THE SUCCESS OF THE E-VOTING TO ENHANCE THE POLITICAL ENGAGEMENT: A COMPARATIVE STUDY

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ABSTRACT

Purpose: This research investigates the e-voting system in the United Arab Emirates by comparing European countries such as the UK, Switzerland, and Netherlands experiences.

Theoretical framework: The current research consists of an introduction and the definition of e-voting in addition to the advantages and risks of the e-voting system, no ultimate judgment, e-voting as a subject of structuration, legal and technical guarantees for e-voting, types, and techniques of e-voting, e-voting in Europe, and e-voting in the United Arab Emirates.

Design/Methodology/Approach: It should be noted that descriptive and analytical methods have been adopted in this study, clarifying the concept of e-voting and then addressing the advantages and risks of e-voting, in addition to comparative approach has been used to compare European countries such as UK, Switzerland, and Netherland from one side, and the United Arab Emirates from the other side.

Findings of the paper: The UAE has electronic voting systems that help empower people to vote from anywhere.

Research, Practical & Social implications: We suggest using AI in election systems to enhance public participation, empower people, and facilitate people's voting to make it easy and fast. Originality/Value: We propose to create electronic systems for public procurement in the Emirates that do not have electronic systems for public procurement, in addition to continually introducing technical support to the employees to avoid mistakes and to enhance effectiveness and efficiency.

Keywords: e-voting, e-democracy, political engagement, elections, transparency, United Arab Emirates.
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RESUMO

Objetivo: Esta pesquisa investiga o sistema de votação eletrônica nos Emirados Árabes Unidos comparando experiências de países europeus como Reino Unido, Suíça e Holanda.

Estrutura teórica: A pesquisa atual consiste em uma introdução e a definição de e-voting, além das vantagens e riscos do sistema de e-voting, sem julgamento final, e-voting como objeto de estruturação, garantias legais e técnicas para o e-voting, tipos e técnicas de e-voting, e-voting na Europa, e e-voting nos Emirados Árabes Unidos.

Design/Metodologia/Abordagem: Deve-se notar que foram adotados métodos descritivos e analíticos neste estudo, esclarecendo o conceito de votação eletrônica e, em seguida, abordando as vantagens e os riscos do voto eletrônico, além da abordagem comparativa tem sido utilizada para comparar países europeus como Reino Unido, Suíça e Holanda de um lado, e os Emirados Árabes Unidos do outro lado.

Resultados do jornal: Os Emirados Árabes Unidos possuem sistemas de votação eletrônica que ajudam a capacitar as pessoas a votar em qualquer lugar.

Pesquisa, implicações práticas e sociais: sugerimos o uso de IA em sistemas eleitorais para melhorar a participação pública, capacitar as pessoas e facilitar o voto das pessoas para torná-lo fácil e rápido.

Originalidade/Valor: Propomos criar sistemas eletrônicos para a contratação pública nos Emirados que não tenham sistemas eletrônicos para a contratação pública, além de introduzir continuamente suporte técnico aos funcionários para evitar erros e aumentar a eficácia e a eficiência.

Palavras-chave: voto eletrônico, democracia eletrônica, engajamento político, eleições, transparência, Emirados Árabes Unidos.

1 INTRODUCTION

Nowadays, technology has recently increased in all aspects of life (Kumari, Rathee, & Maheshwari, 2020; Lee, Chang, & Berry, 2011; McCormack, 2016; Mostafa, & abdel Jalil, 2022) to the extent that life in the future is called e-life due to the great use of technology in providing all services, such as e-justice, e-procurement (Alvarez, Hall, & Trechsel, 2009; Abasaheb, & Subashini, 2023; Subagyono, Astutik, Chumaida, Romadhona, & Usanti, 2023; Aboelazm, 2023b; Boucher, Butler, de Groot, Lironi, Russack, Stratulat, Youngs, & Zacharzewski, 2019), e-commerce, e-government, e-justice (Aboelazm, 2022a; GARWAL, Haider, Jamwal, & Chandel, 2020) .... etc. electronic transactions are commonplace for many people, and some participate in online surveys and television competitions to vote (Moynihan, 2004). Thinking about online voting for public elections as a logical progression from online business and political
applications makes sense (Musiał-Karg, 2022). E-participation and e-voting are becoming political agenda items, and trials are being conducted nationwide. Based on stories from mainstream media and assertions made by fervent supporters, computerized voting has a promising future (Mostafa, & abdel Jalil, 2022; Jackson, 1975).

