frontiers | Frontiers in Political Science

TYPE Original Research
PUBLISHED 17 May 2023
DOI 10.3389/fpos.2023.982558

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OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Elections and Representation, a section of the journal Frontiers in Political Science

RECEIVED 30 June 2022
ACCEPTED 31 March 2023
PUBLISHED 17 May 2023

CITATION
Borucki I and Hartleb F (2023) Debating E-voting throughout Europe: constitutional structures, parties' concepts and Europeans' perceptions. *Front. Polit. Sci.* 5:982558. doi: 10.3389/fpos.2023.982558

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Debating E-voting throughout Europe: constitutional structures, parties' concepts and Europeans' perceptions

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Techno-optimists with a more cosmopolitan focus agree that E-voting lies at the heart of implementing e-government and digitalization into democratic structures. The example of the "e-state" Estonia proves the relevance: E-voting has been in (legal) practice since 2005, and research can take much empirical evidence from this laboratory for digital innovation. The fact that Estonia is an exception to the rule within the European Union (EU) member states explains the comparative approach to the (possible) legal framework for eparticipation. With focusing on liberal democracies' constitutional predefinitions, voting procedures in the virtual age have not been compared yet. However, we have yet to learn much about the extent to which E-voting exists in European constitutions, even after one generation of intense debate about its possible implementation. Perceptions of E-voting matter because of the omnipresent digital transformation and discussions about how democracies (could) digitalize. E-voting represents a bottom-up part of top-down e-government and, through this, digital transformation. This research explores whether party policies, legal frameworks, and citizens' perceptions resemble E-voting on the national and European levels. To explore this question, several mixed-methods approaches are used. The question of "legalistic opportunity structures" is approached by relying on legal frameworks of European member states, parties' policies derived from their manifestos, and survey data from three Eurobarometer waves. Using a dictionary approach, the research design analyses the constitutions, electoral laws and manifestos of parties running for the European elections, combined with a classic analysis of surveys. Therefore, these sources are analyzed using several mixed methods approaches. The results have broader implications that we need to study in more detail what the digital transformation and the constitutionalization of electronic decision-making entail to develop a digital democracy and link it to a public sphere throughout Europe. Ultimately, it is analyzed whether the EU will push its member states to E-voting and implement E-voting for European elections. This would question the normative basing of democracy and how responsivity is brought into place.

KEYWORDS

E-voting, Eurobarometer data, party manifesto data, democratic innovation, Europe, European Union, EU

Introduction: a continual research question since one generation

Voting does matter. Voting can be considered a human right. Campaigns say: "Go vote!". The same applies to electoral integrity, at least in stable liberal democracies (Norris, 2014). To facilitate the procedures is, therefore, a democratic task. Over the years, with varying degrees of success, inventors have repeatedly tried to adapt the latest technology to the cause

of improved voting. For example, on 1st June 1869, Thomas A. Edison received US Patent 90,646 for an "Electric Vote-Recorder" intended for use in Congress. It was never adopted because it was allegedly "too fast" for the members of Congress (Gerck et al., 2002).

Interest in voting technologies has entered the political science literature, first introduced by Shocket et al. (1992). The COVID-19-pandemic, which has delayed and disrupted democratic elections globally, has provided a relevant debate about new and alternative modes of voting (Krimmer et al., 2021). Research can reveal whether citizens would like to use E-voting, what they feel are the advantages and disadvantages and, most importantly, if they can trust the system. In the political and academic debate, there is no doubt that E-voting would facilitate the voting act by reducing the time, costs (Krimmer et al., 2020) and effort to participate, which is regarded as crucial fundament in liberal democracies (Powell et al., 2012).

To maintain a central position in social processes and adapt to the rapidly changing communication structures in the information society, governments have to offer new ways and possibilities of participation and services through networks. These discussions and plans reflect the tendency toward establishing a modern formation of public and private life, where people substitute physical participation (to events) with communication (Mitrou et al., 2002). E-Voting is an excellent way to facilitate access to the polls for voters living abroad (Germann, 2021). The advantages of such a system for expat voters are that it is simple and fast. In most countries, voters who live abroad have to vote at an Embassy or Consulate in their country of residence (some voters have to travel a long way), or they can make a postal vote, with the risk of the postal vote being delayed.

However, another side of the same coin is that "Mouse-click voting" cannot replace participation. E-voting is not on the same level as e-banking. Key social actors, such as non-governmental organizations (NGOs) and experts, often have strong opinions or concerns about E-voting (Institute for Democracy Electoral Assistance, 2011, p. 19). Nevertheless, it is to be expected that the simplification of the electoral process for general elections *via* E-voting will promote political participation and be a remedy against turnout decline, which can be observed in many liberal democracies, including the European parliamentary elections (Norris, 2005; Trechsel, 2007).

The cleavage "big cities" vs. "rural areas" (Kriesi et al., 2006) has a certain significance not just by analyzing the success of radical right-wing populist parties (Heinisch et al., 2018; Lewandowsky and Wagner, 2022) but also in terms of e-voting. Currently, only 60 percent of EU rural households have high-speed internet access, compared to the EU's total average of 86%. Only 48% of rural residents have at least basic digital skills, compared to 62% of the urban population. Reliable connections are a necessary element in revitalizing remote villages by enriching the pool of available resources, as well as attracting new businesses, families and visitors (European Commission, 2021). According to e-voting, the local level shouldn't be underestimated in implementing e-voting: Findings show that the local election administration plays a substantial role in delivering Internet voting, despite the centralized election hierarchy (Krivonosova, 2022).

Based on these three dimensions, the leading research question is: Why is E-voting so special for the parties and the European institutions? Moreover: Is E-voting even part of the digital agenda whether the European Union (EU) wants to align with its member states (and its national election bodies) and work on existing election paradigms? Is it also about change management to improve the "quality" of elections within the constitutional context? We still know little about the connection and interrelation between E-voting and citizens' participation decisions (Petitpas et al., 2021). Here, political parties have a central role in any democracy as they serve as intermediaries between citizens and public institutions. Internet voting has established itself as an instrument of significant impact to renew the inner life of parties such as the Spanish Podemos and the Italian Five Star Movement (Nostitz and Sandri, 2021).

The research design analyses the constitutions, party manifestos running for the European elections with a dictionary approach, and Eurobarometer surveys. To approach the question of "legalistic opportunity structures" it is relied on constitutions of European member states and parties' policies. Therefore, national constitutions and party manifestos are part of this study, which is combined with mixed-methods approaches and survey data from the Eurobarometers. The results have the broader implication that we need to study in more detail what the digital transformation and the constitutionalization of electronic decision-making entail to develop a digital democracy and link it to a public sphere throughout Europe.

E-voting as enabling democratic innovation?

In a broader sense, E-voting can be an element of an e-government narrative (Draheim et al., 2020) following the open society narrative from Popper (1945) and has a lightful and constructive impact. The main difference between E-voting and standard voting is that it can be done in the privacy and security of one's home rather than in the polling station in the community (Licht et al., 2021). The socio-psychological implications of this have been paid little attention to until now (Oostveen and van den Besselaar, 2004). Remote Internet voting (i-voting, for instance, voting *via* electronic means over the internet) should not be confused with other types of electronic voting, such as standalone electronic voting machines, voting kiosks, or simply using the Internet for transmitting and tabulating results (Ehin et al., 2022). Thus, it is important to emphasize: "E-Voting is not like E-Commerce". Electronic voting is unlike electronic commerce in several important ways, so it is insufficient to argue that it is merely a corollary to secure electronic commerce and that the exact security mechanisms should apply (Willemson, 2018). E-voting itself is a general term including all ways of voting, remote electronic voting (i-voting) but also voting machines (Vinkel and Krimmer, 2017, p. 179 f.; for the framework of i-voting Valimised.ee, 2023). Some researchers use indistinguishably the terms "remote electronic voting," "internet voting," and "online voting" (also in their shorter version as "i-voting") to refer to e-casting technologies used from remote environments, both controlled and uncontrolled (Rodríguez-Pérez, 2022). One of the

main concerns about i-voting is the fact that voters may be forced to vote in a certain way under duress if they vote from uncontrolled environments (Manin, 2015).

