Stewart, 2011). Moreover, given the fact that e-voting software is frequently provided by third parties, hacker attacks and sabotage could threaten the secrecy of the electoral process (Delwit et al., 2005). By the same token, opponents state that the combination of technology with government institutions that are not built for its use does not automatically improve democracy (Hilbert, 2009). Thus, e-voting is defamed an artificial “push-button democracy” (Hilbert, 2009, p. 89) that supports authoritarian regimes. Instead of creating more citizen participation, e-voting leads to a greater concentration of power in favour of the government, which ultimately provokes disenfranchisement (Card & Moretti, 2007).

Lastly, the economic and political implications have social consequences according to e-voting opponents. Due to the aforementioned lack of transparency, voters lose trust in the electoral integrity which, in turn, diminishes political support (Lau et al., 2008). In a similar vein, if a government enjoys little political support, the “mental” distance of citizens to politics will be entrenched by a “physical” distance which e-voting from home could trigger (Hilbert, 2009, p. 91).

In light of the discussion above, it comes to the fore that e-voting remains a contested phenomenon in academia. Research from the supporting as well as the opposing end points at a number of structural aspects which are considered crucial to make sense of e-voting. Moreover, both camps highlight how the aforementioned translates in the economic, political and social realm respectively. A realist view on e-voting is dominating the debate which conducts a cost-benefit analysis to make sense of its viability. By the same token, a strong focus on the state and government prevails to which the electorate is seen as subordinate. E-voting in this context is taken as a given for which profitability is scrutinised once it has been implemented. What is missing in this streamline are firstly, a more nuanced analysis of e-voting once it has been introduced and secondly, the role which the electorate plays in this context. With regard to the former, the state of the art of e-voting literature can for example not make sense of why countries such as Switzerland or Nepal have introduced e-voting but abolished it again (IDEA, 2020a) whereas the technology enjoys great support and is used for almost two decades in Estonia or Brazil (Hartleb, 2020; Aranha & van de Graaf, 2018). With regard to the latter, even though the electorate was considered in the aforementioned debate, it was not granted agency which would allow to actively change the status quo.

The rationale followed by this research takes these dynamics into account and examines not only how e-voting is implemented but also what influences its continuance or abolition. Importantly, it appreciates the potential effectiveness of e-voting not only in developed countries with high technological standards but also in developing countries. This is an additional gap in the current literature on e-voting, given that a great amount of scholars have disregarded its effectiveness a priori for developing countries. Moreover, this led to a void in cross-country studies about e-voting. The subsequent section will briefly point at these two remaining gaps before turning to the conceptual framework.

2.3 Effectiveness of E-voting in Developing Countries & Lack of Cross-Country Studies

Many scholars reject the role of e-voting to serve as a catalyst that could enhance the lives of people in developing countries (Brynjolfsson & Saunders, 2009; Mansell, 2001; Lu, 2001). The rationale behind refers to “typical developing country problems” which originate firstly from the demand and supply side of public service delivery and secondly, from structural cleavages within civil society (Khan, 2019, p. 44).

The first argument makes reference to a weak institutional capacity on the supply side and a lack of citizen culture on the demand side of public service delivery (Mimba et al., 2007; Peixoto, 2009). Regarding the former, critics emphasise that the use of technology to

improve the electoral process is not an end in itself, but requires a sound executive, legislative and judiciary branch (Mistry, 2012). That is to say, for e-voting to become effective in the developing world, an unfeasible administrative reform of notoriously corrupt government systems would be required (Neshkova & Kalesnikaite, 2019; Andersen, 2009; Northrup & Thorson, 2003). Regarding the latter, civil society is blamed for lacking the technological affinity and social capability needed to engage in a dialogue with the government about the use of e-voting (Rodríguez-Domínguez et al., 2011).

The second argument makes reference to a large urban-rural divide which e-voting could translate into a “digital divide” (Dugdale et al., 2005, p. 109). Poor internet coverage and difficult access to locations make the digital domain inaccessible for a significant share of the population in developing countries (Warf, 2014). As a result, spatial inequalities lead to a cleavage which divides society along a digital line that defines who can and cannot make use of their citizen rights (Yigitcanlar & Baum, 2006). The impact of a digital line is especially strong if e-voting was introduced in an entire country at the same time (Warf, 2014). In many especially federalist countries, however, e-voting is first introduced in certain areas before a nation-wide coverage progressively takes place (Yigitcanlar & Baum, 2006). As a result, those citizens who have the greatest need of government services such as the poor or ethnic minorities are the ones with the least opportunity to make use of them (Warf, 2014).

These pessimistic tendencies about e-voting effectiveness in developing countries as demonstrated in the preceding paragraphs resulted in a scarcity of cross-country studies. Studies on e-voting in developed countries have mainly focused on Europe (Chowdhury, 2013; Oostveen, 2010; Gerlach & Gasser, 2009) and the United States (Johnson et al., 2017; Taherdoost et al., 2013). Studies on e-voting in developing countries focused mainly on Latin America (Porrúa, 2013; Benitez & González-Pietrosevoli, 2012) or Africa (Karakola et al., 2012; Thakur, 2015). Nevertheless, there is scant evidence which links both bodies of literature by comparing countries with different development levels. Due to the aforementioned structural differences, it is widely believed that findings about e-voting in the developed world cannot be extrapolated to the developing world (Alvarez et al., 2011; Porrúa, 2013; Benitez & González-Pietrosevoli, 2012; Gerlach & Gasser, 2009; Chowdhury, 2013).

The gaps analysed in the previous paragraphs point at the rejection of e-voting effectiveness in developing countries and a void of research on cross-country studies. This research aims to fill these gaps along the following lines. Firstly, it recognises that e-voting can unfold in different ways regardless of the development level of a country. This is because

e-voting is highly context-dependent and its complexity does not allow for a one-size-fits-all approach. While the research does not reject the arguments brought forward by its critics, it contends that the absolute statements they deliver are not valid to make sense of e-voting continuance or abolition. Secondly, rather than perceiving low levels of transparency in developing countries as an obstacle for e-voting to become effective, it is analysed whether low transparency could in fact pose a catalyst for its continuance or abolition. Lastly, a cross-country study is conducted which considers countries from low to high levels of development. With this, the research seeks to fill the void of literature that acknowledges the effectiveness of e-voting in developing countries and allows for a comparison to developed countries.

2.4 Contribution to Research Fields

In light of the above, the research contributes to three bodies of literature. Firstly, through the examination of factors that influence the introduction of e-voting, the research shares the view that the development of e-government services was one of the most relevant changes in the field of Public Administration in the 21st century (Lupu & Lazar, 2015). The performance of public institutions increasingly depends on the use of technology, if countries want to stay globally connected. Moreover, many principles of good governance are nowadays expressed in e-government terms such as accountability, responsiveness or transparency (Lupu & Lazar, 2015).

Secondly, by applying a social constructivist lens to make sense of e-voting continuance or abolition, the research challenges the realist notion thereof. The realist view is state-centric and gives importance to the role of governments in steering the electoral process (Keohane, 1986; Nye, 2004; Rodrik, 2004). The social constructivist view, on the contrary, also gives importance to the role of non-governmental actors and emphasises the impact of discursive elements in this context (Kuhn, 1962; Schütz, 1967; Berger & Luckmann, 1966). Thus, by stressing the agency of the electorate and the role of discourse, the research shows how non-governmental actors can take an active role in the continuance or abolition of e-voting within a country.

Finally, this work aims to reinforce a dialogue between computer science and social science research in order to mitigate the consequences of a biased pro or contra view on technology (Pérez Corti, 2015). When e-voting began its path as a technological project, computer science research seemed most adequate to make sense of the novel innovation (Pérez Corti, 2015). Over the years, however, the implications of e-voting became

increasingly complex and a mere computer scientific approach does not suffice anymore to fully grasp all implications of it. As the analysis above has shown, the consequences of e-voting are not only influential in computer science and technology, but translate in the economic, political and social realm. Hence, a social constructivist understanding tackles these shortcomings and allows for a more nuanced analysis of e-voting. Both disciplines will benefit from an interdisciplinary approach that allows for an updated, mutual understanding of e-voting.

3. Social Constructivism & Technology

The implications of e-government development and public sector transparency on e-voting can be studied from different theoretical angles. As mentioned earlier, this research adopts a social constructivist perspective on the issue at hand. Research that stems from the fields of computer science at one end and social science at the other end slowly started to become synthesised in recent years to analyse the social shaping of new technologies (Gunderson, 2016; Marres, 2017; Duke, 2018; Selwyn, 2019). Social constructivism has crucially influenced this debate and provided for valuable insights to make sense of technological developments (Lynch, 2016; Djordjevic et al., 2016; Barak, 2017). One of the most recognised theories that emerged in this context is the Social Construction of Technology theory (hereinafter referred to as “SCOT”) coined by Bijker, Hughes and Pinch (2012). The SCOT theory tackles the study of technology through an integrated social constructivist approach (Bijker et al., 2012). This implies that the development process of a new technology is understood as an alternation of selection and variation (Bijker et al., 2012). The so-called “multidirectional model” used to understand how technological artifacts are constructed is essential to any social constructivist understanding of technology (Bijker et al., 2012). History studies of technology, by contrast, apply a “linear model” to make sense of technological innovations (Bijker et al., 2012, p. 22). The former acknowledges different possible options that were considered in the process of constructing the artifact whereas the latter merely appreciates the options that have de facto been used (Bijker et al., 2012). Thus, a social constructivist understanding of technology allows for a more nuanced, in-depth understanding of what influences the introduction of technologies. By the same token, it is possible to grasp why some technologies were introduced but abolished again in some countries while they are continuously used in others, which is an aspect crucial to this research.

3.1 The Social Construction of Technology

The SCOT framework consists of four components which are applied in chronological order to understand why a technology is introduced in the first place and how continuance or abolition thereof unfolds. The components are namely the wider context, the interpretative flexibility of technological artifacts, relevant social groups and lastly, stability and closure (Bijker et al., 2012, pp. 33-40). The first component remains understudied by the authors and can be placed either at the beginning or at the end of the causal chain of technology continuance or abolition. The wider context relates the content of the technological artifact under study to the wider socio-political milieu of the country it is introduced in (Bijker et al., 2012, p. 39). In other words, it analyses the socio-cultural and political situation including norms and values present in the country where the relevant actors shaping the technology are situated in. The second component entails the multidimensional aspect mentioned before, which is described as an “interpretative flexibility” of technological artifacts (Bijker et al., 2012, p. 33). This means that there are different interpretations of how an artifact could be designed and subsequently used. Thus, the construction of the technological artifact is highly context-dependent in that it serves to solve problems which can be very different in nature. For the scope of this research, this points at the different purposes for which e-voting is introduced in different countries. In some countries, it might seem attractive to make use of new voting procedures because traditional methods have led to irregularities. In other countries, however, traditional methods might enjoy a lot of support due to their reliability and e-voting is introduced for reasons related to cost and time reduction. In other words, the wider context and interpretative flexibility define how and why a new technology is introduced in the first place (Bijker et al., 2012).

The third component of the SCOT theory is dealing with the “relevant social groups” that participate in the debate of evaluating the newly introduced technology (Bijker et al., 2012, p. 37). Different social groups attach distinctive norms and values to a new technology. Moreover, the effectiveness of the technology in solving the problem defined in steps one and two are rated differently. This, in turn, shapes a domestic discourse which signals whether the new technology is accepted or not in society. Despite the discourse being triggered within civil society, close interaction with public officials and the government takes place (Bijker et al., 2012). In the fourth component of the SCOT theory, the discourse formed earlier is stabilised and closed. Bijker, Hughes and Pinch (2012) distinguish between “rhetorical closure” and “closure by redefinition of the problem” (p. 38). The former describes the

scenario in which relevant social groups scrutinise whether the problem was solved or not, based on which the discourse is closed and a concrete opinion for or against the technology formed. In the latter scenario, the original problem is redefined, so that it fits the developed technological solution (Bijker et al., 2012). Following this redefinition, the discourse is closed in favour or against the new technology (Bijker et al., 2012).

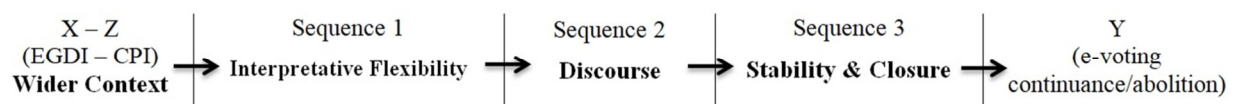
What follows the final component of discourse stabilisation and closure is the de facto continuance or abolition of the technology. There are of course instances where the public discourse within society is not strong enough to translate into political or legal decisions. This does, however, not pose an issue for the scope of this research, given that its aim is to trace the process of e-voting continuance or abolition. The methodology used in research stage three allows to capture those instances where a strong discourse failed to effectively bring about change. It must however be noted, that the effective continuance or abolition of the technology is not a finite scenario. That is because the wider context placed at the beginning of the mechanism is continuously evolving. This implies that new actors could appear who exercise new activities that ultimately reshape the discourse in the long-run. Thus, rather than being linear, the mechanism can involve iterative loops in between the respective components of the SCOT theory. Research stage three will translate the theory into three consecutive sequences which allows for analysing whether or not iteration took place.

3.2 Hypothesis & Causal Mechanism

In light of the above, the research hypothesises that e-government development and public sector transparency mutually trigger a discourse within a country which influences the likelihood of e-voting continuance or abolition. The underlying causal mechanism is illustrated in Graph 1 below which also shows where each component of the SCOT theory is embedded respectively.

Graph 1

Generic Causal Mechanism (short)



Note. Generic Causal Mechanism per sequence including the respective component of the SCOT theory (source: author).

In brief, the independent variables X (e-government development) and Z (public sector transparency) trigger a discourse which contributes to the continuance or abolition of e-voting (Y). In other words, a discourse in favour or against e-voting is formed by the civil society in sequence two which in turn influences the likelihood of whether e-voting is abolished or not. Alternatively, the statement could be made that the electorate does not possess agency but is subordinate to the electoral system and government officials on the national (in unitary states) or sub-national (in federations or confederations) level. This means that e-voting is pre-determined by the national or sub-national government and accordingly disregards a possible influence exercised by the civil society. The causal mechanism will be explained in more detail in chapter six on data analysis, which shows how each sequence unfolds.

4. Conceptualisation

The following subchapters define the three leading concepts of this research. The continuance or abolition of e-voting is the dependent variable whereas e-government development and public sector transparency are considered the two most significant independent variables (Bayona & Morales, 2017; Singh et al., 2010; Shuler et al., 2010; Garcia-Murillo & Ortega, 2010).