Moreover, all these uses of technology in the provision of services force the governments to think about the transition from traditional democracy to e-democracy by replacing the paper voting system with the e-voting system. According to the e-voting system (Danielsen, & Zimmerman, 2005; Kersting, 2012; LIM, 2010), the problems resulting from classical voting are avoided. Collecting and sorting the electoral papers manually may lead to some human errors, which can be avoided through e-voting. (MELITSKI, & CALISTA, 2016; Musiał-Karg, 2022; Olumide, Olutayo, & Adekunle, 2020; Aboelazm, 2023E)

But there are also more cautious voices. They highlight the potential issues that electronic voting could bring about regarding the core values underpinning the democratic process. Voting might be more than just another service provided by the government that ICT might enhance (ALONSO, 2009; Arafah, Hasyim, & Kapoyos, 2021; Xu, 2012; Stromer-Galley, 2003; Roztocki, 2022). Arguments for and against electronic voting are frequently framed in the discussion as objective and unchanging, and both sides utilize them to state their positions on what actions they believe should be performed regardless of the specific social environment (Rana, Williams, Dwivedi, & Williams, 2012; Qu, Wu, Wang, Liu, & Wang, 2020; Pyroha, Tokarchuk, Perezhniak, Nikitenko, & Berch, 2022).

This essay makes the case that choosing the best course of action for e-voting adoption requires more thought than just weighing the apparent advantages and risks. Instead, variations in the social milieu are significant. Several variables, including populations, political and administrative structures, electoral systems, public opinion, and countries, affect how advantageous electronic voting is in a given situation. This means that decisions on whether or not to implement a specific type of electronic voting are organized differently and may have diverse consequences in different nations with distinct institutional circumstances.
2 METHODOLOGY AND SCOPE

Research design: The study used the descriptive approach to describe and analyze the concepts of e-voting. The analytical method was used to identify the advantages and risks of the e-voting system and the benefits of e-voting. The analytical approach was also used to deal with the laws regulating e-voting. Also, the comparative approach will be used to compare some European countries' systems, such as the UK, the Netherlands, Switzerland, and the UAE.

Data collection and analysis: This study examined many other pieces of research, including books, research papers, and conference papers. It relied on sources published in international journals and indexed on databases such as Web of Science, Scopus, JSTOR, and EBSCO. Some laws were also relied upon, such as the Elections Law.

3 CONCEPTUAL FRAMEWORK FOR E-VOTING

3.1 THE CONCEPT OF E-VOTING

Voting or polling is a democratic method used by a group of groups to make a specific decision that expresses their views after exhausting the political and legal discussions that often take place in parliamentary councils or political elections, and that is when the government lays the foundations of the democratic system that allows the electorate to vote for candidates for political office or voting on decisions of a political or constitutional nature (Fan, Wu, Zheng, Chen, Alam, & Xiao, 2020; Gibson, 2001).

Voting is an official expression of an individual’s acceptance or rejection of a proposal linked to exercising his political rights for choosing a specific candidate or political party. It can also be performed during the discussion of draft laws and voting on important decisions in the parliamentary and parliamentary assemblies. Hence, voting is traditionally done by manually counting the votes using paper cards, carried out by employees under the supervision and control of the state, often represented by the judicial authority (Hoy, 1971; Judge, Pal, & Centre for International Governance, 2019).

Considering technological development, e-voting technology has emerged, which is a means of obtaining voters’ votes electronically, as a modern system that relies on technologies related to the Internet and is used to exercise the political rights of citizens in all types of constitutional entitlements (Gustafsson, 2002; MELITSKI, & CALISTA, 2016; Norris, 2010).
Political rights vary between a constitutional referendum on the articles of the constitution, choosing a candidate for the House of Representatives, the Senate, and local councils, or choosing the President of the Republic, as is the case in Egypt. Technology is used instead of traditional methods such as cards and ballot boxes (Rendon, 2018).

This system also specializes in storing results in computer systems according to specific security and technical standards to ensure achieving the highest levels of transparency, accuracy, and safety, which provides the integrity of the electoral process in its electronic form (Stromer-Galley, 2003; WARREN, 2011).

E-voting is all the electronic means that can be used to vote, tabulate votes, sort them, and use them to complete the electoral process. E-voting means employing technical means in all forms and using digital software, through which all electoral data is tabulated and processed, and its results are shown (Roztocki, 2022; Agarwal, Haider, Jamwal, Dev, & Chandel, 2020; Ch, A, & A, 2022).

The importance of e-voting in elections is highlighted in the effective contribution to implementing the transition process to electronic government applications and developing plans to strengthen democratic governance, which is achieved by facilitating the electorate’s choice of representatives of the people (Boucher, Butler, de Groot, Lironi, Russack, Stratulat, Youngs, & Zacharzewski, 2019; Alvarez, Hall, & Trechsel, 2009).

Therefore, e-voting is based on using all electronic means in the poll and sorting the electoral results through computers, information networks, and other electronic means instead of paper ballots. Therefore, e-voting is carried out through electronic data processing systems that include monitoring data inputs and outputs and processing them electronically during the voting process after identifying the voters’ identity (Arafah, Hasyim, & Kapoyos, 2021; Damore, Waters, & Bowler, 2012).