E-Voting can be regarded as an additional voting channel next to analog ones. Thus, this research uses the notion of E-voting as casting the electoral vote to national or European elections by citizens *via* electronic channels, platforms and tools. E-voting also brings a new aspect to the multi-governance debate. It is argued that introducing an E-voting system is inherently connected with many technical, procedural, and legislative challenges in every nation-state (Maurer and Barrat, 2015; Rodríguez-Pérez, 2022). Also there are some trials to create standards on e-voting such as the Recommendation Rec (2004)11 of the Council of Europe, the only international instrument on e-voting regulation, and to other countries' case-law (Maurer and Barrat, 2015; Council of Europe, 2022).

Furthermore, we want to challenge the paradox that theoretical and practical demand stands in contradiction to the saying "give it a try". Is it about innovation, legislation or just about "technocracy"—the latest in the light of discovery in research (Esmark, 2020)? In this sense, we talk about several clusters of E-voting: socialization, success and creating a user experience, the enabling industry and business behind it, infrastructure, demographics such as gender and education, legal requirements, and possible obstacles such as the spread of conspiracy theories.

Internet voting has become a challenging field of action for political scientists, computer companies and legal advisers. Technological trajectories concerning most of the essential technical components are steadily emerging. In various projects worldwide, the technical details for "Internet voting," "online elections," "cyber vote," and "E-voting" are being worked out (Buchstein, 2004). Also, the E-voting debate has a global scope: in developing countries such as Nigeria, E-voting has been considered a necessity and one solution for credible elections beneath information and transparency (Ishaq et al., 2013). Furthermore, the Corona pandemic could have been a driver, as some elections in the EU were delayed or risky (Err.news, 2020).

In this context, Castells has analyzed the development of information and communication technologies (ICT): "The diffusion of Internet, mobile communication, digital media, and a variety of tools of social software have prompted the development of horizontal networks of interactive communication that connect local and global in chosen time" (Castells, 2007, p. 246). Most E-voting-skeptic initiatives seem to rely on the implicit assumption that the conventional paper-based voting systems are inherently more secure (Willemson, 2018). Pessimists point out technical problems and dangers:

- the collision of constitutional principles of secrecy, generality, and uniformity,
- negative or absent experiences in other countries; weakness of technical preparations;
- the problem of hackers.

In the Netherlands, the country reverted in 2007 back to paper ballots, after anti e-voting activists showed that it is not secure, using experimental hacking. The German Chaos Computer Club has partnered with the Dutch foundation Wij vertrouwen stemcomputers niet (We do not trust voting computers) to stop the further spread of electronic voting (Deutsche Welle, 2009). Therefore, it can hardly be doubted that this is the 'train into the future, technology-driven as our time is. The question remains, however, about how governments can maximize the benefits of technology while minimizing the risks. A problem, which can be solved by good technical design, is accessibility: technical support should be designed to enable disabled persons to cast their votes without needing help from others (Gibson, 2002).

However, in the recent elections, fair election processes cannot be taken for granted, even in EU member states such as Hungary (Banuta et al., 2020). Since the Cambridge Analytica (scandal) case and the claims of former US President Donald Trump that elections were manipulated, the topic got a toxic dimension, a backlash for the believers that "institutional engineering" has a point in "old democracies" (Laterza, 2021). At that point, the substantial implications for liberal democracies have to be considered in three ways: first, the legal and constitutional framework; second, the parties' perceptions of E-voting; and third, the citizen's attitude.

Establishing a legal framework might be challenging, as the Canadian case has shown (Schwartz and Grice, 2013). After all, the legal dimension regulates how the electoral code could be changed to allow votes cast by electronic means and provide necessary accountability to the voter. The Council of Europe started in 2004, permanently continuing to set intergovernmental standards in E-voting. In Estonia, when E-voting started in 2005, the Estonian National Court also referred to its decision to Recommendation Rec (2004) 11 of the Council of Europe of 30th September 2004 to member states on legal, operational and technical standards of E-voting. It explained that the right to change the e-vote also follows the recommendation.

The European Commission has defined minimum technical specifications and procedures for assurance levels for electronic identification. The European Union's eIDAS (Electronic Identification, Authentication and Trust Services) regulation, adopted in 2014, lays down the conditions under which member states recognize each other's national electronic identification schemes (The European Parliament the Council of the European Union, 2014). In 2017, a new recommendation was released (Council of Europe, 2017). At EU-level potentials and challenges of Internet voting (European Parliament, 2016; Constitutional Affairs, via. A. Trechsel) is considered to have a "second spring" (p. 6) after it was regarded as a "hot topic" already in 2003 (Oostveen and van den Besselaar, 2004). When evaluating the current state of its implementation, the European Commission itself admits a lack of implementation in most of its member states. This finding irritatingly is countered by the flourishing research on E-voting in the last 20 years without elaborating deeper into its actual implementation. This renaissance means the topic is relevant for the EU and its member states. The EU is anything but united on its approach to technology (European Commission, 2018).

E-voting effects can be observed in terms of cohort effects, gender and type of voters (Petitpas et al., 2021). Other arguments have been also raised, such as the habit creation effect (Solvak and Vassil, 2018). The existing research is unclear at that point: Some argue that E-voting may reduce inequalities by increasing turnout

(Serdült et al., 2015), and some are more skeptical, emphasizing the aspect that the e-voters are the "experienced", well-educated and wealthier citizens. In this case, an often discussed "digital divide" in our societies would come into practice (already Norris, 2001), and a vulnerability would also have a social dimension regarding inclusion. The UN Convention on the Rights of Persons with Disabilities sets the prevailing norm for ensuring that persons with disabilities have equal access to the same services as the rest of the population. Article 29 of the convention explicitly requires state parties to ensure that persons with disabilities can participate in political and public life on an equal basis; this includes the right and opportunity to vote. Moreover, some critics focus on the claim that "there is one E-voting" system, whereas the system remains a vague term (McGaley and Gibson, 2006).

Methods and operationalization

The question of user demographics is central to political parties' reasoning within their programs about the electoral effects of E-voting. To assess the research question of the constitutional mirroring of E-voting, a 3-fold multi-methodological approach was conducted: first, present legal frameworks (constitutions and electoral laws) were analyzed with text analysis tools and manual controls. Second, manifesto corpus data served to analyze party positions delineated in their programmatic texts.[1] Within the manifesto's statements it was searched for whether parties' proliferating e-voting in general elections, but not within parties as a reform to intra-party elections. Still, e-voting is an issue that parties might emphasize in their electoral campaigns to appear progressive in embracing digital transformation. Third, the opinions and beliefs of Europeans toward E-voting were exploited with survey data from three Eurobarometer waves. After searching the World Value Studies, European Social Surveys and European Value Studies, the Eurobarameters were the only surveys on the European level to cover our dependent variable (favor of e-voting or not) and this is why these surveys were chosen. Unfortunately, these surveys do only inconsistently measure opinions toward e-voting of which the herein analyzed three are the most recent ones.