4.1 E-voting Continuance & Abolition

The concept of e-voting is defined in broad terms for the scope of this research for two reasons. Firstly, stage one of the research conducts a large-N analysis of countries with a broad range of e-voting technologies in place. To be able to include all different types of technologies deployed by these countries, in turn, requires a broad understanding of the term. This relates to the second argument, which is that the research does not aim to discriminate between different voting technologies. This means that the goal of this work is not to make statements about the effectiveness of e-voting conditioned on a certain type of technology. Instead, the research is interested in the discourse triggered by e-government development and public sector transparency which influences the continuance or abolition of e-voting. This allows for a broad definition of the term, given that the nature of e-voting as such is more crucial than the exact type of technology used.

Hence, e-voting is defined as the act of casting a vote through the use of the internet (“i-voting”) or electronic voting machines (Musial-Karg, 2016, p. 220). The former refers to voting via (inter alia) email, websites or online platforms which allows to vote from home in a so-called “uncontrolled environment” (Vinkel & Krimmer, 2016, p. 180). This form of

voting moreover enables nationals living abroad to cast their vote for elections in their home country. The latter refers to voting in a “controlled environment” (Schuermann, 2016, p. 195), which refers to public buildings usually owned by the government, state or municipality where citizens go to cast their vote via an electronic voting machine. These machines are referred to as “Digital Recording Electronic” (DRE) voting machines if no paper print out is provided after the vote was cast and “paper-based electronic voting” machines if a printout is provided (Volkamer, 2010, pp. 179-180).

In light of the above, e-voting is understood as “introduced” once the technology has a legal base and is used during binding elections within a country. These elections can be on the sub-national or national level. With respect to the “continuance” or “abolition” of e-voting, the research distinguishes between de facto and legal scenarios. Regarding the former, continuance or abolition can take place per “geographic scope” or “election type”. Geographic scope continuance means that e-voting was for example used in only one sub-national unit and is extended to be used in another sub-national unit. The opposite is true for geographic scope abolition. Continuance per election type means that e-voting was used for sub-national elections only (for example the election of city mayors) and is expanded to also cover national elections (for example for heads of government) or vice versa. The opposite is true for abolition per election type. With regard to legal continuance or abolition, the research refers to a judicial decision that declares an e-voting system that is already in place legal or illegal for the future deployment during sub-national or national elections.

4.2 E-government Development

Literature on e-government development frequently makes a distinction between “e-government” and “e-governance” (Paoli & Leone, 2015; Melitski & Calista, 2016; Marzooqi et al., 2017; Scholl, 2016). Even though some scholars use them interchangeably (Murasse et al., 2018; Andersen, 2009; Abu-Shanab et al., 2013), this research emphasises the importance to distinguish between the terms. That is because they are conceptually different and thus independent from each other. Consequently, “e-government” makes reference to the provision of public services and government information through electronic means (Panzardi et al., 2002, p. 7) whereas “e-governance” refers to the direct participation of constituents in the activities of government via technology (Panzardi et al., 2002, p. 7). Hence, e-government is a more generic term because it has a broad focus and emphasises the actions taken by governments and public officials in the digitalisation of their services. This may for example take the form of setting up a sound telecommunication or online services infrastructure

(United Nations, 2018). E-governance, instead, points at the direct link between governments to their citizen through electronic means. Consequently, e-governance is limited to activities such as e-voting through which citizens actively provide governments with their input during the decision-making process (United Nations, 2018, p. 120). Thus, when referring to e-government, the research does not make explicit reference to this link because the exploratory, macro-level focus in research stages one and two require a broader definition of the term. Hence, the definition applied here is borrowed from the United Nations and defines e-government as “the use and application of information technologies in public administration to streamline and integrate workflows and processes” (United Nations, 2014, p. 2).

4.3 Public Sector Transparency

As mentioned in the preceding paragraphs, the focus of this work is on the public rather than the private sector. That is because the main concern is on e-voting in national and sub-national elections, which forms a central part of the public sector. While it may be true that e-voting is also used in private sector elections such as the election of leading staff in big multicorporate enterprises, this research will not contribute to this debate.

Therefore, the definition of transparency is borrowed from Transparency International which defines it as “shedding light on rules, plans, processes and actions” (Transparency International, 2020). This translates to public sector transparency as “[ensuring] that public officials [and] civil servants (...) act visibly and understandably, and report on their activities. (...) It is the surest way of guarding against corruption” (Transparency International, 2020). In that sense, transparency is treated synonymously to the absence of corruption for the scope of this research. This implies that the less corruption is present in a public sector, the more is the respective public sector considered transparent. Corruption in that sense is “the abuse of entrusted power for private gain” which can reach from petty to grand corruption incidents, depending on the amount of financial flows involved (Transparency International, 2020). There is a lot of debate amongst practitioners and scholars about the effective possibility to measure public sector transparency, given the covert nature of corruption (Kim, 2014; Morris, 2008; Rehman & Perry, 2014). This research is aware of the fact that it is indeed difficult to put a numerical value on illegal activities (Young, 2013). It will, however, attempt to tackle this issue as illustrated in the subsequent section on data operationalisation.

5. Methodology & Operationalisation

Mixed methods research has experienced a surge in popularity during the past decades and is now together with quantitative and qualitative methods recognised as one of the three main research paradigms (Johnson et al., 2007). Mixed methods are required when neither quantitative nor qualitative methods are able to deliver answers to a research question respectively. A synthesis of the two allows to exploit the benefits of each method in order to grasp highly complex issues (Creswell, 2012). Consequently, mixed methods not only allow for a better understanding of more complex research problems, they also provide richer answers to research questions that show high levels of external validity (McKim, 2017). Especially for the case of this research, the stage-wise design that tackles e-voting from the macro to the micro level enables to present a more complete picture of the phenomenon. Figure 1 in the first chapter illustrated the stage-wise design and how the mixed approach of this research looks like. The quantitative components seek to answer the first research question and to choose two cases for the final research stage. The qualitative component builds the core of the research and seeks to answer the second research question.

More concretely, research stage one is a large-N screening that serves to unveil the factors that have a significant influence on the introduction of e-voting. The second research stage is extracting nine out of the 162 countries which are analysed on the factors identified in research stage one. The third research stage picks two out of the nine countries based on certain patterns detected in stage two. Moreover, the third research stage opens the causal black box of e-voting continuance or abolition by virtue of a within-case analysis. The subsequent sections will explain the methodological approaches and data collected for each research stage respectively.

5.1 Stage 1: Exploratory, large-N, Cross-Case Analysis

Research stage one is exploratory in nature and conducts a large-N, cross-case analysis of 162 countries. The research question that stage one seeks to answer is “what influences countries to introduce electronic voting?” Even though the dependent variable is e-voting continuance or abolition, research stage one will only measure the presence or absence of e-voting, regardless whether or not it has been abolished before. That is because research stage one serves to deliver a broad macro-level overview of the e-voting landscape in the world, as outlined earlier. Research stage three will then allow for a micro-level analysis and deal with the dependent variable in narrow terms by scrutinising the continuance or abolition thereof. The independent variables are distilled from the literature analysed in chapter two.

Notwithstanding that it is not feasible to detect all possible impact factors of e-voting introduction, the first research stage will examine the factors commonly referred to in literature. These factors are namely levels of e-government development (Singh et al., 2010; Panzardi et al., 2002), public sector transparency (Shuler et al., 2010; Garcia-Murillo & Ortega, 2010), economic strength (Mistry & Jalal, 2012; Rojko et al., 2011), civil and political freedom (Bayona & Morales, 2017; Sá et al., 2016) and the size of a country (Warf, 2014; Dugdale et al., 2005).

5.1.1 Data Collection & Operationalisation of Key Variables

An overview of the dependent and independent variables is provided in Table 1 below. The table illustrates the unit of analysis that was measured and which variable types they stand for in this research, the values that the variables express and where the data originates from (Table 1). Data on the dependent variable was provided by the e-voting database of the Institute for Democracy and Electoral Assistance (IDEA, 2018)¹. Data on the independent variables originates from five different sources. Firstly, the level of e-government development within a country was measured through the E-government Development Index (EGDI) of the United Nations (2018). Secondly, public sector transparency was measured through the Corruption Perceptions index (CPI) of Transparency International (2018). Thirdly, the economic strength of a country was measured in the gross domestic product (GDP) per capita, on which data was provided by the World Bank (2018). Fourthly, the level of civil and political freedom was measured via the Freedom House Index (FreedInd) by Freedom House (2018). Lastly, the size of a country was measured in total population (Popul), for which data has been accessed via the World Bank (2018a).

¹ Nota Bene: international organisations such as IDEA but also the Organisation for Security and Co-operation in Europe (OSCE) will not take an active role in the data analysis of research stage three later. Even though the research is working in parts with datasets provided by these types of organisations, the organisations as such will not be referred to when the empirical data is evaluated. Given that neither IDEA nor the OSCE publish specific reports on e-voting situations per country, the only data consulted from these entities have been the numerical values provided in this section.

Table 1*Overview Variables*

Name	Unit of Analysis*	Variable	value/range (low to high)	Source
e-voting	electronic voting	dependent	yes/no	IDEA
EGDI	e-government development	independent	0.0 - 1.0	United Nations
CPI	public sector transparency	independent	0 - 100	Transparency International
GDP	gross domestic product	independent	per capita in USD	World Bank
FreedInd	civil and political freedom	independent	0 - 100	Freedom House
Popul	total population	independent	in thousands	World Bank
*per country				

Note. Overview dependent and independent variables (source: author).

The two independent variables considered most important for the introduction of e-voting are the EGDI and CPI (Bayona & Morales, 2017; Singh et al., 2010; Shuler et al., 2010; Garcia-Murillo & Ortega, 2010; Panzardi et al., 2002). Whether they in fact pose the most significant independent variables will be tested in the data analysis section of research stage one in chapter 6.1. Before turning to the methodological approach of the second research stage, two remarks must be made on the EGDI. Firstly, the United Nations has a separate “E-participation Index” to measure (inter alia) e-decision-making under which e-voting counts (United Nations, 2003, p. 16). This is an important aspect to highlight, given that e-voting continuance or abolition poses the dependent variable and EGDI one of the independent variables which means that both must be measured separately from each other. Secondly, The EGDI is a composite index comprising the Online Services Index (OSI), the Telecommunication Infrastructure Index (TII) and the Human Capital Index (HCI; United Nations, 2016, pp. 135-138). The OSI measures the quality and scope of government services provided online. The TII indicates how well a country is connected domestically in terms of its telecommunication infrastructure. Lastly, the HCI gives value to the education level of all citizens concerning the use of e-government tools (United Nations, 2016). Additional methodological remarks on the EGDI and more details about the composition of the sub-indices can be found in Appendix A.

5.2 Stage 2: Exploratory, medium-N, Longitudinal Analysis

Research stage two is also exploratory in nature and conducts a medium-N, longitudinal analysis of nine countries which are representative of the large-N dataset. The purpose of research stage two is to select two out of the nine countries for which a within-case analysis

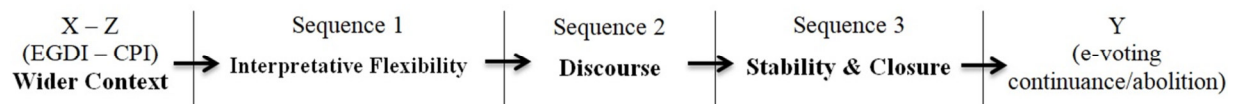
is conducted in the final research stage. The dependent variable remains unchanged, whereas the independent variables are narrowed down to a total of two, based on the results from research stage one. A longitudinal analysis for both independent variables seeks to find certain patterns across the countries so that two typical, crucial cases can be chosen for the final research stage. This will become clearer in chapter 6.2 on the data analysis of research stage two.

5.3 Stage 3: Explanatory, small-N, Within-Case Analysis

Research stage three turns from an exploratory to an explanatory approach and conducts a small-N, within-case analysis of the two countries chosen in stage two. The research question that stage three seeks to answer is “how do e-government development and public sector transparency contribute to the continuance or abolition of electronic voting?” The dependent variable and the independent variables adopted in stage two remain unchanged. Nevertheless, given the aim of the research and the type of question that stage three seeks to answer, a qualitative research method is required. Referring back to the SCOT theory, research stage three aims to open the causal black box between e-government development and public sector transparency at one end and e-voting continuance or abolition at the other, as shown in Graph 1.

Graph 1

Generic Causal Mechanism (short)



Note. Generic Causal Mechanism per sequence including the respective component of the SCOT theory (source: author).

Methodologically, process-tracing is the most adequate tool to analyse how the causal mechanism unfolds. The subsequent chapter will account in detail what this approach entails before turning to the data analysis.

5.3.1 Process-Tracing

Process-tracing is a within-case study method frequently used in social science. The rationale of process-tracing followed here is borrowed from Beach and Pedersen (2013) as well as Bennett and Checkel (2015). Beach and Pedersen distinguish between three variants of

process-tracing, which are namely theory-building, theory-testing and explaining-outcome process-tracing (Beach & Pedersen, 2013, p. 3). Given that this work aims to test the validity of the SCOT theory in explaining the continuance or abolition of e-voting, the second variant is applied. The subsequent section will outline how process-tracing is embedded in the mixed methods design of this research before theory-testing process-tracing is explained.

Process-Tracing and Mixed Methods Research

The ontological and epistemological foundations of process-tracing differ from large-N and comparative research methods (Beach & Pedersen, 2013). Table 2 below illustrates the ontological differences of process-tracing regarding assumptions about causality.

Table 2

Ontological Assumptions of Causality

	Probabilistic	Deterministic
Regularity	(1) Large- <i>n</i> quantitative statistical methods, KKV's qualitative case study methods	(2) Congruence case studies (within case), comparative cross-case study methods (small- <i>n</i>), and qualitative comparative analysis (QCA) (medium- <i>n</i>)
Mechanisms	(3) Not logically possible in single case studies, not feasible to examine mechanisms in larger- <i>n</i> study	(4) Process-tracing methods (single case)

Note. Ontological assumptions regarding causality of different methodologies in social science (Beach & Pedersen, 2013, p. 28).

The key difference between statistical regression analysis and process-tracing is that the former tests the probability of associations between X and Y, whereas the latter tests deterministic theories (Beach & Pedersen, 2011). In other words, for theory-testing process-tracing, theories are clearly determined ex ante which are then tested systematically on a case. Testing a probabilistic theory would not make sense for a within-case analysis because no statement could be made whether the theory is wrong or the case not adequate if no supporting evidence was found (Beach & Pedersen, 2011). Another difference between process-tracing and large-N or comparative methods concerns the type of causal relationship that inferences are made about (Beach & Pedersen, 2011). Process-tracing makes inferences

about the presence or absence of a *causal mechanism* between X and Y whereas regression-based or comparative methods make inferences about *regularities* between X and Y (Beach & Pedersen, 2011).

One might ask how these differing approaches fit together in a mixed methods approach. The answer is that a synthesis between large-N and comparative methods at one end and process-tracing at the other can create a strong synergy effect and pose a powerful research instrument if applied correctly. Especially theory-testing process-tracing is adequate to be nested in a mixed methods design because it allows to make cross-case inferences for a broader population of cases (Beach & Pedersen, 2011). Moreover, process-tracing is able to deal with issues of regression analysis related to random variability, reverse causality or equifinality (Beach & Pedersen, 2011). Hence, there is a positive trade-off in a mixed methods design for both process-tracing and large-N or comparative methods. Having clarified how process-tracing speaks to other research methods, the subsequent section will provide for the terminology of theory-testing process-tracing which is necessary for the data analysis later.