3.2 CHARACTERISTICS OF E-VOTING

E-voting systems have many functions: encryption, randomization systems, communications, and security. By analyzing these functions, we find that they go beyond the direct scope of a basic understanding of what e-voting systems can do. It is helpful to look at some end-user functions they can provide. These systems are for both voters and election officials (Devanesan, & Chandrasekaran, 2011).

Electronic voter lists and voter authentication are part of the e-voting system. An electronic voter list can cover either a single polling station or the entire country, and this
list can be used to authenticate eligible voters and record that they have cast their votes (Disparte, & Tillemann, 2020).

E-voting provides unique interfaces for disabled voters, including Braille or voice input for blind devices, easy access for voters with physical disabilities, and simpler interfaces for illiterate voters (Kerschbaum, & Centre for International Governance Innovation, 2022).

E-voting has some characteristics, as follows:

### 3.2.1 Alternative option

E-voting is considered an alternative channel to paper voting, as it does not present e-voting as the only method available to voters. Still, it is regarded as an additional option for voting in the electoral process, and the voter can choose the best alternative for him in the initial application stage (Kumari, Rathee, & Maheshwari, 2020).

### 3.2.2 E-voting provides physical proof of votes cast

While many e-voting systems are subject to oversight, in some regulated systems, e-voting can be physical proof of voting in the form of paper or electronic voter receipts (Voter Verified Audit Trail (VVAT)) so that voters can verify their vote on the ticket, then deposit the token in the ballot box by manually or electronically recounting the permits. Election results can be fully verified by a well-designed manual recount of tickets from a random sample of polling stations (Khaustova, 2022).

### 3.2.3 Overcoming the phenomenon of electoral bribery

E-vote systems are usually not produced in an uncontrolled environment, as they cannot be used to sell votes so that the voter will keep the receipt, and a manual recount is not possible, which makes such permits useless (Lee, Chang, & Berry, 2011).

### 3.2.4 Direct verification

E-voting systems allow direct verification as they can be verified end-to-end by providing encrypted receipts; however, the plans are not widely used in real life, not least because they are not very easy to use (Pyroha, Tokarchuk, Perezhniak, Nikitenko, & Berch, 2022).
3.2.5 Promote integrity and transparency

E-voting achieves many guarantees that guarantee the conduct of the electoral process in a democratic manner, as it achieves transparency to fully understand the behavior of the e-voting system, as it is used to translate source codes that humans can read into another code that machines can read. It also achieves integrity because e-voting can prevent human interference and tampering with votes and counting (Otchere-Darko, 2010).

3.2.6 Facilitating the electoral process

E-voting contributes to the elections being easy, simple, and uncomplicated, as the voter only votes electronically and the system counts and calculates the polls, without the need for election supervisors to intervene to measure and calculate the votes and announce the results, as the electronic system does all of this quickly. E-voting also makes voting more accessible for voters (Prandini, & Ramilli, 2012).

3.2.7 Voting speed

E-voting is an effective way to complete the election process faster than paper systems, as it prevents crowding in front of polling stations, and the voter will not stand in lines waiting to enter the electoral committees to cast his vote. He can do this through electronic means, as some systems allow voting from anywhere, even outside the country (Mavriki, & Karyda, 2022; Aboelazm, & Ramadan, 2023D).

3.2.8 Promote and increase political participation

Many individuals are reluctant to cast their votes because they do not want to go to the polling stations and wait long to cast their votes. The presence of an e-voting system would encourage individuals to participate through secure channels and techniques that allow voting from home or from any other place, which is desirable. Because it will increase the political participation of individuals and help spread electoral awareness, in addition to helping enable individuals to participate in choosing their representatives and thus managing the affairs of the state (ALONSO, 2009; Danielsen, & Zimmerman, 2005).
3.3 PROSPECTS OF E-VOTING

Any form of voting that uses electronic means is commonly referred to as "e-voting". While there are numerous ways to conceptualize e-voting, it is essential to distinguish between electronic machine voting (eMV) and electronic distance voting (eDV) (Daud, Sumaryana, Nurasa, & Susanti, 2022; Dawes, 2008). E-voting machines (eMVs) are devices used at a fixed public location to record and count votes. This could be a standalone PC setup, especially in a voting kiosk or a specialized voting machine in a voting booth. By implying the electronic registration, screening, and tallying of votes cast from many places, eDV goes one step further. Generally, it enables the voter to cast his vote from any preferred location, including the office, home, or even a deck chair on a cruise ship somewhere in the Caribbean, using more general technologies like interactive digital TV, the phone, Short Message Service (SMS), or the Internet (Duenas-Cid, Janowski, & Krimmer, 2022; Falck, Gold, & Heblich, 2014).