Legal frameworks

Providing a secure identification and authentication scheme for eligible voters is a condition sine qua non for using E-voting systems in public elections. As the Council of Europe stated in 2017, in most countries, existing national electoral law does not contain a provision for E-voting. To conduct possible introductions of E-voting, new legislation must be drafted. This new legislation could take three different forms:

- A temporary law permitting E-voting pilots or trials;
- A change in the existing national electoral law or the implementation of existing legislation;
- A temporary law for E-voting and changes in the existing electoral law.

In most cases, legislation permitting E-voting experimentation has a specific time limit and is geared toward one or more specific elections. For example, tryouts may only be conducted during local elections, as in Switzerland. The advantage of using a temporary law is that the existing electoral legislation does not have to be modified, which would probably take more time, thus slowing down the process (see Council of Europe, 2017, 2022).

To assess whether E-voting is apparent in the legal frameworks of the EU member states, the constitutions of all EU member states were derived and analyzed with a coding sheet. This coding sheet provides information about the release of the constitution, its latest amendments and the presence of E-voting as a voting procedure (see coding sheet on GitHub for details). Based on English translations of the constitutions, the legal texts were combed for references using a keyword search. The list included the words: device, digital, elect (which covers the words election and electronic), Internet, machine, online, vote and voting. As there were no results in the constitutions, it was also chosen to analyze electoral laws. They were examined similarly to the coding of constitutions as English translations of the legislative texts were studied using the following keywords: device, digital, electronic, Internet, machine and online.

Party documents

Do voters respond to party manifestos or a broader information environment? The central assumption is here that the E-voting debate touches both dimensions—party manifestos and voters' preferences—because political parties still matter in the modern information society (Adams et al., 2014). In the case of the party programs from the manifesto dataset (Merz et al., 2016), it was primarily a matter of conducting a rough quantitative search, which was then refined. For this purpose, first keyword-in-context searches within the database and the manifestoR package were conducted.[2] For electronic and Internet voting, documents and official websites in the respective language were searched to determine the correct terms. When searching for those keywords, problems occurred with the necessary translation of the national languages to better search within the database. First, the search words were translated into the national language to compensate for the missing language proficiency in all European languages. If that did not lead to any results, machine translation from DeepL or Google Translate was used. Second, the searching in the Manifesto Project Dataset was first conducted via the dashboard and second using manifestoR to compare the results of both sources. The intention was to identify sentences containing electronic voting with machine translation help. All sentences were copied into a spreadsheet for manual analyses.

1 Using party manifestos is a widespread tool in policy research (Franzmann and Kaiser, 2006).

2 The keywords searched for were vote, voting, election, E-voting, electronic voting, internet voting, and I-Voting and are available on the spreadsheets via *GitHub*.

Surveys

With the data from the Eurobarometer surveys, the intention was to analyze whether there are correlations between sociodemographic characteristics (age, gender, education) and the support for online voting procedures (recoded as binary dummy variables to enable comparison between years). As mentioned above, only in three surveys, questions on E-voting as our dependent variable were posed to respondents: The "*2001 Flash and Specials Eurobarometer on Impacts of New Technologies, Employment and Social Affairs, and Disabilities*", the "*2016 Flash Eurobarometer 431 (Electoral Rights, wave 3)*" (European Commission, 2016), and the "*Eurobarometer 90.1: Democracy and elections from 2018*". Bivariate correlations and cross tables were conducted for each survey: 2002, 2016, and 2018.[3] Since those correlations and ANOVAs testing were promising, multivariate analyses were conducted.[4]

The following variables were used into the analysis: Preferences for E-voting and living abroad. From this point, favoring E-voting is recoded into dummy variables as these differ from 2002 to 2016 and 2018. For instance, in 2002, there was no variable for expats. In 2018 not E-voting as such was measured, but people's tendencies to vote for expats (see below). Thus, there was another variable that might be somehow biased in the sense that it asked: "Imagine now that you were able to vote electronically, online or by post. How concerned or not would you be about each of the following?" With this question about concerns about E-voting, a neutral measurement is impossible. This difference in the variables is depicted in the regression tables. For independent variables, set sex, age and the country where the survey was held served as independent variables; and switching between preferences for E-voting (where available) and living abroad was implemented accordingly. Here, following the literature mentioned above, it was assumed that being an expat may affect how respondents perceive voting via the Internet or not.[5]

Primarily, E-voting is operationalized as being better to simplify the voting procedure in national elections. It is connected to fears of manipulation or fraud or to living abroad. Besides our most interesting variables on E-voting, we also want to look into sociodemographics: sex, age, education, and internet usage as a possible proxy for the prevalence of E-voting. In 2002, only the availability of a landline was asked later, in 2016, also mobile phones, and in 2018 internet, and Internet access overall with more sophisticated questions.

This change in questions and variables makes a comparison between the three time points in this respect nearly impossible. A combined dummy from the variables measuring having a landline, mobile and internet access helps to counter this. The latter is only valid for 2018. Thus, the data from the three waves of the Eurobarometer are not comparable because they entail different variables to measure the dependent variable. Other variables (like internet use in 2018) are not part of all data sets. Regression analysis gives a deeper look into how the models fit the baseline argument (1) that people are more inclined toward technology measures and (2) that expats would instead opt for E-voting than residents.

Results

The tricky question of understanding E-voting from constitutional structures, party manifestos, and surveys

The first and most exciting result is that neither the constitutions and electoral laws nor the party documents broadly contain the topic of E-voting. That said, we saw a different pattern present in survey data accordingly. There, respondents cheered the possibility of voting via the Internet or smartphones.

When looking for passages on E-voting in *constitutions*, we mainly found that our subject is not codified *per se*. However, the codification of E-voting appears in simple legal frameworks such as electoral laws. There, more regulations and descriptions of the procedures for E-voting are codified. Especially for France, Bulgaria, and Germany, passages codifying voting per voting machines are present, whereas voting through the Internet and smartphones is only implemented in Estonia. Thus, for the legal frameworks it can be concluded that E-voting as a complementary way to vote is partly implemented throughout European legal texts.

In the *manifestos*, E-voting is mentioned 108 times by using the exact keywords as above for all documents. The manifestos entail passages on E-voting from parties' electoral programs from 16 member states, the UK, and Switzerland and Norway. Figure 1 depicts the cumulated counts per country from 2000 to 2019. The dots in the figure represent the clustered tokens (found entities in the programs: mention of the keywords in one program of one party) to a respective time point. The bigger the size of the dots, the more mentions occurred in the respective year. Bigger clusters, for instance, appear mainly for the Czech Republic in 2010 or Hungary in 2018 and is depicted to allow best visibility. Overall, a general trend toward increased mentions in the electoral programs occurs in the last 10 years. Most mentions start in the 2010s, centering in Spain, Hungary, Lithuania, the Netherlands and the Czech Republic from 2015 to 2020.