Causal Mechanisms, Bayesian Logic, Types of Evidence

Theory-testing process-tracing adopts a mechanistic understanding of causal mechanisms, which Bennett and Checkel define as “physical, social, or psychological processes through which agents with causal capacities operate (...) to transfer energy, information or matter to other entities” (2015, p. 12). Causal mechanisms are always situated between X^2 and Y and usually divided up in sequences which respectively have actors, activities and entities (Bennett & Checkel, 2015). For the scope of this research, an *actor* is the so-called “activity maker” because it asserts direct influence through *activities* on the passive *entity*, which is the “activity taker”. This mechanistic understanding allows to delineate process-tracing from mere storytelling. Key in this context is to define a generic causal mechanism ex ante which is then systematically tested on cases. By the same token, one has to be very critical and reflect on alternative explanations in order to avoid confirmation bias (Bennett & Checkel, 2015). Hence, it is important to cast the net widely when searching for evidence that could proof and even more so disprove the mechanism (Beach & Pedersen, 2013).

² this is a so-called “monocausal” start of the causal mechanism (Beach & Pedersen, 2013, p. 95). The logic explained here does however not change if there is an additional independent variable Z, which triggers the causal mechanism together with X.

When collecting evidence, the so-called “Bayesian inferential logic” is often applied in process-tracing (Beach & Pedersen, 2013, p. 95). According to the logic, empirical tests serve to update the level of confidence on the presence or absence of the mechanism in light of the empirical evidence detected (Beach & Pedersen, 2013). Sequence evidence, for example, deals with the spatial and temporal chronology of events predicted by the generic causal mechanism (Beach & Pedersen, 2013, p. 99). Pattern evidence relates to statistical trends one would expect to see if the mechanism applies (Beach & Pedersen, 2013, p. 99). Hence, a pre-definition of these types of evidence allows to systematically observe whether or not the causal mechanism materialised within a case. During the data analysis, tests of sequence and pattern evidence will be applied which enable to make statements about the validity of the claims derived from the empirical material. Moreover, the level of detail and the time horizon for which the causal mechanism is analysed can vary. For the scope of this research, Bennett and Checkel’s (2015) notion is adopted, which allows to conduct process-tracing over several years. According to the authors, one does not have to scrutinise tiny increments of time in order to deliver generalisable statements about a causal mechanism (Bennett & Checkel, 2015). That is to say that there is no right or wrong how far back in time or in-depth in detail one must go to explain a mechanism. Instead, researchers need to justify well and defend their decisions in a plausible manner about when to begin and when to stop testing their explanations (Bennett & Checkel, 2015).

In light of the above, a mixed methods approach poses the most adequate tool to open the causal black box of e-voting continuance or abolition. Despite the limits of both quantitative and qualitative methods, a synthesis between the two mitigates some of these shortcomings. The stage-wise design of this work illustrates well how this interplay can look like. The subsequent chapter on data analysis will now proceed to apply in practice what has been outlined in theory.

6. Data Analysis

The preceding chapter on methodology and data collection has outlined each of the three research stages in theory. This section will now analyse the data collected and provide for answers to the research questions. Each research stage is tackled consecutively whereas stage three builds the core of this work and will open the causal black box between e-government development and public sector transparency at one end and the continuance or abolition of e-voting at the other.

6.1 Stage 1: Exploratory, large-N, Cross-Case Analysis

Stage one of the research aims to find out which factors influence the introduction of e-voting within a country. It seeks to answer the first research question, which is namely “what influences countries to introduce electronic voting?” This allows for a better understanding of various actors, actions and overall dynamics when analysing the causal mechanism in the third research stage. The dependent and independent variables have been introduced in chapter 5.1, which are namely e-voting continuance or abolition, e-government development, public sector transparency, economic strength, civil and political freedom and the size of a country. The year that was chosen for the cross-case analysis is 2018, given the reliability and availability of the datasets outlined earlier. The total number of countries analysed is 162, which is the overlap of countries considered from all databases consulted.

6.1.1 Data Analysis & Results

As outlined earlier, research stage one measures the dependent variable as the presence or absence of e-voting, regardless whether it has been introduced but abolished again before. Research stage three will then deal with the dependent variable in narrow terms, by analysing its continuance or abolition. Hence, given that all independent variables have continuous values and the dependent variable is a binary (e-voting: yes or no), a multiple logistic regression analysis was run in R. Before conducting the analysis, e-voting was given dummy variables in order to differentiate whether or not it has been introduced (irrespective of prior abolition) on the national, sub-national or on both levels. For this, four dummies were determined for which 0 indicates that no e-voting is used, 1 indicates that it is used solely on the national level (for example in presidential elections), 2 indicates that e-voting is used on the sub-national level (for example in municipal elections) and 3 indicates that it is used on both the national and the sub-national level. For the scope of this research, “sub-national” level refers to everything that is below the national level, which can be states or provinces in federal systems but also municipalities within those sub-national units.

The results presented in Table 3 indicate that e-government development is the most significant³ variable to predict whether a country has e-voting in place, given its p-value of 0.033. The remaining variables did not show significant p-values, with population indicating a p-value of 0.16, public sector transparency of 0.46, economic strength of 0.63 and finally civil and political freedom as the least predictor of e-voting indicating a p-value of 0.77. Referring back to what literature has stated about the importance of these factors in chapter

³ a p-value is frequently considered “significant” in social science if it is below 0.05 (Field et al., 2012, p. 183).

two, this is an interesting observation. On the one hand, it weakens the argument of critics that developing countries cannot make use of e-voting due to a lack of financial resources. On the other hand, it confirms the importance of having a sound e-government system in place which e-voting should be embedded in.

Table 3

P-values Independent Variables

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-2.775e+00	7.903e-01	-3.512	0.000445	***
CPI	-1.703e-02	2.288e-02	-0.745	0.456494	
EGDI	3.412e+00	1.603e+00	2.129	0.033219	*
Popul	1.607e-06	1.142e-06	1.407	0.159483	
FreedInd	2.978e-03	1.009e-02	0.295	0.767788	
GDP	-7.218e-06	1.501e-05	-0.481	0.630616	

Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'	0.1 ' ' 1

Note. The last column on the right shows the p-values for the respective independent variables related to e-voting as the dependent variable (source: author).

Knowing that e-government development is the most significant of the five variables to predict whether e-voting is introduced, it was tested whether the variable is correlated with one of the other variables. With this, any possible overriding effect that another variable might have on e-government development can be detected and respectively considered in the subsequent research stages. For this, a simple linear regression was run in R and a strong⁴ correlation value of 0.76 was found between e-government development and public sector transparency. The other variables were correlated moderately or weakly to e-government development with correlation values of 0.65 for economic strength, 0.53 for civil and political freedom and 0.053 for population. Important to mention in this context is that the statement this research derives from the significance and correlation values are no absolute statements. In other words, it cannot be ruled out that GDP, civil and political freedom or country size have an influence on e-voting introduction. Nevertheless, the impact of these three factors is qualified as less important for the scope of this research yet their general importance related to e-voting is not rejected.

⁴ indication of correlation values in social science: 0.00-0.19 = very weak; 0.20-0.39 = weak; 0.40-0.59 = moderate; 0.60-0.79 = strong; 0.80-1.00= very strong (Mensah et al., 2019, p. 592).

The first research stage has provided for a better understanding of the factors that indicate whether a country has (if it is still deployed) or has not (if it was never introduced or abolished again) e-voting in place. An answer for the first research question was found and e-government development determined to predict best whether a country has e-voting introduced. Nevertheless, it was also found that public sector transparency has a strong correlation to this predictor, which makes it necessary to scrutinise more in-depth how these two variables speak to each other. Moreover, strong correlations between two variables could indicate reverse causality, which makes it necessary to move away from a large-N quantitative to a qualitative analysis. Thus, the second research stage will now take a closer look on the development of the EGDI and the CPI through a longitudinal analysis before the third research stage opens the causal black box.

6.2 Stage 2: Exploratory, medium-N, Longitudinal Analysis

The second research stage will analyse the development of the two most significant independent variables analysed in the first research stage, which are e-government development and public sector transparency. By looking at the development of EGDI and CPI values over the past years, it is possible to make an adequate choice of two countries to analyse more in-depth in the final research stage.

6.2.1 Data Analysis & Results

The time frame chosen for the longitudinal analysis stretches from 2002 until 2018, given that e-government gained momentum at the beginning of the millennium as has been outlined earlier. A total nine out of the 162 countries analysed in stage one have been extracted, which are namely Yemen, Sudan, Madagascar, Pakistan, India, Argentina, Germany, Iceland and Singapore (see Appendix B). The choice was made based on all 162 countries' EGDI and CPI values of the year 2002. In order to have all levels of development represented equally, three countries with low, middle and high EGDI and CPI levels respectively have been chosen randomly. The correlation detected in research stage one was clearly reflected in this context, given that low, middle and high EGDI values corresponded with respective low, middle and high CPI values in 2002. For these nine countries, the development of both their EGDI and CPI values between 2002 and 2018 was analysed. The aim was to explore whether the positive correspondence of the EGDI and CPI holds over time. Moreover, it was analysed which of these countries did and did not have e-voting in place at the end of the time frame in the year 2018 (regardless whether it has been introduced but abolished again).

The following pattern comes to the fore: firstly, countries that started with low levels of e-government development and public sector transparency in 2002 were neither able to remarkably improve these values nor did they have e-voting in place in 2018. The e-government development between 2002 and 2018 for Yemen, Sudan and Madagascar improved by less than 0,06 points and their CPI values even saw a negative development (see Appendix B). Secondly, countries that started with intermediate levels of e-government development and public sector transparency in 2002 significantly improved both values and had e-voting in place in 2018. Pakistan, India and Argentina improved their EGDI values by more than 0,1 points between 2002 and 2018 and their CPI increased by 12 points or more (see Appendix B). Argentina, for example, even managed to reach high EGDI levels in 2018. Lastly, countries that started with high levels of e-government development and public sector transparency in 2002 improved their EGDI values, yet not by the same high values than the aforementioned country group. Similarly, the CPI values of Germany, Iceland and Singapore merely saw moderate improvements or even worsened and none of them had e-voting in place in 2018 (see Appendix B).

6.2.2 Case Selection Strategy

Important to mention is that the observations of research stage two must be understood as a broad *pattern* which does not allow for deterministic statements. This means that there indeed do exist highly developed EGDI countries that have e-voting in place (for example Australia) and middle EGDI countries that do not have e-voting introduced (for example Croatia; IDEA, 2020; United Nations, 2018). Nevertheless, this research does not aim to account for deviant cases. Instead, the aim is to open the causal black box of what leads to e-voting continuance or abolition and how e-government development and public sector transparency contribute to this. As a consequence, typical or crucial cases are more adequate which allow to make general statements about how this mechanism unfolds and how it applies to a broader population of cases. The aspects based on which the two countries for the final research stage need to be chosen are dictated from the methodology subsequently used, which is theory-testing process-tracing. Theory-testing process-tracing is most adequate - though not exclusively - to be applied on positive cases, meaning that both the dependent and independent variables must be present (Beach & Pedersen, 2011). Moreover, given that this research wants to trace the process of e-voting continuance or abolition, it is plausible to choose two cases where the independent and outcome variables differ. In other words, both

cases should differ in their EGDI and CPI levels and both should have introduced e-voting yet one of the two cases should have abolished e-voting whereas the other continued with it.

6.3 Stage 3: Explanatory, small-N, Within-Case Analysis

Research stage three will open the causal black box between e-government development and public sector transparency at one end and e-voting continuance or abolition at the other. The final research stage seeks to provide an answer for the second research question, which is namely “how do e-government development and public sector transparency contribute to the continuance or abolition of electronic voting?”

6.3.1 Case Selection

Based on the results of research stages one and two, the two cases chosen are Argentina and Germany. This has several reasons: firstly, both are similar in that they are federalist states in which the electoral system is determined on the sub-national level (2BvC 3/07, 2009, §32; Pérez Corti, 2015; Korte, 2017). In the case of Argentina, this concerns 23 provinces, in the case of Germany 16 states, so-called *Bundesländer* (Sawe, 2019; Deutsche Welle, 2020). Secondly, for both cases, e-voting was first successfully introduced on the sub-national level which subsequently led to discussion about its implementation on the national level. In the case of Argentina, about 1,2 million voters in one province voted electronically during the 2015 presidential elections (Barnes et al., 2017, p. 440), in the case of Germany, 2 million voters across five *Bundesländer* voted in 2009 for the German *Bundestag* (2BvC 3/07, 2009). These two characteristics make both cases comparable in keeping possible differences constant that could derive from system structure. Thirdly, both cases are crucial cases in that each part of the causal mechanism is pronounced very clearly. This means that the introduction of e-voting in neither of the two cases remained uncontested which ultimately led to its continuance in Argentina and abolition in Germany. In both countries, civil society was spearheading discussions. Fourthly, both cases are typical cases in that they represent a broader population of cases. In the case of Argentina, the observations made are similar to other emergent countries that started at medium EGDI and CPI levels and saw an opportunity in e-voting, for example India, Ecuador or Pakistan (see Appendix B). The developments analysed in Germany are representative for a broad range of developed countries with constantly high EGDI and CPI levels that introduced but abolished e-voting again, such as Norway, the Netherlands or Finland (IDEA, 2020a).

In light of the above, it is for theoretical, methodological and empirical reasons, that Argentina and Germany are the most suitable cases to test the causal mechanism and the validity of the SCOT theory. The subsequent section will illustrate the causal mechanism in theory before applying it to the cases of Argentina and Germany.

6.3.2 Generic Causal Mechanism

The causal mechanism of this research is made up of three sequences, as was shown earlier in Graph 1. The mechanism was developed based on the respective components of the SCOT theory, which were interpreted to occur in three consecutive sequences. Even though the theory does not dictate the occurrence of the sequences in such a manner, the causal mechanism developed for this research allows for a clear separation of the components. That is because the actors, activities and entities of each sequence correspond very clearly with one respective component of the SCOT theory which they were accordingly associated with. Graph 2 below illustrates the mechanism in a full-fledged manner (see also Appendix C).

Graph 2

Generic Causal Mechanism (complete)

X – Z (EGDI – CPI) Wider context	Sequence 1 Interpretative Flexibility	Sequence 2 Discourse	Sequence 3 Stability & Closure	Y (e-voting continuance/abolition)
e-government set up; public sector transparency (historical context)	Actor: government/public officials, courts Activity: e-voting trial and introduction (legal base) Entity: civil society	Actor: civil society Activity: discussions about e-voting; pro or contra e-voting discourse formation Entity: government/public officials, courts	Actor: civil society Activity: concrete push for or against e-voting continuance or abolition; active discussions between actor and entity Entity: government/public officials, courts	de facto (geographic scope or election type) or legal (court judgement) continuance or abolition of e-voting
	Sequence evidence - domestic info events on the use of technology in politics Pattern evidence - increasing number of news publications on digitalisation, e-government development or e-voting	Sequence evidence - gradual increase/decrease of e-voting use within the same sub-national unit - domestic info events on the use of e-voting in politics - backlash of hacker attacks & corruption incidents Pattern evidence - surveys that reflect national opinion on e-voting and/or public sector transparency	Sequence evidence - pro or contra discourse formed is stable enough to not be influenced by foreign e-voting experiences - foreign countries adapt similar attitudes based on the domestic discourse formed - cross-national info events on the use of e-voting in politics Pattern evidence - stable, increasing or decreasing search trends on Google & Twitter of e-voting terms	

Note. Complete generic causal mechanism per sequence (source: author).

The first row of Graph 2 shows the two independent variables X and Z and the dependent variable Y which are placed before and after the causal mechanism respectively. Sequences one to three make up the causal mechanism and each sequence refers to one component of the SCOT theory. The second row of Graph 2 labels which actors, activities and entities are expected to appear per sequence of the causal mechanism. The third row shows the types of evidence which would prove or disprove that the respective sequences of the causal

mechanism in fact materialised. The subsequent paragraphs will explain in detail how the causal mechanism unfolds in theory.

Generic Causal Mechanism per Sequence

As outlined earlier, the two independent variables X and Z are e-government development and public sector transparency which trigger the mechanism. Important to mention in this context is that none of the two independent variables by themselves are able to trigger the causal mechanism. As was shown in research stage one, even though e-government development is the most significant variable to predict whether e-voting occurs, public sector transparency is strongly correlated to it. The subsequent case analysis will illustrate how norms and values attached to transparency played an essential role in the discussion shaping the discourse by the relevant social groups.

Both independent variables are embedded in a wider country-specific context. Historical events such as crises scenarios surrounding the e-government development and public sector transparency can reinforce dynamics in this context. The first sequence of the causal mechanism is the “interpretative flexibility” of e-voting. In this sequence, e-voting is concretely discussed for the first time domestically and possibly trialled. At the end of its interpretative flexibility, an e-voting system is introduced and used in binding elections. These can be sub-national or national elections which are broad or very small in scope, covering a small or large part of the electorate to use e-voting technologies. The crucial aspect here is that the elections are binding and that the system has a legal base. One piece of evidence that would prove the presence of the first sequence could be the fact that more informative events are organised domestically about the general use of technology in politics. According to the SCOT theory, this would point at the fact that there is still demand to discuss about the design of a technology for which no common ground is found yet (Bijker et al., 2012). Apart from this sequence evidence, one possible pattern evidence could be the increase or decrease of news publications that contain reports about digitalisation, e-government developments or e-voting. The SCOT theory states in this context that the news and media reflect the overall dynamics present in a country (Bijker et al., 2012). On the one hand, they provide for a mirror image that reflects the broad opinions of the general public about a technology. On the other hand, news and media are inherently biased and frequently provide for a one-sided view thereof (Bijker et al., 2012). Thus, the important aspect of this pattern evidence is not whether these publications are in favour or against e-voting but whether the overall number of publications increased or decreased. This, in turn, would

indicate a high or low interest in the topic and reflects the interpretative flexibility of a technological artifact (Bijker et al., 2012).

In the second sequence, the e-voting system introduced in sequence one is scrutinised by the relevant social groups that form a discourse for or against the new technology. In extreme cases, this can take the form of filing legal cases against the use of e-voting, for example in case of rejection. Alternatively, if high levels of acceptance are present, a supporting discourse can lead to a further push of the technology, even crossing levels of e-voting coverage that were initially planned by the government. Evidence that would prove the presence of the second sequence is for instance if e-voting was introduced only in parts of a sub-national unit which is then extended to cover more e-voters within the *same* sub-national unit. Other confirming evidence would pose the organisation of domestic events on e-voting or if hacker attacks or corruption incidents are publicly used to support the pro or contra e-voting discourse. The SCOT theory states in this context that information delivered on events or corruption incidents could systematically be used by groups to reinforce their supporting or opposing discourse (Bijker et al., 2012). Additionally to these sequence evidences, a pattern evidence would be surveys reflecting the pro or contra opinion about e-voting and related concerns about transparency in the public sector.

In the third and last sequence of the causal mechanism, the discourse formed in sequence two is stabilised and subsequently closed. The stability of a discourse is characterised by the concrete push for or against e-voting within civil society, based on the discourse formed in sequence two. As a result, civil society can actively engage with public officials and passive debates that have not been heard before turn into active discussions. Closure of the discourse takes place with the de facto or legal continuance or abolition of e-voting. Evidence that would prove the presence of the third sequence is for example if the discourse formed in the prior sequence is stable enough to not be influenced by positive or negative foreign e-voting experiences. Disproving evidence, for instance, would be if a pro e-voting discourse formed in sequence two is turned into a contra discourse because the negative experience from a foreign country has a destabilising impact domestically. On the flipside, if foreign countries adapt similar attitudes based on the domestic pro or contra discourse formed shows the strength thereof. The organisation of cross-national events on e-voting would further prove the stability and spread of the domestic discourse abroad. A pattern evidence for sequence three would be a stable, increasing or decreasing search interests of e-voting terms reflected on Google and Twitter. The same counts here as with news publications, meaning that the search trends do not have to be in favour or against e-

voting, but the stable, increasing or decreasing overall volume confirms the persisting or declining interest in the topic. What follows the stability and closure of the discourse is the dependent outcome variable Y, namely e-voting continuance or abolition. As outlined earlier in chapter four, continuance or abolition in this context refers to the de facto or legal expansion or annulment of e-voting.

6.3.3 Causal Mechanism applied to Argentina and Germany

The preceding subchapter has outlined how the generic causal mechanism unfolds per sequence. The subsequent paragraphs will examine whether the causal mechanism materialised for the cases of Argentina and Germany while testing the validity of the SCOT theory. Appendix C illustrates the generic causal mechanism of Graph 2 again as well as the causal mechanism applied to Argentina and Germany. The following analysis will account in detail how the wider context looks like and how each sequence unfolds for both countries. The time frame analysed for Argentina stretches from 2004 until 2015 and for Germany from 2001 until 2009 (see Appendix C). This means that, for each case, there is a time difference when the causal mechanism potentially unfolds and a discrepancy in the total length of the time frames. Nevertheless, the time difference and length discrepancy do not exercise any impact on the causal mechanism as such. On the contrary, the fact that the causal mechanism does potentially unfold across different years in different geographical contexts increases the external validity of the observations made. This moreover implies that both countries under study did not exercise any remarkable impact on each other when introducing and potentially continuing with or abolishing e-voting. In other words, a possible influence that originates from these time aspects is held constant by testing the mechanism in two different scenarios. With this, time as a relevant explanatory factor of the causal mechanism can be ruled out.

6.3.3.1 The Wider Context

The beginning of the millennium implied difficult times for both cases under study. In 2001, Argentina reached the peak of a severe financial crisis which the country would not recover from for years (Burke-White, 2008). At the same time when the Argentinian Peso collapsed and the crisis peaked, several public sector corruption scandals were revealed (Burke-White, 2008). Corrupt politicians who made investments in dubious infrastructure projects or the so-called “mega bond swap” of former President de la Rúa soon became the focal point of the crisis (Cohen et al., 2004, p. 90). The government faced the pressing need to make the Argentinian public sector more transparent and foster better citizen involvement to restore

trust in politics. In the case of Germany, the bursting of the dotcom bubble and the crash of the global technology market hit the country especially hard during an economic recession at the end of 2001 (Engel, 2014). Like many industrialised economies, Germany had invested great amounts in stocks of the “New Economy” which refers to the software, technology, and biotech industry that gloomed at the end of the past century (Beyer & Schikora, 2010, p. 71). With the market crash, many public and private investors incurred big financial losses. Moreover, the Euro that has just been introduced in 1999 was subject to critical public scrutiny. Only one year after the Euro introduction, the *Schwarzgeldaffäre* (black money affair) was exposed, which remains one of Germany’s highest level corruption scandals in the public sector (Beier, 2007, p. 464). The Christian Democratic party of former chancellor Helmut Kohl accepted secret financial donations which were hidden on foreign bank accounts via illegal wire transfers (Beier, 2007). Hence, when ICTs reached many public sectors globally and e-government gained momentum on a broader scale at the beginning of the millennium, the socio-political milieu of Argentina and Germany was tainted by crises scenarios and transparency issues. Nevertheless, both countries made strategic use of this situation.

The Argentinian government emerged on 30 different ICT projects in the early 2000s to progressively digitalise its public sector infrastructure. At the core of these projects was the launch of two online portals called *gobierno electrónico* (electronic government) and “Cristal” (Panzardi et al., 2002, p. 3). The former facilitated the successive move of public services online (for example the request of documents, filing of taxes or payment of fines) whereas the latter was dedicated to increase public sector transparency. Especially Cristal was a bold project which served to inform citizens about the performance of the public sector through the provision of data on the fiscal relationships between the provincial and federal governments and the legality of government actions (Bhatnagar, 2003). Thus, e-government developments were strategically used to mitigate corruption in the public sector in order to avoid the repetition of past scandals. The general public reacted positively to these developments and soon after a first period of success, discussions came up to make use of technology during the electoral process as well (Lau et al., 2008). Since traditional ballot and paper voting procedures have led to many irregularities in the country, technology was perceived as an opportunity to facilitate cleaner, more transparent elections (Mirau et al., 2012).

In the case of Germany, the repercussions of the recession in the early 2000s were felt especially in the German economy. The financial loss incurred from the market crash called

for solutions to regain benefits. Interestingly, even though the global technology crash could have led to scepticism about its use, many European countries kept investing in ICTs to innovate their public sectors (Daveri, 2000). Hence, Germany faced the pressure to take part in a digital innovation race if the country did not want to see its economy left behind (Daveri, 2000). Apart from the pressure to stay economically competitive, the government had to restore transparency in the public sector after the corruption scandal of Helmut Kohl and his party was revealed (Beier, 2007). Especially for the electoral process, transparency has always been a condition *sine qua non* in Germany. The traditional paper and ballot system enjoyed great support and no major irregularities had been registered by the year 2000 (Braun et al., 2003). That is why the general public reacted rather sceptical when the government launched the *Bund Online 2005* (Federal Government Online 2005) project (Seliger, 2010, p. 383). The project intended to facilitate not only public service delivery but also the electoral process online by the end of 2005 (Seliger, 2010).

The wider context has outlined the socio-political milieu in the period right before discussions about e-voting in Argentina and Germany intensified. In the case of Argentina, concerns about public sector transparency and irregularities in the election process were present when the first e-government initiatives were launched. The digitalisation of public services were welcomed by civil society and seen as a merit for the aforementioned concerns. In the case of Germany, a suffering economy and competition pressure incentivised the government to participate in the e-government development game. The general public reacted rather sceptical when first initiatives were launched. Nevertheless, a large-scale corruption scandal gave reason to make the German public sector more transparent and innovate traditional services. Hence, e-government development and public sector transparency were the driving factors for discussions surrounding the potential introduction of e-voting in both countries. The first sequence of the causal mechanism in the subsequent section will trace the process how e-voting came about before sequences two and three show whether the countries continued with or abolished the novum.

6.3.3.2 Sequence 1: Interpretative Flexibility

The launch of *gobierno electrónico* in Argentina incentivised discussions at the provincial level on how to implement e-government locally. The national electoral law did not allow for e-voting, yet the decentralised election system of Argentina allowed the provinces to reform their respective electoral law (Ardanaz et al., 2012). In 2004, the provinces of Salta, Córdoba,

Santa Fe, Río Negro, Mendoza and the city of Buenos Aires⁵ started concrete plans on how the information provided through *gobierno electrónico* could be translated on the sub-national level (Prince et al., 2012). High levels of corruption and low transparency in the public sector were perceived as a chronic disease of the country which the provincial governments intended to tackle through the tools provided by e-government (Pomares et al., 2014). The “scandal-prone politics” (Lehmann, 2004) that often resulted from corruption incidents should be reversed and new financial benefits created. Especially the local government of the Salta province made very clear that a better integrity of the electoral process was one of the main reasons to move towards electronic voting systems (Pomares et al., 2014).

With the problem clearly defined and a first toolkit provided through *gobierno electrónico*, the question soon arose on how to design a potential new e-voting system. The electoral authority of the city of Buenos Aires assigned a team of computer scientists, political scientists and geographers the responsibility to design and supervise an e-voting experiment in 2005 (Katz et al., 2011). The province of Salta set up its first pilot for the same year whereas the provinces of Santa Fe and Río Negro planned for their first e-voting trials in 2007 (Prince et al., 2012). After these first trials had been technically successful, discussions amongst the provinces intensified how an ideal e-voting system design could look like. By the same token, the debate gained increasing momentum after the province of Córdoba experienced a series of highly competitive provincial elections in 2007 (Alvarez et al., 2013). The back then incumbent vice governor of the province won the provincial election by a margin of 1% (Alvarez et al., 2013, p. 120). Soon after the preliminary results were published, the election was denounced as fraudulent and a recount was demanded. The legitimacy of the electoral process was eroded and only three months later, an expert committee published its final report on the incident. The key recommendation of the report was to abolish the traditional ballot and envelope system (Alvarez et al., 2013, p. 120).

In the case of Germany, the project *Bund Online 2005* incentivised discussions about the implementation of e-voting from 2001 (Braun et al., 2003). One of the initiatives which had an important function in this context was called “D21”, which held workshops on the design of e-voting (Karger, 2002). During the workshops, ideas from politicians, scientists and civil society were gathered on how the technology could be implemented in the country.

⁵ Nota Bene: the province of the “City of Buenos Aires” is independent from the province of “Buenos Aires”. The province of Buenos Aires covers the surrounding areas of the capital city, but not the capital city itself, which instead has its own provincial name (Pirez, 2002, p. 145).

The workshops showed that e-voting was not only a technical challenge for Germany but even more a socio-political issue (Council of Europe, 2002; Braun et al., 2003). While possible ways of trialling e-voting on the sub-national level were outlined, questions soon arose on how the election principles could be complied with. The German election principles hold that not only on national but also on sub-national levels, the principles of general, direct, free, equal and secret elections have to be guaranteed (German Basic Law, 1949, §38). At the same time, the election process must be subject to public scrutiny to ensure the transparency of elections (German Federal Electoral Law, 1996, §31). Especially the latter principle of the public nature of elections was discussed intensively since many civil society actors feared that they would not anymore be able to grasp what happens to their vote once it was cast (Bremke, 2004; Bauer, 2004). With regard to the principles of direct, free and secret elections, the concerns related to the manipulability of votes and the infringement in the election process through possible third-party intervention of the machines (Winkel, 2004; Lorig, 2004). Doubts about compliance with the principles of general and equal elections were referred to in terms of disparate access to the internet amongst the electorate if i-voting would be introduced and a lack of technical affinity of the elderly to make use of voting machines (Bremke, 2004). Thus, public support for the election principles and the traditional paper and ballot system was strong in Germany given that they had fostered a fair and transparent election process in the past and ensured that no major irregularities had occurred (Martens, 2017).