The contextual range of said programmatic mentions entails data protection and vote manipulation to arguments of comfort (voting from home) and better reach for people willing to vote together with arguments of better accessibility. For instance, the Spanish PSOE, in her 2011 program, sees E-voting as a "complementary system to postal voting and consular voting" and refers to Switzerland as a successful example of its implementation. Two Czech parties (ODS, KDU-CSL) included passages on E-voting in their 2010 manifestos stating that they want to support voters inclined toward electronic voting solutions. A more skeptical perspective is stated by the Irish Progressive Democrats in 2007 when they pronounced the reliability and transparency of votes. E-voting security was also an issue for the Spanish party "Unión Progreso y Democracia" in 2011.

The Dutch VVD explicitly indicates the necessity for expats to be eligible and allowed to vote in the Netherlands by using

3 With the haven, tidyverse, ggplot2 (Wickham et al., 2019), psych (Revelle, 2022) and blorr (Hebbali, 2020) packages in RStudio (RStudio Team, 2019).

4 Using lme4 (Bates et al., 2015), model summary (Arel-Bundock, 2022) and performance (Lüdecke et al., 2021) packages in RStudio.

5 We provide a detailed Rmarkdown script for conducting the analyses upon request. Their own collected data and coding is available via *GitHub*.

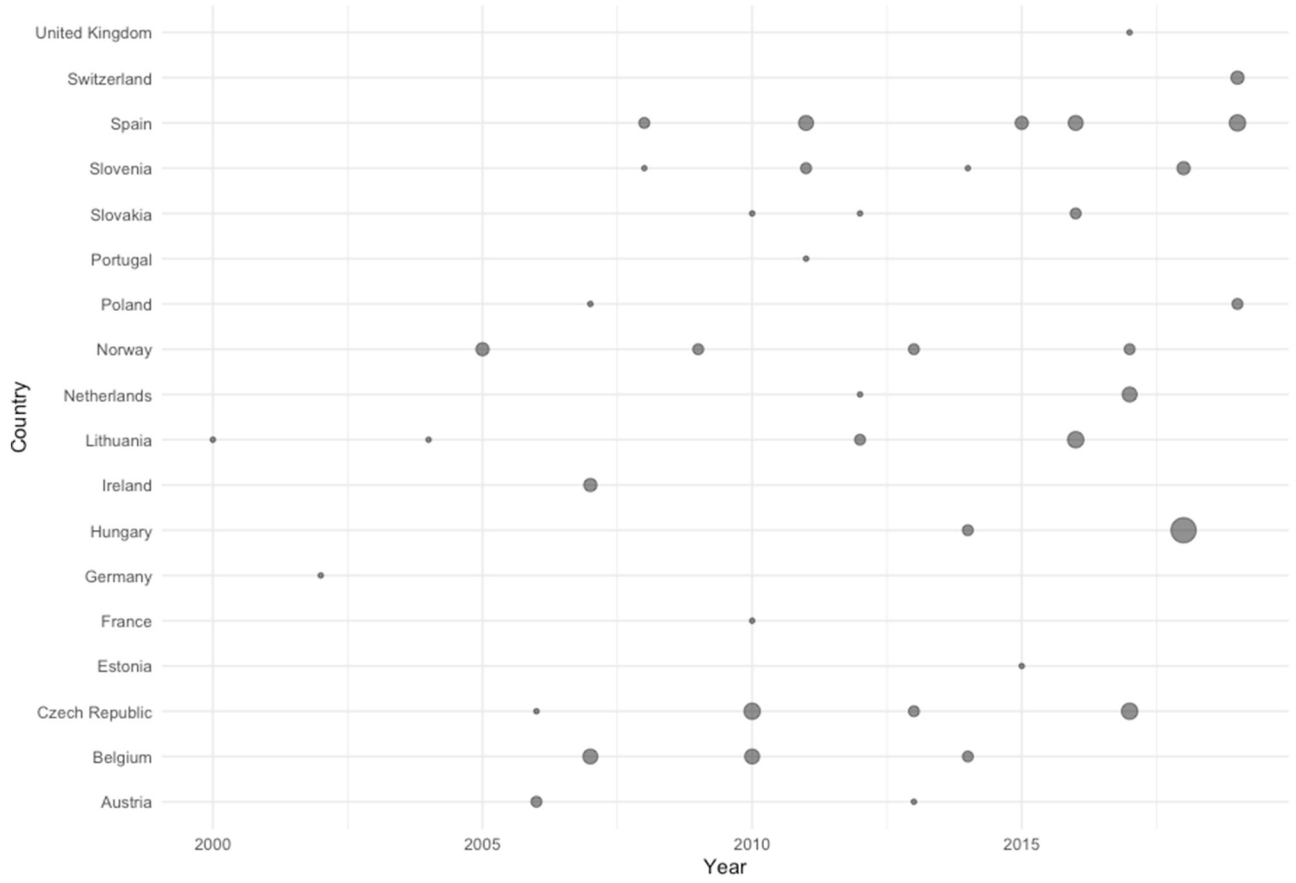

FIGURE 1
Clustered distribution of mentions of E-voting in party manifestos over years; own calculation, data from Manifesto project (Merz et al., 2016).

electronic voting procedures in their 2017 manifesto, as does the Lithuanian LSDP in 2016 and the Belgian CD&V in 2010 and 2014. The Hungarian Párbeszéd favors the introduction of E-voting in their 2018 manifesto, stating to adopt the Estonian model. The most outstanding finding from the manifestos, thus, is notwithstanding before the background of a small-N that parties mostly favor introducing E-voting for citizens living abroad.

Contrary, when asked in *surveys*, Europeans wish to have E-voting as a comprehensive form of classical voting to analog forms. Looking into more detail of the analyzed three surveys from Eurobarometer, the following correlations become apparent: If opinions toward E-voting are set as the dependent variable, age, sex, and the variable measuring expats lead to higher correlations on the outside. These correlations mean that people who are younger, male and frequently travel or live abroad are more in favor of voting online or using E-voting systems than people who stay at their place, are older, and are female. These findings align with the known digital divide literature, arguing that mainly digital instruments designed to improve democratic procedures fail in this attempt and proliferate the normalization of said inequalities.

Looking at the results in more detail, trends within these data appear together with the mentioned correlations between individual resources and opinions toward E-voting in Europeans. The connection between sex, age, and the tendency to favor E-voting procedures when living abroad allows deeper insight with regressions. Here, evident differences are visible between the old and new or younger European member states regarding positive or negative chances to favor E-voting as a procedure. Moreover, being an expat channels the tendency toward favoring E-voting or not.

Thus, two scenarios were tested with logistic regressions where needed variables were available (see Figures 2A–C): First, we set preferences for E-voting were set as the dependent variable, putting in being an expat as the independent variable, together with the country of residency, the available technology (landline, mobile phone, and Internet), and sociodemographics (sex, age, and education). Second, we set preferences for E-voting connected to being an expat were set as a dependent variable since, especially in the 2018 dataset, this was the only variable measuring E-voting. In 2016 the E-voting variable was operationalized as an enabling and simplifying factor for people living abroad, for instance, not in their country of origin, thus already containing information about expats within E-voting, making differing both difficult. Thus, living abroad is assumed to be a proxy for E-voting. Other variables connected to E-voting, such as fear of manipulation or fraud through E-voting systems, are part of the batteries with which E-voting was measured in 2018. However, they are isolated there, which makes them useless for comparison.