Once these tensions and the complexity of e-voting were recognised, the government increased investment in the research on the implications and feasibility of e-voting in Germany. In 2002, the initiative *Bündnis für elektronische Signatur* (Alliance for Electronic Signatures) was established, an e-town study conducted and the *Forschungsgruppe Internetwahlen* (Research Group for Internet Voting) formed, to name just a few (Siedschlag & Bilgeri, 2003, pp. 14-15; Deutsche Welle, 2002). These are examples of how different side aspects of e-voting were explored more in-depth, such as technologies applied for electronic signatures which could be used for i-voting or a study on the e-government development of big German cities to have a status quo overview of the country. Nevertheless, except for one small-scale trial in 1999 during the European Parliament elections, e-voting was not used in the public sector until 2002 (Deutsche Welle, 2009). A small-scale trial during the elections for the German *Bundestag* brought positive results in a technical-operational way since no visible errors had occurred and the results were reported without any obvious glitch. Nevertheless, socio-politically the technology still could not live up to the high standards set

by the electoral principles since there was no way for civil society to scrutinise the results (Volkamer, 2010). Hence, research continued and most of the trials were shifted to the private sector before a ripe e-voting design could be launched for public sector elections. Between 2003 and 2005, various e-voting systems were tried out such as the “Polyas System” by the company Micromata, a digital voting pen but also internet voting platforms to facilitate remote i-voting (Volkamer, 2010, pp. 183-185). During this period, the German government emphasised that there would be no way around to implement e-voting in the near future. The reason for that, it was stated, was that the future of democracy would be digital (Deutscher Bundestag, 2005, p. 31). Hence, given that transparent elections build the core fundament of a well-working democracy, they would have to be part of the overall digitalisation process (Deutscher Bundestag, 2005, p. 51).

These empirical developments resulted for both countries in the first large-scale use of e-voting during binding elections. In the case of Argentina, Salta was the first province to translate various trials into a binding e-voting election based on decree 1340/09 (Boletín Oficial de Salta, 2009, §3) that enabled its use. On 12 July in 2009, about 13,000 Saltenians across 36 polling stations cast their vote via touchscreens during the primary election of the Peronist party (Alvarez et al., 2013, p. 120). The municipal government planned to gradually increase the scope of its e-voting facilities to cover 33% of the electorate to e-vote in 2011, 66% in 2013 and the whole electorate in 2015 (Pomares et al., 2014, p. 3). In the case of Germany, the *Bundesländer* of North-Rhine Westphalia, Brandenburg, Hessen, Rhineland-Palatinate and Saxony-Anhalt (2BvC 3/07, 2009, §3) cast their vote electronically during the 16th German *Bundestag* election on 18 September in 2005, based on Article 35 of the Federal Electoral Law (German Federal Electoral Law, 1996, §35).

Evidence

With the empirical base provided for both countries, it will now be examined whether the evidence dictated by the generic causal mechanism was present. If sequence or pattern evidence that was defined ex ante is found in one or both cases would increase the confidence that sequence one of the causal mechanism and the interpretative flexibility component of the SCOT theory are valid. Sequence evidence in support of the causal mechanism would be an increase in domestic information events organised by the government on the use of technology in politics which would show that there was in fact an increased interest and more discussion on the topic. Similarly, pattern evidence would reflect this trend in terms of

newspapers which publish higher numbers of articles that inform about topics related to digitalisation, e-government development or e-voting. It is subordinate in this context whether publications were in favour or against e-voting, since an increased number as such shows that there was an upheaval in the discussion about the technology which proves the interpretative flexibility thereof.

With respect to sequence evidence, domestic information events on the use of technology in politics were held in both countries during the time frame of sequence one. In Argentina, especially the year 2006 saw an increased launch of events about the use of ICTs in politics (IEEE, 2006; ASAI, 2006; Consejo, 2006). Even though some of these events had already been held before such as the *Congreso Argentino de Informática* (Argentine Informatics Congress), new programme strands had been added which were dedicated for lectures about the link between ICT and politics (Consejo, 2006). Some other examples are the *Jornadas Argentinas de Informática* (Argentine Informatics Workshops) held in Mendoza or the *Congreso Internacional de Innovación Tecnológica Informática* (International Congress on Information Technology Innovations) held in Rosario (ASAI, 2006; IITI, 2006). In the case of Germany, the same sequence evidence was present. Remarkable in this aspect is that the events did not only focus on the mere link between technology and politics but had a special focus on the impacts thereof on democracy. This shows that there was a need to justify that the use of technology in politics would not impede democracy and a transparent public sector, which many citizens were concerned about. In May 2001, the *Internet – eine Chance für Demokratie* (Internet - a Chance for Democracy) congress was held in Berlin, in June 2002 the *Digitale Demokratie wagen* (Dare Digital Democracy) conference took place and the *Politik - Wissenschaft - Öffentlichkeit* (Politics, Science, Publicity) conference, to name just a few (Eigen, 2003, p. 104; Rogg, 2013, p. 7; DVPW, 2003).

In regard to pattern evidence, news publication numbers in both countries further increases confidence about the presence of sequence one and the validity of the second component of the SCOT theory. In Argentina, one of the leading newspapers in the country called *La Nación* (The Nation) more than doubled its publications that contained the words *digitalización* (digitalisation) and *voto electrónico* (electronic vote) between 2004 and 2009 (La Nación, 2009; La Nación 2009a) compared to 2000 and 2004 (La Nación, 2004; La Nación 2004a). In Germany, the newspaper *Süddeutsche Zeitung* (South German Newspaper), which is considered one of the most influential newspapers in the country (Weidenbach, 2020) published 11 articles that contained the term *elektronische Wahlen* (electronic voting) between 2001 and 2003 (Süddeutsche Zeitung, 2003). Within only one

year, this number increased to 47 articles between 2004 and 2005 (Süddeutsche Zeitung, 2005).

In light of the above it becomes clear that sequence one of the causal mechanism materialised in a very similar way in both countries in spite of large contextual differences. Firstly, the triggering factors of discussions about the implementation of e-voting were possible opportunities or threats that e-government developments could imply for public sector transparency. When research begun and e-voting was trialled, the implications of the technology led to two different problem definitions: in Argentina, the question was how low public sector transparency could be improved *through* the use of e-voting whereas in Germany the question was how high public sector transparency could be maintained *despite* the use of e-voting. Secondly, in both countries the main actor that pushed for the introduction of e-voting was the government which in turn exercised influence on civil society and private sector entities that rather passively assimilated the information provided. Thirdly, sequence and pattern evidence has shown that similar developments were present in both countries in terms of info events and news publications that dealt with e-voting. This further increases the confidence that sequence one of the causal mechanism as well as the interpretative flexibility component of the SCOT theory are valid. The subsequent section will scrutinise how the introduced e-voting system has been received by the civil society.

6.3.3.3 Sequence 2: Discourse

The second sequence is connected to the third component of the SCOT theory, which deals with the relevant social groups that debate about the newly introduced technology. A discourse is formed which represents the opinion of civil society actors that express their views frequently by establishing interest groups. This research contends that the formation of a pro e-voting discourse by civil society significantly increases the likelihood that e-voting is continuously used in the long-run whereas a contra e-voting discourse most likely leads to its abolition.

The first binding large-scale e-voting election in Salta in 2009 was rated a great success both technically and socio-politically soon after results were published. The automation of the counting process which allowed for the quick publication of results increased the perceived level of transparency by the Saltenian civil society (Mirau et al., 2012). According to a survey conducted with citizens right after they cast their vote, seven out of ten respondents stated that they perceived the e-voting system more reliable than the

previous elections on paper (Mirau et al., 2012, p. 217). As a result of the first positive binding e-voting experience in Argentina, Salta soon became the centre of interest for various interest groups from the public and private sector. At the forefront of civil society actors has been “Cippec”, an independent non-government organisation (NGO) dedicated to the implementation of public policies that foster equality and growth (Cippec, 2020). The NGO consulted data from the Electoral Tribunal of Salta and evaluated the e-voting system that had been used in a detailed report. The director of Cippec concluded that past mistakes and vulnerabilities of the system which were detected during the trial period had been taken into consideration and that the outcome was a transparent, clean voting system (Emiliano, 2012). In light of past corruption scandals and fraudulent elections, the further implementation of e-voting on a larger scale in the country could foster better relations between the government and citizens. Other civil society actors which engaged in public discussions about e-voting were inter alia, the *Fundación Conciencia* (Awareness Foundation), *Agencia Popular* (Popular Agency) or the *Movimiento Independiente de Justicia y Dignidad* (Independent Movement for Justice and Dignity; Siri, 2011; Fundación Conciencia, 2020; Agencia Popular, 2020; MIJD, 2009). Remarkably to note in this context is that prior to the introduction of e-voting, many of these civil society organisations criticised the Argentinian government for little accountability towards their citizens due to an untransparent public sector (Siri, 2011). Technology was perceived as an effective remedy to close this deep cleavage between the government and citizens. In other words, e-voting was perceived as a sort of neutral mediator to restore trust in government. Consequently, there was a growing network of private actors which shared a common interest in the potential benefits of e-voting for some of the problems they had already addressed before.

In the year 2011, the planned incremental increase of e-voting facilities took place and 33% of the Saltenian electorate could cast their vote via touchscreens during the general provincial elections on 10 April (Barnes et al., 2017). The director of Cippec welcomed the decision to follow these plans and spoke on behalf of its supporters stating that “us Saltenians, we are wounded from the tradition. This is a light that allows us to progress and we know that it’s a tool that permits change and guarantees more dignity” (Emiliano, 2012). The second time that e-voting was used during a binding election in Salta again led to positive repercussions on the perceived complexity, celerity and transparency of the voting process in the province. A survey amongst the e-voters stated that 83.1% felt confident that their vote had been registered correctly (Mirau et al., 2012, p. 222). Moreover, the vast majority of both e-voters and poll workers stated that they preferred the new system and

would not see an added value in returning to the traditional paper ballot (Mirau et al., 2012, p. 219). Interestingly, the fact that only 33% of the electorate in Salta was able to e-vote due to insufficient voting machines available led to complaints of citizens who could only use the traditional method during the 2011 elections. Interviews at polling stations were conducted on the election day in 2011 and voters stated that they had to vote via the “prehistoric” method and defamed the traditional paper system an “atrocious” (Alvarez et al., 2011, p. 211). One 60-year-old e-voter stated that “we will eliminate this [paper vote] system, get rid of counting ballots and move to a system that is completely electronic” (Alvarez et al., 2011, p. 211). After the second use was successful, it became more and more clear that e-voting was not solely a phenomenon that computer scientists were interested in. Instead, it was a socio-political topic in Argentina which was especially reflected when civil society movements got politically engaged. One example was called *Barrios de Pie* (Neighbourhoods on Foot) which became closely tied to the *Movimiento Libres del Sur* (Free Movement of the South) party (Barrios de Pie, 2020; Movimiento Libres del Sur, 2020). The movement, mostly made up of students, raised its voice to implement e-voting on a larger scale and this way foster a more transparent election process in the country. Given its close ties to a political party, *Barrios de Pie* contributed to the connection of the social and political realm which e-voting concerned simultaneously.

Compared to the Argentinian case, Germany saw rather different developments after the first binding-large scale use of e-voting in 2005. One of the first responses to the 16th *Bundestag* election came from the German civil society organisation “Chaos Computer Club e.V.” which deals with privacy and security aspects of technology (Chaos Computer Club, 2020). Hacker experts within the club raised serious doubts about the security of the Dutch voting machines used during the election provided by the company “Nedap” (Chaos Computer Club, 2006). More concretely, the experts stated that the machines were vulnerable to manipulation which would make third party interference in the election process possible (Chaos Computer Club, 2006). The club started the *Kampagne gegen Wahlcomputer* (campaign against election computers) which aimed at hindering the further deployment of voting computers during elections in Germany (Chaos Computer Club, 2005). By the same token, the club saw democracy endangered through the use of e-voting. The experts stated that they would “know too much about computers to entrust the last pieces of democracy to them” (Chaos Computer Club, 2005).

With their campaign, the club soon triggered interest from other civil society actors. In October 2005, political scientist Joachim Wiesner and his son physicist Ulrich Wiesner denounced the use of voting machines during the 16th German *Bundestag* election (EDRI, 2009). Supported by experts from the club, they filed a complaint against the legality of e-voting and the validity of the election with the Election Examination Board of the *Bundestag* (Volkamer, 2010). Their appeals were registered on 15 October and 6 November 2005 respectively (Deutscher Bundestag, 2006, pp. 7-25). The complainants argued that the hardware and software architecture of the voting machines “ESD 1” and “ESD 2” by Nedap would not be in line with the German election principles (Deutscher Bundestag, 2006, p. 7). Moreover, the machines would impede the transparency of elections because the election tallying and determination of results was not subject to public scrutiny. By the same token, laymen who lacked technological skills would be unable to comprehend how the results came about, the complainants stated (Deutscher Bundestag, 2006).

The filing of the two complaints stimulated the debate about the use of e-voting amongst civil society actors in Germany especially from late 2005. The “FoeBuD e.V.” (FoeBuD, 2013), an association on open and secure data traffic from the German city of Bielefeld joined forces with the Chaos Computer Club (2006a). The two civil society organisations launched an online platform which enabled citizens to upload and exchange files on the freedom of information laws in Germany (Chaos Computer Club, 2006a). With this, the German public should become aware of those rights which would severely be impeded if e-voting was used in the country. Yet not only domestically but also across the German border, interest groups started to cooperate in order to hinder the spread of e-voting. In 2006, the Chaos Computer Club and the Dutch citizen group *Wij vertrouwen stemcomputers niet* (we do not trust voting computers) collaborated to examine the security and manipulability of the voting machines by Nedap (Volkamer, 2010, p. 186). They reconstructed the source code of the machines and found that the programming methods were trivial which allowed them to effortlessly manipulate the software (2BvC 3/07, 2009, §84). More concretely, once a vote was cast, it could be altered arbitrarily prior to its storage (2BvC 3/07, 2009, §85). Soon after this shortcoming was revealed, 45,126 German citizens signed a petition against voting machines on 28 November 2006 (Chaos Computer Club, 2006b).

Less than one month later, on 14 December 2006, the Election Examination Board of the *Bundestag* published its rejection of appeals 145/05 and 108/05 by Joachim and Ulrich Wiesner (Deutscher Bundestag, 2006). The Board justified its decision on the ground that the

principle of the public nature of elections as well as democracy as such had both not been infringed by e-voting during the 16th German *Bundestag* elections (Deutscher Bundestag, 2006, p. 15). The comparison was made to voting in paper or via post. It was stated that using the traditional methods, the entire process from casting the vote until results are published was also not entirely traceable (Deutscher Bundestag, 2006, p. 16). Moreover, an entire understanding of all technical voting machine details would not be required to comply with the principle of the public nature of elections (Deutscher Bundestag, 2006, p. 16).

This setback did however not mute the objections against e-voting by the German civil society. In 2007, the Chaos Computer Club called for support for its ongoing campaign against election computers. They cooperated with the “Wau-Holland” foundation and emphasised their support for the appeals by Joachim and Ulrich Wiesner (Chaos Computer Club, 2007). Moreover, the club again together with the *Wij vertrouwen stemcomputers niet* initiative published a detailed report on their examination of the Nedap voting machines (Kurz et al., 2007). In their statement, they stressed that the question remains “why should we replace the secure, transparent and functional paper-based-ballot voting system we already have in use with a very expensive and insecure system which puts the principles of democracy to its knees [?]” (Chaos Computer Club, 2007).

The empirical developments outlined above resulted for both countries in a discourse formation in favour for Argentina and against the use of e-voting for Germany. Given the strong voices of e-voting supporters in Argentina and increasing complaints of municipalities that did not have the facilities in place yet, the government saw itself forced to change the implementation timeline in 2013 (Alvarez et al., 2013). Instead of a 66% coverage of e-voting in Salta in 2013, the government decided for a full roll-out of the technology on 16 November 2013 (Abboud & Busto, 2013, p. 141). In Germany, on the contrary, the pressure exerted from civil society actors led the highest court of the country, namely the German Federal Constitutional Court, to hear the appeals that had been rejected earlier by the Election Examination Board of the *Bundestag*. Joachim and Ulrich Wiesner were invited for an oral hearing on 28 October 2008, which should clarify the legality of e-voting in Germany (2BvC 3/07, 2009).

Evidence

Sequence evidence that would prove the presence of sequence two of the causal mechanism and the validity of the discourse element which is formed by what the SCOT theory labels

“relevant social groups” would be firstly, the gradual increase or decrease of e-voting within the same sub-national unit in which it has been introduced. Secondly, if hacker attacks or corruption incidents occurred and were picked up by the groups to support the pro or contra e-voting discourse formed. The final sequence evidence would pose domestic information events on the implications of e-voting in politics. Pattern evidence would be surveys that reflect the national opinion of a supporting or opposing discourse.

With regard to the first sequence evidence, there clearly was a spread of e-voting within the province of Salta where the technology had been introduced first. As was outlined above, due to societal pressure, the government even adjusted the implementation timeline to have a full roll out two years earlier than initially planned. For Germany, e-voting was introduced in five *Bundesländer* in total as stated earlier. After the Wiesner duo filed its objections against the technology, two out of the five *Bundesländer* followed suit and raised concerns about the planned use of e-voting during municipal elections. In Brandenburg, a private actor filed a complaint against the use of e-voting for the election of the mayor of the city of Cottbus (Fehndrich, 2006). Even though the complaint was later rejected, the city refrained from the purchase of the voting machines due to the discussion that was incentivised by the appeal (Fehndrich, 2006). Similarly, a private actor filed a complaint against the general use of e-voting in the *Bundesland* of Hessen (Chaos Computer Club, 2008). After e-voting had been trialled in the town Alsbach-Hähnlein, several municipalities within Hessen returned to the use of traditional voting after doubts got louder about the reliability of the Nedap software (Chaos Computer Club, 2008; Fehndrich, 2007).

Regarding the second sequence evidence, there was no referral to a concrete corruption incident neither by the Argentinian nor by the German civil society detected in the material. Instead, there was a general referral to the importance of transparency during the election process and the avoidance of corruption through the use of e-voting (Argentina Ciudadana, 2013; Barnes et al., 2017; Stromer, 2008; Kurz et al., 2007). The only incident that was used for the opposing discourse in the German case was the successful hacker attack by the Chaos Computer Club of the Nedap voting machine. Even though this was no “real” corruption incident, it had a significant influence on Hessen to return to traditional voting procedures (Deutsche Welle, 2008). In Argentina, several corruption scandals in the public sector took place between 2009 and 2013 (Manzetti, 2014). It could, however, not be detected that civil society strategically referred to these incidents in order to further push for e-voting in the country.

The last sequence evidence is about the organisation of e-voting events that were used to transmit the supporting or opposing discourse to the broader public. In the case of Argentina, there was no remarkable increase of events that were specifically informing about e-voting between 2009 and 2013. Nevertheless, the *Software Libre Argentina* (Free Software Argentina) movement hosted an annual conference at which talks were held on e-participation concepts and the benefits of technology use in politics (Flisol, 2009; Filsol, 2011). Moreover, in 2013 started an event series called “media party” that served to make the media and journalists aware of implications that open data and technological developments can have inter alia on public sector transparency so that they could inform the general public adequately (Blejman, 2013). In the case of Germany, one remarkable event was the *IT Gipfel* (IT Summit) which was held by the German government for the first time on 18 December 2006 when the discussion around e-voting saw an increased upheaval (Deutscher Bundestag, 2006a). The national meeting concerned the question on how the German digital infrastructure could be improved to stay globally competitive while fostering social commitment on the national level. The use of e-voting was referred to in this context as an adequate instrument to improve citizen participation during the digitalisation process (Deutscher Bundestag, 2006a). Less than ten days later, the Chaos Computer Club organised its annual congress in Berlin from 27 until 30 December in 2006 (Chaos Computer Club, 2006c). The programme could be read as a direct response to the *IT Gipfel*. It called for a critical reflection on the impact that technological advancements have on society. The lectures held at the congress were divided up in five strands, from which two were named “Society” and “Culture” (Chaos Computer Club, 2006c). These two served to point - amongst other aspects - at the impact of e-voting on the socio-political milieu in Germany and included talks about mistrust in voting computers or the lacking legal basis for an implementation of the technology (Chaos Computer Club, 2006d, Chaos Computer Club, 2006e). Thus, these two events organised by the government on the one hand and from civil society actors on the other prove the tension that was present in Germany during the discourse formation between 2005 and 2009.

Lastly, pattern evidence in the form of surveys reflecting the broad public opinion was found for both countries. For Argentina, the survey of an independent NGO in 2009 showed that when the first trial period just finished and the use of e-voting in binding elections got more concrete, 72% of the participants stated that they preferred the electronic to the paper system (Gervasoni & Mangonnet, 2009, p. 16). One of the most representative surveys that captures public opinions of Latin American countries is the “Latinobarómetro” (IHSN, 2019).

Between 2009 and 2013, there was no set of survey questions included yet that captured the sentiments of citizens towards e-government development or e-voting. The survey shows, however, that civil society continuously had doubts in the transparency of the Argentinian public sector within this time frame. In 2009, only 13% of the survey respondents stated that corruption in the Argentinian public sector had improved in the past two years (Latinobarómetro, 2009, p. 183). This number increased to only 26% in 2013 (Latinobarómetro, 2013, p. 45). However, in order to make a valid statement on this aspect, results would need to discriminate between provinces to see whether the impact was bigger in Salta where e-voting was introduced compared to other provinces where it has not. Since the survey does not make this distinction, it only allows for a weak statement on the validity of this evidence. The European equivalent to the Latinobarómetro is the “Eurobarometer”. The representative survey of European Union citizens opinions did, however, also not include any question on e-government development or e-voting yet between 2005 and 2008. Nevertheless, in 2008, the European Commission published a “special Eurobarometer” that reflected the attitude of European Union citizens towards corruption (European Commission, 2008). One result of the document in particular gives an interesting insight. In the year 2008, Germany was the country whose citizens were the most concerned about corruption and transparency issues in European Union institutions (European Commission, 2008, p. 20). Even though this does not allow for a statement on citizens’ opinion about the German public sector, it shows the level of concern and sensitivity of Germans about transparency in politics as a whole.

The sequence and pattern evidence outlined in the preceding paragraphs increases confidence to a certain extent that sequence two of the causal mechanism materialised in both countries. Even though there were no concrete corruption incidents that had been systematically used to stabilise the discourse in either of the countries, the evidence on gradual increase and decrease of e-voting was unambiguous in both cases. What is more, the fact that the Argentine civil society was concerned about public sector transparency throughout the whole time frame shows that e-voting did not have a country-wide positive effect. Nevertheless, the empirical material points at similarities in both countries despite large contextual differences. As dictated by the generic causal mechanism outlined earlier, the actors in sequence two came for both countries from civil society that spearheaded discussions about the prior introduction of e-voting by the government. Though the actors did not actively hold public debates with politicians on the issue, the network of e-voting supporters in Argentina and

opponents in Germany grew bigger and information exchange increased. As a consequence, they were able to influence and exert indirect control on the course of actions taken by the government subsequently. How these actions materialised and whether the discourse formed was translated into political or legal decisions respectively is analysed subsequently in sequence three of the causal mechanism.

6.3.3.4 Sequence 3: Stability & Closure

The final sequence of the causal mechanism makes reference to the “stability and closure” component of the SCOT theory. As outlined earlier, Bijker, Hughes and Pinch distinguish between rhetorical closure and closure by redefinition (2012, p. 38). For both cases under study, rhetorical closure took place which refers to the scrutiny of the relevant social groups whether the problem defined in sequence one had effectively been solved through e-voting. Based on this judgement, the discourse formed in sequence two is further stabilised and ultimately closed. The subsequent paragraphs will illustrate how discourse closure came about for both countries before analysing if it materialised into the de facto continuance or abolition of e-voting.

In Argentina, the full roll out of e-voting in the whole province of Salta in 2013 encouraged other provinces to pick up the debate about e-voting again. Especially in the provinces of Santa Fe, Cordoba and the city of Buenos Aires, discussions between civil society actors and politicians intensified in 2014 (Pomares et al., 2014). Within the province of Salta, earlier discussions amongst e-voting supporters in civil society turned into active debates with public officials. More concretely, civil society actors demanded the deployment of e-voting not only during provincial and municipal but also during national elections (Pomares et al., 2014; Barnes et al., 2017). On the one hand, they grounded their arguments on the basis that the past experience using the technology was overall positive (Mirau et al., 2012). On the other hand, the vast majority of Saltenians perceived the long-standing problem of fraudulent elections mitigated through the automation of the counting process by e-voting (Emiliano, 2012). Both aspects are crucial for the scope of this research, because they point at the stability of the discourse formed in sequence two. The referral back to the problem defined earlier, namely an untransparent election process leading to fraudulent results, shows that civil society actively re-evaluated the issue in light of e-voting. Importantly, the re-evaluation was positive and hence in favour of continuing with and even enhancing the use of e-voting by covering another election type. As a consequence, politicians on the national level started to pay increasing attention to the e-voting experience

in Salta (MSA, 2015). Political supporters were for example Horacio Larreta or María Vidal who both made reference to the celerity of the estimation of results, the transparency of the process and the agility of e-voting (MSA, 2015a). The stability of the discourse created in Salta came especially to the fore when the National Director of elections Alejandro Tulio picked up the topic in 2015. Tulio stated that the traditional voting system in Argentina seemed to have reached its limits and that discussions would have to start about the use of technology during the election process (Spinetta, 2015). He referred to the example of Salta which has shown how e-voting has been implemented, improved and is still successfully used (Spinetta, 2015). With this, the most important figure of the electoral process in the country made clear that a nation-wide implementation of the technology could be considered.

In the case of Germany, the end of sequence two illustrated how critical the general public had been about the use of e-voting during the 16th German *Bundestag* election. The problem defined in sequence one made reference to the necessity to maintain the high level of public sector transparency when considering the use of e-voting. The fact that the vast majority of citizens in Germany had been satisfied with the traditional paper ballot system did not provide the government with the same set of arguments that would justify changing the electoral system as was the case for Argentina. Hence, when Joachim and Ulrich Wiesner were invited for an oral hearing on 28 October 2008 at the German Federal Constitutional Court, many civil society actors shared their concerns (Frickel, 2008). Their appeals evaluated the initial problem as not being solved but that e-voting rather worsened the transparency of elections. According to the plaintiffs, the use of e-voting was against the German election principles which require inter alia that all essential steps of the election process have to be subject to public scrutiny (German Basic Law, 1949, §38; German Federal Electoral Law, 1996, §31). Moreover, e-voting would not allow for citizens without knowledge about technology to grasp how election results are exactly determined (2BvC 3/07, 2009, §113). This points at what e-voting opponents have earlier called the inherent “black box” nature of e-voting (Alvarez et al., 2011, p. 201; Gauld et al., 2006). After they delivered their statements in front of the Court it would take another five months until a decision about the legality of e-voting and the validity of the 16th German *Bundestag* election would be made. During this time, e-voting opponents from civil society took advantage of the fact that they had finally been heard - not by politics but by the judiciary. At the forefront was again the Chaos Computer Club which called upon all of its members and sympathisers to help out at their local elections in order to avoid the spread of e-voting and to have an eye on

the election landscape in the country. Their motto in this context was called *Hacker zu Wahlhelfern* (Hackers as Election Helpers; Chaos Computer Club, 2008a).

In light of the empirical facts outlined above it comes to the fore that both countries were facing similar scenarios at the end of sequence three yet from two opposing angles. At one end, Argentinian civil society actors pushed for a further expansion of e-voting in geographic scope and election type. The supporting discourse formed in sequence two turned into an active demand by society to continue with e-voting. Rhetorical closure took place because e-voting was perceived as an effective remedy for the problem of untransparent, fraudulent elections. At the other end, German civil society actors did not perceive the use of e-voting as a feasible option to reform the domestic electoral process. The opposing discourse formed in sequence two turned into an active denial of the technology by society which even brought the issue in front of Germany's highest Court to decide upon the legality of e-voting. Rhetorical closure of the discourse took place because e-voting did not pass the test to maintain the high level of transparency that the electoral process enjoyed in the country. Before the final section will scrutinise whether or not the discourse closure translated into de facto continuance or abolition of e-voting, evidence for sequence three is analysed.

Evidence

The final set of evidence will show whether sequence three of the generic causal mechanism materialised for the cases of Argentina and Germany. At the same time, the validity of the “stability and closure” component of the SCOT theory is tested. Sequence evidence that would increase confidence about the aforementioned would be firstly, if the supporting or opposing e-voting discourse was in fact stable enough to not be impacted by foreign positive or negative e-voting experiences. Secondly, if foreign countries adapt similar attitudes based on the domestic discourse formed would show the stability thereof. This could mean that the domestic positive or negative e-voting experience incentivises a foreign country to also start or stop investing in e-voting by referring to the respective experience of the country. Lastly, if not only domestic but also cross-national information events on the use of e-voting took place would prove the discourse stability given its spread to countries abroad. One possible pattern evidence that would prove the stability of the discourse are trends on Google or Twitter that show whether the interest of the civil society in e-voting maintained high or decreased.