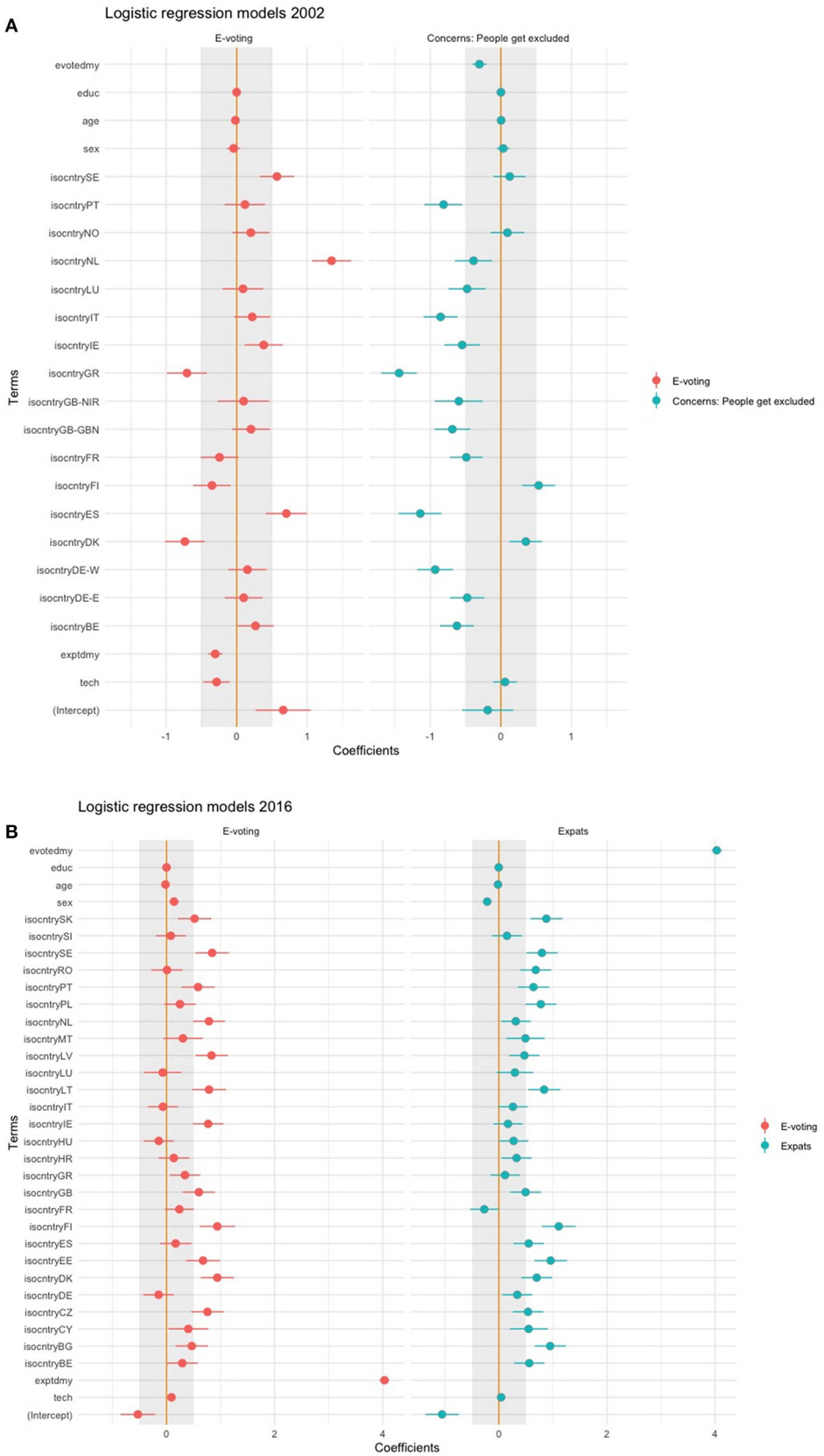

FIGURE 2 (Continued)

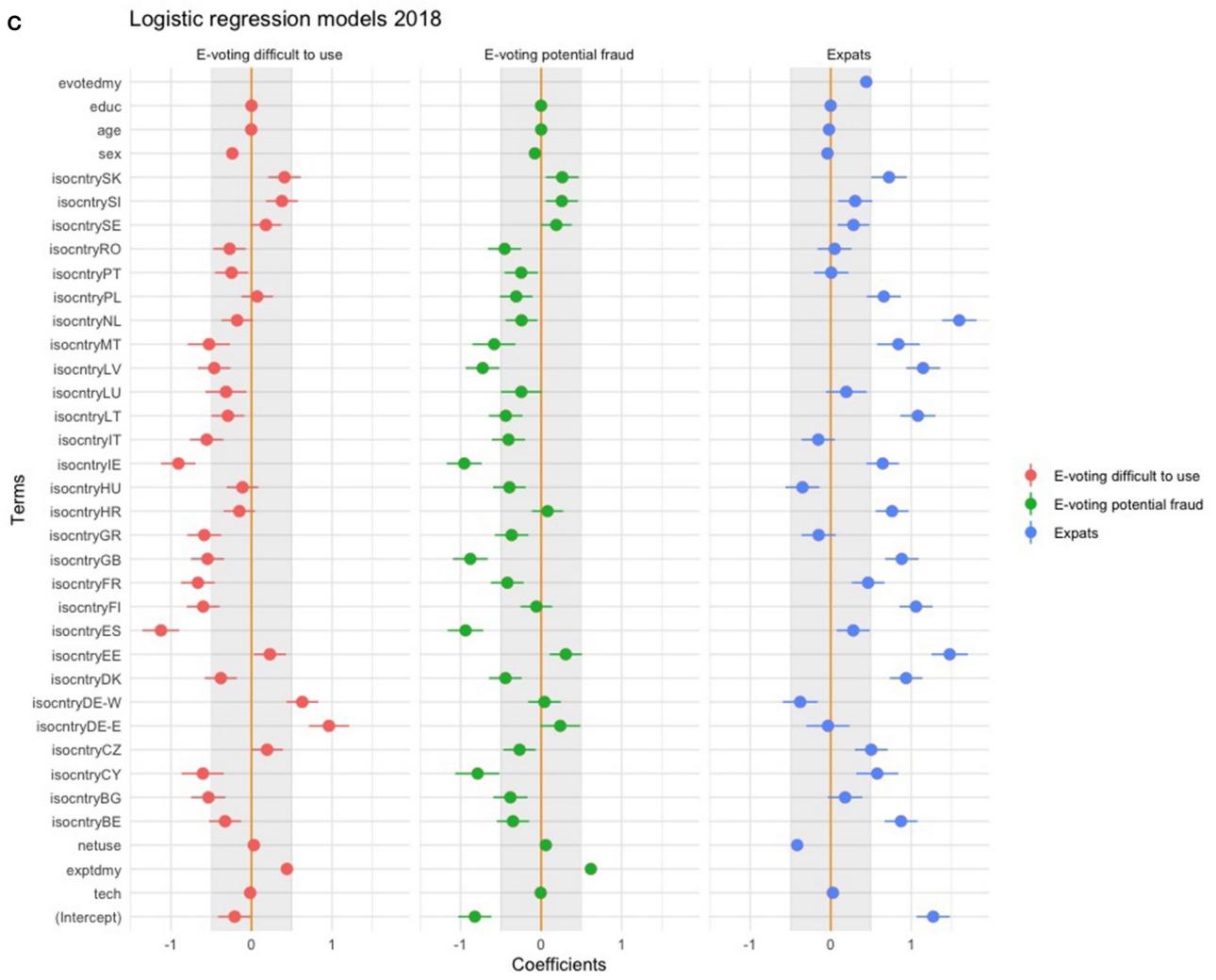

FIGURE 2 (Continued)
Clustered coefficient distribution of mentions of E-voting in party manifestos over years [**(A)** = 2002; **(B)** = 2016; **(C)** = 2018]; own calculation, data from Manifesto project (European Commission, 2016; Merz et al., 2016; European Commission and European Parliament, 2018).

In the following, the results from said scenarios are reported and explained which of these might best explain how people estimate E-voting and their living EU member states. As Table 1 shows, there are differences in concerns of whether E-voting is the dependent variable or being an expat. The first produces more positive chances than the second. Moreover, being an Expat increases the chances in 2016 of favoring E-voting, but only in 2016. Sociodemographic factors have only adverse effects on opinions toward E-voting, with only age being significant with no or weak correlations.

When looking at the countries, especially for 2002 and 2016, favorable chances appear with weak to moderate effects for Sweden, Slovakia, Portugal, the Netherlands, Latvia, Lithuania, Italy, Finland, Estonia, Denmark, Czech Republic, Bulgaria, and Belgium. Interestingly, this finding is only valid for 2016, differing from 2002 to 2018. That said, Internet voting might have been a massive issue in the European public sphere in that year, and not much so in 2002 and 2018. Differently in 2018 is that E-voting is either conceptualized as difficult to use or potential fraud and not neutrally coined as sheer transfer of voting via the internet. Also, the difference between the Member states is thriving since those who are pioneers of digital infrastructure and transformation are behind. Moreover, when setting Expats as the dependent variable, we see that there are more and higher chances of favoring E-voting procedures for Expats. Moreover, the emphasis on expats favoring E-voting reveals that here are clear higher chances in the Netherlands, Estonia, Latvia, and Lithuania, followed by Finland, Slovakia, and Denmark. Therefore, one can think of either spill-over effects from Estonia into its neighborhood, and diffusion processes due to many Dutch living abroad.

Interestingly, socio-demographics and technological availability make no difference in the preference or rejection of E-voting, with a slight tendency of older voters to refrain from E-voting procedures which correspond to figures on technology

TABLE 1 Logistic regression models.

	E-voting			Technology concerns	Expats	
	2002	2016	2018	2002	2016	2018
Expat (dummy)/E-voting (dummy)	0.738***	56.444***	1.552***	0.737***	56.370***	1.554***
	0.037	2.604	0.05	0.037	2.599	0.051
Available technology	0.752***	1.094***	0.984	1.061	1.043	1.027
		0.071	0.033	0.092	0.03	0.018
Internet use			1.029***			0.659***
			0.01			0.008
Belgium	1.308**	1.336**	0.720***	0.536***	1.755***	2.393***
	0.173	0.197	0.073	0.066	0.251	0.25
East Germany	1.105		2.615***	0.620***		0.966
	0.151		0.332	0.077		0.133
West Germany	1.166		1.877***	0.394***		0.684***
	0.161		0.19	0.051		0.076
Germany		0.863			1.406**	
		0.124			0.199	
Bulgaria		1.593***	0.586***		2.582***	1.195
		0.244	0.064		0.38	0.13
Cyprus		1.494**	0.547***		1.734***	1.781***
		0.282	0.073		0.309	0.237
Czech Republic		2.130***	1.214*		1.715***	1.654***
		0.326	0.121		0.247	0.173
Danmark	0.480***	2.555***	0.683***	1.425***	2.014***	2.549***
	0.069	0.402	0.07	0.167	0.295	0.263
Estonia		1.963***	1.256**		2.607***	4.379***
		0.316	0.128		0.402	0.505
Spain	2.025***	1.182	0.325***	0.319***	1.737***	1.322***
	0.302	0.175	0.038	0.049	0.25	0.139
Finland	0.705**	2.555***	0.548***	1.710***	3.028***	2.882***
	0.096	0.428	0.057	0.204	0.479	0.302
France	0.784*	1.267*	0.514***	0.613***	0.763**	1.591***
	0.107	0.173	0.055	0.073	0.103	0.165
UK	1.226	1.817***	0.579***	0.502***	1.639***	2.416***
	0.169	0.275	0.061	0.065	0.237	0.256
North Ireland	1.104			0.551***		
	0.204			0.095		
Greece	0.494***	1.405**	0.556***	0.236***	1.121	0.861
	0.071	0.202	0.06	0.03	0.155	0.093
Croatia		1.143	0.86		1.388**	2.141***
		0.167	0.086		0.197	0.224
Hungary		0.865	0.894		1.313*	0.704***
		0.123	0.09		0.183	0.076

(Continued)

TABLE 1 (Continued)

	E-voting			Technology concerns	Expats	
	2002	2016	2018	2002	2016	2018
Ireland	1.469***	2.155***	0.403***	0.578***	1.184	1.906***
	0.202	0.311	0.044	0.074	0.162	0.196
Italy	1.248*	0.933	0.573***	0.425***	1.297*	0.856
	0.163	0.132	0.061	0.052	0.181	0.09
Lithuania		2.193***	0.746***		2.310***	2.950***
		0.351	0.078		0.348	0.33
Luxembourg	1.095	0.93	0.729**	0.620***	1.344*	1.213
	0.162	0.163	0.095	0.084	0.232	0.155
Latvia		2.297***	0.629***		1.605***	3.148***
		0.351	0.065		0.229	0.338
Malta		1.352	0.590***		1.636***	2.318***
		0.253	0.079		0.294	0.315
Netherlands	3.847***	2.190***	0.836*	0.679***	1.367**	4.933***
	0.545	0.327	0.083	0.091	0.191	0.54
Norway	1.222			1.098		
	0.163			0.134		
Poland		1.280*	1.073		2.174***	1.933***
		0.192	0.108		0.317	0.207
Portugal	1.125	1.790***	0.780**	0.443***	1.897***	1.007
	0.165	0.28	0.082	0.061	0.279	0.11
Romania		1.007	0.762***		1.978***	1.05
		0.149	0.078		0.287	0.113
Sweden	1.772***	2.321***	1.195*	1.134	2.218***	1.326***
	0.22	0.366	0.116	0.132	0.329	0.133
Slovenia		1.08	1.459***		1.162	1.354***
		0.153	0.148		0.162	0.147
Slovakia		1.678***	1.506***		2.406***	2.063***
		0.266	0.155		0.365	0.233
Sex	0.958	1.148***	0.788***	1.034	0.805***	0.96
	0.046	0.051	0.023	0.046	0.034	0.029
Age	0.984***	0.980***	0.996***	1.005***	0.983***	0.979***
	0.002	0.001	0.001	0.002	0.001	0.001
Education	1	0.999	1	1.001	0.997***	0.999
	0.001	0.001	0.001	0.001	0.001	0.001
Constant	1.937***	0.587***	0.811**	0.83	0.349***	3.570***
	0.386	0.095	0.085	0.154	0.055	0.376
Observations	8,721	25,376	23,336	8,721	25,376	23,336
Log likelihood	−5,313.41	−7,353.08	−14,112.28	−5,918.03	−8,504.54	−13,403.64
Akaike inf. crit.	10,672.81	14,772.15	28,294.55	11,882.06	17,075.07	26,877.29

Researcher's calculations, based on Eurobarometer surveys; logistic regression models representing odds ratios and standard errors. Significance levels: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

use and generational shifts (Smith, 2014). In sum, being an expat and measuring E-voting as an independent variable produces higher positive changes in the respective member states. This slight trend toward E-voting depending on an expat status can also be explained by the wishes of the younger generation to be mobile throughout their lives in Europe and still be able to vote in their home country. After summarizing these findings, implementation cases will be presented with a particular focus on Estonia which can be seen as a unique case.