With regard to the first sequence evidence, Argentina was well aware of the negative opinions that many especially European countries had about e-voting around 2013 (Pérez Corti, 2015). In fact, concrete referrals to the drastic reaction of the German Federal Constitutional Court in 2009 to e-voting had been made in this context (Pérez Corti, 2015; Bea, 2011). Interestingly, the decision of the German Court was referred to by the Argentinian press and civil society as a “normative decision” on the nature of e-voting (Bea, 2011; Pérez Corti, 2015). Hence, the way that Germany perceived the technology would not fit with the Argentinian definition. In Germany, on the other hand, another interesting development occurred around the same time that first e-voting trials were run and introduction took place. Estonia, which is a small European country that usually does not have a major role to play in European Union affairs, emerged as one of the world leaders that deployed e-voting successfully (Kalvet, 2012; Madise & Martens, 2006). Since 2005, the same year that e-voting was introduced in Germany, all Estonian citizens have the option to vote for municipal, national and European elections via the internet from home and since 2011 even with their mobile phones (Kind & Bovenschulte, 2019, p. 2). The country was praised by many technology experts but also political figures for the progress they made with the technology (Kalvet, 2012; Madise & Martens, 2006; Kind & Bovenschulte, 2019). Germany, however, watched the Estonian developments rather passively and did not refer to the country extensively in its domestic debate about the use of e-voting (Kind & Bovenschulte, 2019). Similarly, Switzerland as one of Germany’s neighbouring countries made positive experiences with e-voting throughout the first decade of the millennium (though it was abolished again later). The Swiss experience neither exercised a significant impact on the German opposing discourse (Kind & Bovenschulte, 2019). Hence, for both Argentina as well as Germany, negative and positive e-voting experiences abroad did respectively not have a substantial impact on the domestic pro and contra discourses formed which could have led to a change thereof. This increases the confidence that sequence three materialised as predicted and the “stability and closure” component of the SCOT theory is valid.

In a similar vein, the impact that both countries’ discourses had on other especially geographically close countries affirms the aforementioned. In 2013, the National Directors of elections of Argentina and Ecuador signed a joint “electronic voting covenant” with the intention to mutually support each other’s progress with the technology (Consejo Nacional Electoral Ecuador, 2013). The initiative in this context came especially from Ecuador, because the country was planning to implement e-voting on a similar scale like Argentina in

the Azuay province. Given the positive experience of Salta, Ecuador was seeking help from Argentina to successfully implement the technology on its own territory (Pomares et al., 2014; Consejo Nacional Electoral Ecuador, 2013). One remarkable impact that the opposing e-voting discourse present in Germany had abroad was clearly seen in the Netherlands. That is not to say that the Netherlands followed suit when Germany started to oppose e-voting, but there was a mutual reinforcement of dynamics. In September 2007, the Nedap voting machines had been declared unlawful in the Netherlands which led the country to return to a paper voting system in May 2008 (Wij vertrouwen stemcomputers niet, 2013; Libbenga, 2007). One decisive document that led the judge to decide in such a manner was the report of the Dutch and German initiatives that revealed the security leaks and manipulability of the Nedap voting machines (Chaos Computer Club, 2007a). Regarding the last sequence evidence, there were no remarkable cross-national events organised on e-voting besides the conferences mentioned earlier which continued to take place throughout sequence three.

Finally, pattern evidence that increases confidence in the causal mechanism was found for both countries. In the case of Argentina, Graph 4 below illustrates that since the introduction of e-voting up until today, the term *voto electrónico* was searched for the most in July 2015, which was the moment when the discourse stability peaked in the country and e-voting continued in geographic scope and election type soon after.

Graph 4

Google Trends Argentina 2009 - 2020



Note. Google Trends image of the search term *voto electrónico* in Argentina between June 2009 and May 2020. A value of 0 indicates low, 100 indicates high search interest (Google Trends, 2020).

Out of the 23 Argentinian provinces, the term was searched for the most in the province of Salta whereas the city of Buenos Aires was on the fourth rank (Google Trends, 2020). Moreover, from all Spanish speaking countries in the world, Argentina was the country that searched the most for the term right after Ecuador during the time frame of sequence three between November 2013 and July 2015 (Google Trends, 2020a). In the case of Germany, the term *Wahlmaschine* (voting machine) was searched for the most in September 2005, which was when the discourse formation in the country intensified. The search interest continued until September 2009, which was when the term still had a popularity of 15 points (Google Trends, 2020b). After September 2009 up until today, the term never reached popularity levels higher than five (Google Trends, 2020b). These Google Trends numbers prove for both countries that the interest by civil society in e-voting was still present and stable in the respective time frames of sequence three.

In light of the evidence analysed in the preceding paragraphs, confidence increased that the final sequence took place as predicted by the generic causal mechanism for the cases of Argentina and Germany. Even though no cross-national events took place with a special focus on e-voting, the stability of the respective discourse formed was proven by the fact that experiences from abroad had little influence on them. Moreover, the domestic discourses in Argentina and Germany were ultimately strong enough to also have an impact especially on neighbouring countries which adopted similar attitudes on e-voting. The subsequent section will outline whether or not the stability and closure of the discourses translated into de facto decisions made by politics or the judiciary. Moreover, a brief status quo of the current sentiments towards e-voting in Argentina and Germany is provided before concluding in the final section.

6.3.3.5 E-voting Continuance or Abolition

For both countries under study, the rhetorical closure of the discourse translated into de facto changes to the use of e-voting. On 5 July 2015, e-voting was officially implemented for binding elections in the province of the city of Buenos Aires, based on law number 4894 (Buenos Aires Ciudad, 2015; Ley 4894, 2013). With this, the city of Buenos Aires was after Salta the second province in the country that used e-voting during binding elections on a large scale (Hernández Trejo, 2017). Only three months later, on 25 October 2015, the whole province of Salta voted for the first time during presidential elections using e-voting (Instituto de la Democracia y Elecciones, 2017; Ensínck, 2015). Law number 7730 (Ley 7730, 2012) in

accordance with Title VIII of Law number 7697 (Ley 7697, 2012, Tit. VIII) extended the use of the technology from provincial and municipal to also cover national elections. The deployment of e-voting in Buenos Aires concerns what this research calls continuance per “geographic scope” whereas in Salta continuance per “election type” took place (see Appendix 3).

In Germany, the Federal Constitutional Court announced on 3 March 2009 its decision on appeals WP145/05 and WP 108/05 by Joachim and Ulrich Wiesner (2BvC 3/07, 2009). The Second Senate of the Court declared the deployment of the Nedap voting machines unconstitutional because they did not comply with the principle of the public nature of elections (2BvC 3/07, 2009, §112). The Court ruled, however, that the errors identified would not require a repetition of the elections in the five *Bundesländer* where the voting machines had been used. Instead, it formulated two fundamental requirements for the future deployment of voting machines in Germany. Firstly, it clarified the nature of the aforementioned election principle stating that “all essential steps in the elections are subject to public examinability unless other constitutional interests justify an exception” (2BvC 3/07, 2009, §112). Secondly, the Court made clear that “when electronic voting machines are deployed, it must be possible for the citizen to check the essential steps in the election act and in the ascertainment of the results reliably and without special expert knowledge” (2BvC 3/07, 2009, §119). With this, e-voting was not declared illegal but it significantly made its future deployment more difficult which should abolish its use up until today.

Before concluding, it is worth to briefly examine the current stance of both Argentina and Germany in regard to e-voting. In June 2016, the Argentinian government proposed a bill to reform the electoral law and introduce e-voting for all national elections through a central online system called “Miru” which originated from South Korea (Frigerio et al., 2016; the Sentry, 2018). As a reaction to the proposal, tech blogger Javier Smaldone and security expert Alfredo Ortega called upon the Argentinian civil society to speak up against the expansion of e-voting to the national level (the Sentry, 2018). Their hashtag *#MurióElVotoElectrónico* (electronic voting died) was trending on Twitter in November 2016 and started a social media campaign against the use of the Miru system (Rederburg, 2019). They received support from the Argentinian chapter of Transparency International *Poder Ciudadano* (Citizen Power) and the NGO *Fundación Vía Libre* (Free Path Foundation). The organisations published a joint statement that expressed concerns about the vulnerability of the Miru system which could impede ballot secrecy and election transparency

(Fundación Vía Libre & Poder Ciudadano, 2018). Due to the effective demonstration of vulnerabilities in the system software by a team of computer programmers and security experts led by Smaldone and Ortega, the Argentinian Senate voted the bill down. In December 2016, the proposed reform to the Argentinian electoral law did not receive sufficient votes to pass the Senate, which barred the use of e-voting during the 2017 national parliamentary elections (Rederburg, 2019). Information security professionals and 19 Argentinian university professors signed a statement which declared their support that the legislation failed to pass, expressing their concerns about vulnerabilities of the Miru e-voting system (Aguirre et al., 2016). After these developments, no motion was brought up for a national introduction of e-voting again (Casadevall, 2019). On the sub-national level, the technology is still used yet its expansion in geographic scope dampened (Profesional, 2019).

Compared to the Argentinian case, no such drastic changes had occurred to the contra e-voting discourse in Germany since the judgement of the Federal Constitutional Court in 2009. One of the most recent statements on e-voting made by the *Bundestag* provides a good overview of the status quo in Germany. In the statement, the government refers to Estonia as the only country in Europe which currently offers e-voting on a national scale and France which tried out e-voting for nationals living abroad in the past (Deutscher Bundestag, 2018). In this context, the German government takes distance to these examples and points at the vulnerability of the technology to hacker attacks. By the same token, the *Bundestag* clarifies in the statement that the transparency and verifiability of elections would still not be guaranteed through the use of e-voting which is why a deployment of e-voting in the near future would not be feasible in Germany (Deutscher, 2018). The referral back to the 2009 judgement in the statement shows the normative importance that the decision still enjoys in the country more than ten years after the judgement.

In light of the above, it became clear what has been outlined at the beginning of this research about the causal mechanism. The wider context within a country constantly evolves which implies that new actors can appear that exercise new activities and the domestic discourse of a country could potentially be reshaped, depending on its stability. Public sector transparency and e-government development play a crucial role in the context of the introduction, continuance or abolition of e-voting. Especially recent developments in the Argentinian case show how these factors incentivised new discussions about the topic. Germany, on the contrary, shows how stable a discourse can be, especially if it is reinforced by the aforementioned factors which originally triggered it.

7. Conclusion

The aim of this research was to shed light on the factors that influence countries to introduce e-voting while trying to make sense of why some decide to continue with the technology whereas others abolish it again. In light of the rapid dissemination of e-government processes in the 21st century and increased discussions on whether or not the electoral process should be part of this trend, the conclusions drawn from this work have several academic and policy implications.

With regard to academic implications, this work has illustrated the merits of mixed methods research as an effective remedy to grasp complex socio-political issues. The stage-wise design allowed for a detailed analysis to make sense of the intricate nature of e-voting. Research stages one and two unveiled that e-government development and public sector transparency have a significant impact on whether or not countries decide to introduce e-voting. If the analysis would have stopped after the quantitative analysis, the question would have remained of what leads to the continuance or abolition of e-voting in the long-run. Only by adding a qualitative component, a full picture emerged and it was found that the role of civil society actors was decisive in this context. By the same token, the research tackled the realist view which gives importance to structures and the role of state actors that decide about the electoral process within a country. Both countries under study were structurally comparable in that they are federalist states in which state actors introduced e-voting by virtue of passing respective laws. Thus, the structural setting was similar yet the developments of e-voting and the outcome in both countries are entirely different. Only through the application of a social constructivist lens which gives importance to discursive elements and the role of non-state actors, the research could explain why Argentina continued with the technology while Germany abolished again. The detailed scrutiny per sequence and the analysis of underlying dynamics through the SCOT theory unveiled that the formation of a discourse in favour and against e-voting respectively as well as the stability thereof was the explanatory factor which made the difference. With this, the findings complement research on e-voting by delivering a more nuanced picture on the nature of e-voting which is less black and white. The answer of this work to the supporting and opposing camps is that e-voting is neither a panacea nor a threat for democracy. Instead, the way that e-voting unfolds within a country is highly context dependent and requires the scrutiny of various factors. These factors reach from the wider context before the technology is even mentioned to the definition process of how a possible design could look like up to the post-introduction phase

in which especially non-state actors contribute significantly to the manifestation of technologies.

Apart from academic implications, the research findings point at two important aspects to consider for policy-makers and election officials. Firstly, the electorate is not merely subordinate to governments but an active agent in the shaping of the electoral process. Thus, if a country intends to modify its voting system, policy-makers have to consult civil society and grant them an active role in the decision-making process. Moreover, as the example of Germany has shown, particularly during the implementation phase when technologies are evaluated, it is indispensable to listen to the opinion of voters. If civil society is neglected in this streamline, governments face the danger of negative repercussions especially if voters see the integrity of the electoral system threatened. This refers to the second policy implication of this work. The research findings provide guidance for policy-makers in the definition of a sound framework when selecting and implementing a new electoral system such as e-voting. More concretely, the findings point at factors to consider in the phases prior, during and after a new voting system is introduced. In the phase before system changes are introduced, policy-makers are well served if they provide platforms for civil society actors, politicians and experts to share their ideas and define concrete proposals. These can be workshops, seminars but also virtual meetings on the topic for example. During the implementation phase, evaluation systems have to be installed at polling stations or surveys sent around immediately after elections were held for voters to share their experience with the new system. In the post-implementation phase, it is crucial for government officials to take this feedback seriously into account and be open for adjusting the system based on the voices within society.

In light of the academic and policy implications it is worth to address some limits of the findings. Firstly, the large-N analysis of research stage one was merely exploratory in nature by analysing which countries did and did not have e-voting in place in 2018. This snapshot of one year did not allow to capture those instances where countries had e-voting introduced earlier but abolished it again by 2018. The data analysis could be fine-tuned by adding more dummy variables which would allow to distinguish between these different scenarios. Secondly, the findings of the first research question relied on aggregate data collected inter alia by the United Nations or the World Bank, which is often filtered by government officials before being reported to these entities (Lau et al., 2008). Moreover, the CPI by Transparency International is often criticised as a highly subjective indicator that relies on interviews and does not pose an adequate instrument to apprehend public sector

transparency (Young, 2013; Budsaratragoon & Jitmaneeroj, 2019; Clark, 2017). Nevertheless, in absence of other evidence that captures such a large-N scale as required here, these databases posed the best alternative to gain an exploratory insight in the topic. Future research could consider to either scale down the number of countries consulted or best case to conduct a dataset on its own. This would then also allow to define e-voting in less broad terms and to discriminate between different e-voting types. It would be interesting to see whether a smaller number of countries and a more narrow definition of the term would lead to different insights which this research could not deliver. Finally, it is important to emphasise that process-tracing as the methodology used in research stage three never leads to full certainty because the amount of alternative or rival explanations is infinite. This means that it is only possible to increase or decrease confidence on the results derived from this research, yet no deterministic statements are possible. Moreover, SCOT as a social constructivist theory can be applied in various different ways. Especially the definition of which groups count as “relevant social groups” in the third component of the theory leaves room for interpretation. Even though the causal mechanism was very clearly pronounced in this research and the theory corresponded well with each sequence, there could be instances where the application of the SCOT theory needs more caution.