Implementation of E-voting in practice: Estonia, France, Finland (Åland Islands), Switzerland, and Norway

The implementation of E-voting (next to speaking in the management language, possible test-voting and pre-tests) has three dimensions, as the Electoral Commission in the United Kingdom (2002) has stated:

(1) The doorkeeper principle: Each person desirous of voting must be personally and positively identified as eligible and permitted to complete no more than the correct number of ballot papers.
(2) The secrecy principle: Admitted voters must be permitted to vote in secret.
(3) The verification, tally and audit principle: There must be some mechanism to ensure that valid votes, and only valid votes, are received and counted. This system must be sufficiently open and transparent to allow scrutiny of the votes and, subsequently, the working of the political process.

In Estonia, a country regarded as a digital pioneer (Hartleb, 2020) with E-voting on the national and local level since 2005, a value aspect comes into the debate. "Trust" is the central currency to enforce digital tools and e-services and to create a unique platform such as the "X-road" and secure authentication systems (Solvak and Vassil, 2016; Vinkel and Krimmer, 2017). The idea of E-voting was thus strongly promoted by the then Prime Minister Laar, who proposed the idea of testing E-voting in the year 2001 and decided whether to introduce it already for the 2002 local elections. Laar has continuously touted E-voting as a possibility to increase voter turnout and (partially, therefore) develop democracy. So e-Estonia and the E-voting were about leadership based on a broad party consensus. In reality, a top-down process in a country where "everyone knows everybody" from families, school or university time (Hartleb, 2020).

According to the Parliament (= Riigikogu) Election Act and the Referendum Act (Rahvahääletuse seadus—RT I 2002, 30, 176), the new European Parliament Election Act, citizens (respectively, Estonian and European) residing permanently or temporarily outside Estonia could send their vote by mail. Another facilitation of E-voting in Estonia was the proposed and realized introduction of a mandatory ID Card, which includes a digital signature possibility. The ID Card is, since 1st January 2002, the primary domestic identification document and must be held by all Estonian citizens and permanent resident aliens over 15 years of age. To understand this, nearing with a teleological approach to Constitutional interpretation, for instance, problems should be understood with a view to concrete problem-solving aspects (Drechsler and Madiste, 2002, p. 237). E-voting in Estonia is deeply linked with the future of the public sector, which aims to be effective, building up bridges to citizens as "clients" and seeing them as "homo technicus" (Marcinkiewicz-Wilk, 2017).

An important issue is also to reduce the existing gender (payment) gap, which is at a top-level in the EU countries in Estonia. The difference in socio-economic resources between men and women could be brought up in the internet access debate and some stereotypes that computer technology is more appropriate for men than women. This would confirm the observation that IT is still—from the bottom IT-approach in Estonian schools till the founding of Startups such as Skype, Transferwise, Veriff, and Bolt as a "man business" (Hartleb, 2020). E-voting is also linked to an exchange between academia [with chairs in universities on the field also due to EU-projects at the Taltech (University) Tallinn and the University of Tartu] and engineering (Vinkel and Krimmer, 2017; Ehin et al., 2022).

Two other European but not EU countries also have experienced technological innovation in the electoral process (see Table 2): Switzerland is another pioneering country concerning E-voting, especially the canton of Geneva. Another example is Norway, where pilots started in 2011 in local and 2013 general elections—after rigorous constitutional analysis and international public tender. After some evaluation, however, the Norwegian government decided to discontinue due to possible risks and the general lack of trust politicians have shown (Ansper et al., 2009; Vinkel and Krimmer, 2017, p. 187). Norway conducted Internet voting trials in the 2011 and 2013 parliamentary elections. Online votes could be cast during the advanced voting period, whereas on Election Day, voting was restricted to conventional on-paper voting. Saglie and Segaard found that the trials comprised ten municipalities in 2011 and 12 in 2013. End-to-end verifiability was implemented only in the 2013 elections. 26.4% of those who participated in the 2011 local elections have done so through Internet voting, which increased to 36.4% in the 2013 parliamentary elections. The vast majority of advance votes were cast over the Internet—indeed, more than 77% of the advance votes were online in the trial municipalities. The authors conclude: "Nevertheless, the fact that Internet voting was used by so many voters did not lead to an increase in the overall voter turnout" (Saglie and Segaard, 2016, p. 160).

The three cases show the differences in practice which might also focus on legal consequences—in Estonia, the eID with a unique isikukood (personal identification code), and in Switzerland, including the postal system for passwords (based on Vinkel and Krimmer, 2017, p. 187). In Estonia, to e-vote, one needs either a mobile ID or an ID card and a computer with the ID software required to use the ID-card, mobile ID or ID-card certificate and PIN1 and PIN2 codes. The voting process is straightforward: citizens will need to sign in to the E-voting app referred to on the election website (using PIN1), and then they will be offered the possibility to see the candidates. Comparing electronic solutions in Estonia and the rest of the world, the distinction between i-voting and E-voting can also be seen: I- or internet-based (E-voting form familiar to Estonians) and e or

TABLE 2 Implementation of E-voting (Vinkel and Krimmer, 2017, p. 187).

	Estonia	Switzerland	Norway	France (for expats)
Authentication method	eID	Passwords through the postal system	Unique ID tied mobile phones	Federal Post Card Application (FPCA) absentee ballot request,
Implementation style	Snap implementation, nationally	Step-by-step, Canton-based	Step-by-Step, limited pilots	for French citizens living abroad
Verifiability	Individual	Individual	Individual and universal	Valid e-mail address, individual, computer
Multiple vote casting	Yes (a privilege of the written voting)	No	Yes	voting for own representatives in the national parliament; now only consular councilors for French citizens

all electronic (stationary or not) methods (Valimised.ee, 2023). However, the distinction between E-voting and traditional voting is that e-voters have the opportunity to change their minds. For example, they can vote exactly as often as they want during advance voting—only the last vote counts. If advance-voter votes not only in electronic channels but also in the polling station with a ballot note, the e-votes given before are withdrawn, and only the vote given by ballot is valid (and can no longer be changed) (E-Estonia, 2022). Statistics confirm that the use of intelligent devices is up. In 2020, 98% of Estonians (1,3 million population) used the Internet, while 83% used a smartphone to access it. Even about facial recognition, a debate has started via the chairman of the national election committee (Err.news, 2021a; Ehin et al., 2022). Polls show that the majority of Estonians trust the E-voting—besides the supporters of the radical right party, which itself, being a coalition partner in government between 2019 and 2021, brought in a campaign against the legitimacy of E-voting using conspiracy theories such as the claim of a "deep state" (Solvak and Vassil, 2016; Ehin et al., 2022). This strategy is because more cosmopolitan-oriented voters have used E-voting, preferring the liberal party in the past (Hartleb, 2020). Nevertheless, the legal regulative debate goes further: The Supreme Court ruled in 2019 that additional technical and procedural provisions related to E-voting should be regulated by law rather than by sub-legal acts (Supreme Court of Estonia, 2019).