Looking ahead, this work gives impetus for future research to invest more in the study of technology from a social constructivist angle. As this work has shown, new technological developments like e-voting do not only carry technical challenges but they also translate in the economic, political and social realm. Global challenges such as the increasing economic divide between the southern and western hemisphere could in the future be reinforced by a digital divide. Moreover, principles of good governance such as accountability, transparency or inclusiveness are increasingly expressed in e-government terms. Thus, more interdisciplinary research is required to mitigate the gap between computer science and social science research. The findings of this work shall foster dialogue between the disciplines to better make sense of complex technological innovations in the 21st century. If the dichotomy between both bodies of research is studied further in-depth and information exchange stimulated, we might see the contestation of e-voting diminish in the future. The *raison d'être* of a voting system in the public sector remains the fair and transparent election of political figures. If researchers, technology experts and politicians manage to deliver a complete picture of the implications that e-voting has for a country, civil society might be less inclined to reject the technology. In the near future this could imply that e-voting is no longer understood as a panacea to alleviate structural deficiencies of a fraudulent election system nor

as a dangerous innovation that could undermine democracy. Instead, it could be acknowledged as one option to execute the electoral process that requires careful consideration of contextual factors to foster reliable results.

Appendix A

Methodological Remarks EGDI

The following methodological remarks on the e-government development index do not have an impact on this research project, yet they shall not be left unmentioned. While the methodology of the EGDI has not changed between 2002 and 2018, two changes in terms of terminology have been done by the United Nations over the years. Firstly, the EGDI was called “E-government Readiness Index” prior to 2010 (United Nations, 2014, p. 249). Nevertheless, the sub-indices and methodology remained the same. Secondly, the Online Services Index was called Web Measure Index until 2008. However, both indexes seek to measure the online presence of government services (United Nations, 2003, p. 12). Lastly, the following graphs show in more detail which components the three sub-indices are made up of.

Online Services Index

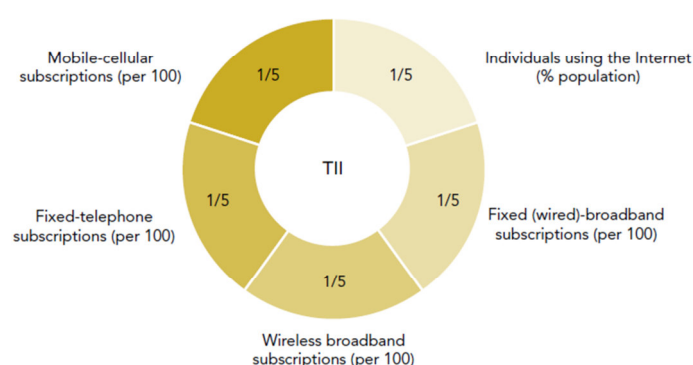
A.4. Online Service Index (OSI)

To arrive at a set of Online Service Index (OSI) values for 2016, a total of 111 researchers, including UN experts and online United Nations Volunteers (UNVs) from over 60 countries with coverage of 66 languages assessed each country’s national website in the native language, including the national portal, e-services portal and e-participation portal, as well as the websites of the related ministries of education, labour, social services, health, finance and environment as applicable. The UNVs included qualified graduate students and volunteers from universities in the field of public administration.

source: United Nations, 2016, p. 138

Telecommunications Infrastructure Index

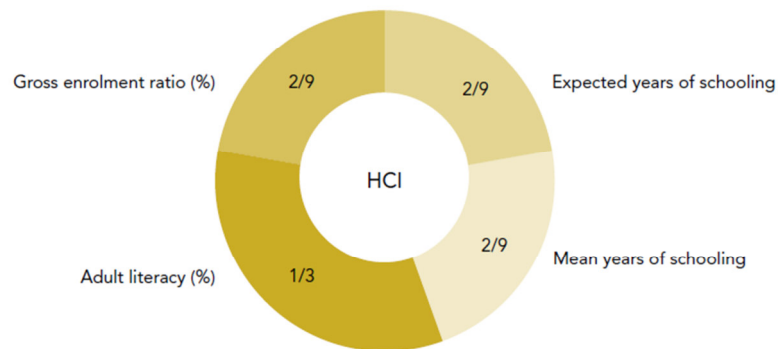
Figure A.2. Telecommunication Infrastructure Index (TII) and its components



source: United Nations, 2016, p. 135

Human Capital Index

Figure A.3. Human Capital Index (HCI) and its components



source: United Nations, 2016, p. 136

Appendix B

Dataset Longitudinal Analysis

Country	evote* 2018	EGDI**				Comparison Years EGDI****		
		2002	2008	2018		2002-2008	2008-2018	2002-2018
Yemen	0	0,188	0,2142	0,2154		0,0262	0,0012	0,0274
Sudan	0	0,206	0,2186	0,2394		0,0126	0,0208	0,0334
Madagascar	0	0,229	0,3065	0,2792		0,0775	-0,0273	0,0502
Pakistan	1	0,247	0,3160	0,3566		0,0690	0,0406	0,1096
India	3	0,373	0,3814	0,5669		0,0084	0,1855	0,1939
Argentina	2	0,577	0,5844	0,7335		0,0074	0,1491	0,1565
Germany	0	0,762	0,7136	0,8765		-0,0484	0,1629	0,1145
Iceland	0	0,702	0,7176	0,8316		0,0156	0,1140	0,1296
Singapore	0	0,746	0,7009	0,8812		-0,0451	0,1803	0,1352

Country	evote* 2018	CPI***				Comparison Years CPI****		
		2002	2008	2018		2002-2008	2008-2018	2002-2018
Yemen	0	26	23	14		-3	-9	-12
Sudan	0	23	16	16		-7	0	-7
Madagascar	0	26	34	25		8	-9	-1
Pakistan	1	21	25	33		4	8	12
India	3	27	34	41		7	7	14
Argentina	2	28	29	40		1	11	12
Germany	0	73	79	80		6	1	7
Iceland	0	94	89	76		-5	-13	-18
Singapore	0	93	92	85		-1	-7	-8

* 0 = no e-voting; 1 = e-voting on national level; 2 = e-voting on sub-national level; 3 = e-voting on both levels

** 0,0 - 0,3333 = low e-government development; 0,3337 - 0,6666 = middle; 0,6667 - 1,0 = high

*** 0 - 35 = high corruption; 35 - 69 = middle corruption; 70 - 100 = none to low corruption

**** no absolute numbers, these values indicate decrease or increase

source: author's compilation of original sources: IDEA, 2018; United Nations, 2018; Transparency International, 2018

Appendix C

Generic Causal Mechanism, Causal Mechanism Argentina, Causal Mechanism Germany

Generic Causal Mechanism

X – Z (EGDI – CPI) Wider context	Sequence 1 Interpretative Flexibility	Sequence 2 Discourse	Sequence 3 Stability & Closure	Y (e-voting continuance/abolition)
e-government set up; public sector transparency (historical context)	Actor: government/public officials, courts Activity: e-voting trial and introduction (legal base) Entity: civil society	Actor: civil society Activity: discussions about e-voting; pro or contra e-voting discourse formation Entity: government/public officials, courts	Actor: civil society Activity: concrete push for or against e-voting continuance or abolition; active discussions between actor and entity Entity: government/public officials, courts	de facto (geographic scope or election type) or legal (court judgement) continuance or abolition of e-voting
	Sequence evidence - domestic info events on the use of technology in politics Pattern evidence - increasing number of news publications on digitalisation, e-government development or e-voting	Sequence evidence - gradual increase/decrease of e-voting use within the same sub-national unit - domestic info events on the use of e-voting in politics - backlash of hacker attacks & corruption incidents Pattern evidence - surveys that reflect national opinion on e-voting and/or public sector transparency	Sequence evidence - pro or contra discourse formed is stable enough to not be influenced by foreign e-voting experiences - foreign countries adapt similar attitudes based on the domestic discourse formed - cross-national info events on the use of e-voting in politics Pattern evidence - stable, increasing or decreasing search trends on Google and Twitter of e-voting terms	

Causal Mechanism Argentina

X – Z (EGDI – CPI) Wider context	Sequence 1 Interpretative Flexibility 2004 – 12.07.2009	Sequence 2 Discourse 12.07.2009 – 16.11.2013	Sequence 3 Stability & Closure 16.11.2013 – 05.07.2015	Y (e-voting continuance/abolition)
2001: peak of financial crisis, corruption scandals in public sector from early 2000s: government embarks on 30 different ICT projects 2002: launch of platforms <i>gobierno electrónico</i> and <i>Cristal</i>	2004 - 2007: first e-vote trials during municipal elections (inter alia: Salta, Córdoba, Santa Fe, Río Negro, Mendoza, City of Buenos Aires) 2005: team of computer scientists, political scientists and geographers to design and supervise e-voting experiment in city of Buenos Aires 2007: irregularities during municipal election in Córdoba, experts committee advices to abolish paper voting 12.07.2009: first binding large-scale application of e-voting during provincial elections in parts of Salta province based on decree 1340/09	- 2009: positive feedback by citizens of Salta on first binding e-vote use, 7 out of 10 preferred the new system - 2009 – 2010: Salta is in the centre of interest for the country based on its e-vote experience; support for Salta by NGO <i>Cippec</i>; contribution to discussions by <i>Fundación Conciencia, Agencia Popular, Movimiento Independiente de Justicia y Dignidad</i> - 10 April 2011: second use of e-voting within Salta, complaints by citizens who could not use the technology (insufficient voting machines) - 2012-2013: cooperation of civil society groups and political parties (e.g: <i>Barrios de Pie</i> movement with <i>Movimiento Libres del Sur</i> party)	16.11.2013: first full application of e-voting in the whole province of Salta during provincial elections 2014: intensification of discussions in Salta between civil society actors and public officials on the application of e-voting during national elections 2015: politicians on the national level start paying attention to claims in Salta (e.g.: Horacio Larreta, María Vidal); National Director of Elections Alejandro Tulio claims to introduce e-voting nationally, referral to example of Salta and demands made by society	05.07.2015: province of the city of Buenos Aires votes head of government electronically, based on law 4894 (continuance per geographic scope) 25.10.2015: Salta uses e-vote for the first time during presidential elections (100% of electorate used e-voting), based on law 7730 in accordance with Title VIII of law 7697 (continuance per election type)
	Sequence evidence 2006: <i>Congreso Argentino de Informática, Jornadas Argentinas de Informática, Congreso Internacional de Innovación Tecnológica Informática</i> Pattern evidence 2004 – 2009: <i>La Nación</i>: publications containing words <i>digitalización</i> and <i>voto electrónico</i> almost doubled compared to four-year period before	Sequence evidence - gradual increase in scope of e-voting in Salta (2009: 5% of population could use e-vote, 2011: 33% of population could e-vote) - 2009-2012: talks on e-participation concepts during annual conference of <i>Software Libre Argentina</i> - 2013: start of event series “media party” for journalists Pattern evidence - 2009: 72% of Saltenians preferred e-voting to voting on paper	Sequence evidence - 2014: referral to negative e-vote discourse in Europe and explicitly Germany, which is labelled a “normative decision” - 2013: Argentina and Ecuador sign a joint “electronic voting covenant” Pattern evidence - Google Trends: between 2009 and 2020, <i>voto electrónico</i> was searched for the most in July 2015 in Argentina (mostly in Salta); Argentina was the country which searched most for the term amongst all Spanish-speaking countries	

Causal Mechanism Germany

X – Z (EGDI – CPI) Wider context	Sequence 1 Interpretative Flexibility 2001 – 18.09.2005	Sequence 2 Discourse 18.09.2005 – 28.10.2008	Sequence 3 Stability & Closure 28.10.2008 – 03.03.2009	Y (e-voting continuance/abolition)
1999: high-level corruption scandal <i>Schwarzgeldaffäre</i> of former chancellor Helmut Kohl revealed 2000 - 2001: dotcom bubble bursts, global tech crash, New Economy in crisis, Euro under critique 2001: initiation of project <i>Bund Online 2005</i>	2001: initiation of initiative <i>D21</i>, discussions on compliance with election principals 2002: initiation of <i>Bündnis elektronische Signatur</i>, e-town study conducted, set-up of <i>Forschungsgruppe Internetwahlen</i> 2003 - 2005: trials of remote e-voting via <i>Polyas System</i> (Micromata) and internet platforms, trial of digital voting pen 18.09.2005: first binding large-scale application of e-voting during 16th German Bundestag election across 5 <i>Bundesländer</i> based on article 35 of Federal Electoral Law	- late 2005: start of <i>Kampagne gegen Wahlcomputer</i> by German Chaos Computer Club - 15.10. & 06.11.2005: appeals against legality of e-voting by two citizens with the Election Examination Board of the German Bundestag - 2006: Chaos Computer Club joins forces with German FoeBud e.V. and Dutch citizen movement <i>Wij vertrouwen stemcomputers niet</i> (launch of online platforms, test of Nedap machines) - 28.11.2006: petition against voting machines by 45,126 German citizens - 14.12.2006: rejection of 2005 appeal by German Bundestag - 2007: Chaos Computer Club cooperates with Wau-Holland foundation; publication of report on vulnerability of Nedap machines	28.10.2008: hearing of 2005 appeals against the legality of e-voting in Germany at the German Federal Constitutional Court late 2008: Chaos Computer Club calls on its supporters to volunteer at local elections under the slogan <i>Hacker zu Wahlhelfern</i> to have a grip on the e-voting landscape in Germany	03.03.2009: German Federal Constitutional Court declares the use of Nedap e-voting machines in Germany unconstitutional, formulation of future requirements for the deployment of voting machines (abolition per judicial judgement)
	Sequence evidence - May 2001: <i>Internet – eine Chance für Demokratie</i> congress in Berlin - June 2002: <i>Digitale Demokratie</i> wagen info event in Berlin; <i>Politik – Wissenschaft – Öffentlichkeit</i> conference Pattern evidence newspaper <i>Süddeutsche Zeitung</i> refers to the term <i>elektronische Wahlen</i> in its publications 11 times between 2001 and 2003 and 47 times between 2004 and 2005	Sequence evidence - 2006: objection by citizen against election of mayor in Cottbus after e-voting use; objection by citizen against general use of e-voting in Hessen (return to paper vote after e-voting trial in Alsbach-Hähnlein) - December 2006: <i>IT Gipfel</i> hosted by German Bundestag vs. Chaos Computer Club congress Pattern evidence - 2008: special Eurobarometer states that Germany is the most concerned EU country about corruption in EU institutions	Sequence evidence - Estland & Switzerland positive experiences with e-voting did not impact German contra discourse - 2008: the Netherlands decertifies the use of paperless systems for voting, referral to report on Nedap machines by German and Dutch initiatives Pattern evidence Google Trends: the term <i>Wahlmaschine</i> was searched for the most in September 2005, search interest continued until September 2009	

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