The Åland Islands, an autonomous region belonging to Finland and therefore part of EU, spent years preparing an internet voting system, to be implemented for the first time in October 2019 for Parliamentary Elections. Despite this, the project was canceled the evening before the expected release date (Duenas-Cid et al., 2020). France is among the world's pioneers of using Internet voting, given French citizens living abroad have been able to vote online since 2006 for select elections. Since low turnout has become worrisome in France, Internet voting is meant to make the voting process easier for citizens, in turn, it presents an opportunity to increase participation. However, as Internet voting has also raised concerns about safety, security, and voting secrecy, this voting modality has suffered setbacks in recent years. As of 2021, Internet voting in France is only available for the elections of consular councilors for French citizens abroad (Dandoy and Kernalegenn, 2021).

Generally, "the field lacks social-science papers about the possible introduction of remote electronic voting in other countries and the implications of their use on a more theoretical level" (Vinkel and Krimmer, 2017, p. 180). This lack of social science papers might be a surprise from the light of normative democratic theory: political participation should help to ensure consideration of the preferences and needs of each citizen (Teorell et al., 2007). The controversy is whether E-Voting increases the turnout, which is empirically the case among abstainers and occasional voters (Petitpas et al., 2021). As the Estonian case indicates, E-voting has certain advantages for expats. The hope of an increased turnout is not fulfilled (Solvak and Vassil, 2016), but the number of e-voters has increased from 1.9% (2005) to 47% (in European elections 2019) and a new record in local elections 2021 (Err.news, 2021b). In the federal elections in March 2023, just over 51% were cast online, with is the first time more than half of votes have been given digitally (Err.news, 2023a). This user experience also shows that it takes some time for acceptance, like in other digital services such as the e-receipt in pharmacies.

The debate on E-voting was highlighted at the beginning of the 21st century. The California Internet Voting Task Force (2000) has published "a report on the feasibility of Internet Voting". It stated wisely that "the implementation of Internet Voting will be a complex undertaking with no room for error" (Err.news, 2023b. p. 4). Another example is Germany's case: Former Otto Schily said in 2001 that online voting for the Bundestag elections would be possible in 2010 (CNN.com, 2001). In 2022, one generation after Schily's statement, Germany is far away from any experience in E-voting. Internet voting was trialed in local elections in the United Kingdom between 2002 and 2007 before being abandoned. France allowed Internet voting in legislative elections for overseas territories in 2012 but stopped this practice due to cyber-attack fears in 2017 (Reuters, 2017). While some European countries, such as Lithuania, are planning to roll out i-voting systems for overseas voters (LRT English, 2020), others, such as Finland, remain skeptical of i-voting, as working groups convened by governments argue that the risks outweigh the benefits (Finnish Ministry of Justice, 2017).

Conclusion

Everyone has talked for one generation about E-voting, but nothing has happened? The picture is not that black vs. white. Efforts must be undertaken to bring the observation of E-voting in line with traditional election observation standards and to develop certain minimum and ethical standards for compliance. The question remains if E-voting will be a part of the

transformation of democracy debate which recently got a backlash due to the rise of authoritarian patterns within and against the West (Levitsky and Ziblatt, 2018; Madrid and Weyland, 2019). From a legal point of view (and from an election observation perspective), it is vital to consider possible scenarios where problems occur in the concrete application of E-voting. Furthermore, the aspect of legal, even constitutional engineering in terms of transparency should not be underestimated, as the Estonian case reveals. Moreover, we must look closely at sociodemographic factors within the data analysis.

With the present analysis, we sought to shed light on the speciality of E-voting among European member states (with case studies on Estonia, France and Finland) and neighbor states (Switzerland, Norway), looking at the legal frameworks, and parties' manifestos. There is still a lot of potential within the legal framework. In Poland, just as an example, the constitution neither allows or prohibits providing the option of e-voting, is therefore just "silent" (Musial-Karg, 2017, p. 220).

Investigating the Eurobarometer survey data revealed differences between the central, eastern and western member states and those who are neighbors of Estonia as an exceptional case to study. It was demonstrated that interesting procedures for E-voting are already implemented, in France and Finland, and especially in such exceptional cases such as Estonia, but also outside the EU, in Switzerland and Norway. Those instruments and cases could serve as blueprints for implementing E-voting in other EU member states if the governments of these states are inclined to do so. With the analysis of the manifestos, we saw no natural inclination of the parties toward broad support for E-voting. Interestingly, in both sources, the surveys and the party manifestos, mentions of E-voting increased since 2015/2016.

However, Europeans' perceptions from the Eurobarometer surveys showed tendencies toward it.

The main opportunities are a potential increase in voter turnout, the strengthening of democratic participation and the adaptation of democratic elections to broader societal developments. The main challenges are answering diverse questions related to problems of trust and acceptance, legal and constitutional issues, and technical and observation standards. The case of Estonia shows that a member state can change the legal framework according to EU standards. However, after elections in March 2023, the radical-right party EKRE (Conservative People party) (which hoped to get more votes in the e-voting and aimed to be in government) tried to challenge the legacy of the e-voting in court but failed to do so immediately (Err.news, 2023a). The election results have shown that the winning liberal party representing more entrepreneurs got many more votes in the e-voting race whereas EKRE representing more the rural areas lost in comparison to the "analog" votes. In this sense, the e-voting results reflect a certain cleavage and fits to the pattern of former elections (Solvak and Vassil, 2016, 2018). And, E-voting was most popular among Estonians in the 25–34 age group, as data shows. Almost 65% of voters in this category cast a digital ballot (Err.news, 2023b). In other words: The more cosmopolitan oriented voters seem to be more open for e-voting (it is still possible to change to analog on election day even after e-voting groß schreiben), and generation matters. It also demonstrates that Tech-companies are the driver and supporters of such steps, which must be driven top-down into the legislative processes. Undoubtedly, the adaption, later the normalization and routinization of digital transactions are key push factors for allowing and accepting E-voting (Ehin et al., 2022).

Moreover, the share of voters participating in national elections from abroad is growing and an important factor as we see in the French case. We should focus more on the understudied groups of voters, the expatriates (Goldberg and Lanz, 2021). In other world regions, such as Canada, the United States, India, Pakistan and Australia, some efforts in some regions as pilot projects have been undertaken (Ehin et al., 2022). This aspect could lead to new initiatives, nevertheless an EU-wide "toolbox" for implementing and synchronizing E-voting is still missing. Maybe e-voting will be integrated more in the debates on European elections under the legal framework of the Council of Europe and the existing scope on personal data protection. Voting in most European countries remains to be an analog affair, according to the legal framework as well as to the political parties' manifestos even though in some member states people wish to vote online as demonstrated with the Eurobarometer analyses. Thus, we need to study more how and to what extent the digital transformation also affects legal frameworks and public spheres throughout Europe. We know that there is no single route, in terms of practice, implementation and reliability—but all is on the road between new dynamics, stagnation or even backlash.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://github.com/isaborucki/e-voting_constitutions.

Author contributions

IB and FH contributed to the conception and design of the study. IB organized the database, data processing, coding, performed the statistical analysis, wrote the results, and discussion sections. FH wrote the theoretical and case study chapters. Both authors contributed to manuscript revision, read, and approved the submitted version.

Funding

The work of IB in DIPART (drafting the article in 2022) was funded by the research programme "Digital Society" of the Ministry of Culture and Science of the State of North Rhine-Westphalia (grant number 005-1709-0003). Open Access funding provided by the Open Access Publishing Fund of Philipps-University Marburg with support of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation).

Acknowledgments

We thank Jan Borcherding and Sarah Jansen for their invaluable help with data coding and processing. We also thank the two reviewers for their invaluable help and Jasmin Schickel for helping with stylesheet adaptions and last corrections. All remaining faults lie in our responsibility.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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