Election organizers have additional opportunities thanks to eMV and especially eDV. When it comes to a trustworthy, impartial, effective, and timely vote count, eMV is useful (CALISTA, & MELITSKI, 2007; Aboelazm, 2023a). It may also present some opportunities for electronic verification (e.g., verifying whether the user is eligible to vote and whether the vote is cast correctly). While these advantages may also be anticipated via eDV, its unique selling point is that it allows voters to cast ballots online without the need to visit a designated polling place. Thus, it offers the possibility of lessening the effort required to cast a vote, particularly for those who find it challenging to get to a polling place on election day, such as those who are physically disabled or reside in distant places (Ahmad, Rehman, Ayub, Alshehri, Khan, Hameed, & Yetgin, 2020; Aboelazm, 2023b; Kaudare, Hazra, Shelar, & Sabnis, 2020).

As e-voting proponents point out, these eMV and eDV options may contribute to more accessible, affordable voting and higher voter turnout. Voters can utilize whichever method of voting they prefer, mainly when e-voting is offered in conjunction with many channels, and eDV is employed as one of them (Ibrahim, Ravindran, Lee, Farooqui, & Mahmoud, 2021; Jackson, 1975).

Lastly, e-voting brings voting into the present era and modernizes the voting process. Some pundits claim that because young voters are accustomed to the concept of electronic transactions, they expect the government to make e-voting possible (Giraldo, Milton, & Gamboa, 2020; Aboelazm, 2022a).
4 ADVANTAGES AND RISKS OF THE E-VOTING SYSTEM

Many countries have realized the importance of technological development and holding elections through e-voting, using various technologies via the Internet. Considering the digital transformation sought by many administrations within the country, many advantages and disadvantages have emerged that result from the use of e-voting systems during elections, as follows:

4.1 ADVANTAGES OF E-VOTING

Digital technology brings excellent efficiency to many aspects of life, including elections. Online databases facilitate the creation and management of accurate and up-to-date electoral lists in less developed countries, whose citizens often lack reliable identity documents. Biometric technology can help determine identity. Voters, thus preventing fraud in the form of multiple voting. Compared to traditional paper procedures, digital technology offers numerous advantages in the election stages, from voter registration to vote counting (Baxter, 2017; Aboelazm, 2023C).

Moreover, modern technologies play an essential role in facilitating the management of traditional logistical operations associated with holding elections, especially considering emergency circumstances that may occur in the future, including what has already happened, such as COVID-19, which imposed on the world the repercussions of social distancing, including the accumulation and presence of a large number of employees inside. Electoral committees, procedures for printing papers, all stages of checking the integrity of registration in the electoral rolls, and a complete inventory of the names of voters and their electoral districts, in addition to the census, sorting, and announcement of results (Buchstein, 2005; Bund, 2016).

In addition, e-voting techniques contribute to the participation of all segments of society during elections without discrimination due to social conditions, as it is considered the most successful means of securing the participation of people with special needs and disabilities, as well as technologically illiterate citizens, through e-voting devices that provide the voter View the candidate’s photo and information related to him (Ahn, 2022; Daud, Sumarya, Nuras, & Susanti, 2022).

E-voting also includes a less human interface, which makes the system less error-prone than traditional paper-based systems. Many technologies have emerged to facilitate user authentication and send the voting file more transparently. It also helps maintain
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System transfer and the accuracy of the voting process (LIM, 2010; Kersting, 2012; Aboelazm, 2023E; Dawes, 2008).

The advantage that emerges from the application of e-voting is that this system provides convenience to voters, as there is no more convenient place to vote than at home, and when electoral participation is so easy that it only requires logging in to a website and selecting a few checkboxes in an electronic form. By clicking on the vote button, there will likely be a noticeable improvement in the level of voter turnout and, thus, the legitimacy of the results (Grönlund, 2002; Harfst, Blais, & Bol, 2018).

E-voting also allows significant savings in deploying and operating actual polling centers if the e-voting centers are sufficient. Sorting and classifying electronic ballot cards is much faster and easier than sorting traditional paper cards or scanned or perforated ones. In addition, there is no delay in sending and receiving the used materials. As well as long-term cost savings by saving time and reducing the costs of producing and distributing ballot papers. Not only will voters find it easier on Election Day, but they will also find it easier to trust a new system if they understand why it exists, the benefits it brings, and the various security measures that support the integrity of electronic elections (Kaudare, Hazra, Shelar, & Sabnis, 2020).

In addition to this, increased accessibility, for example, through voice ballots for blind voters, with online voting for out-of-state voters, also processes results faster, prevents fraud, and provides better service to voters is often a top priority in addition, faster vote counting and more accurate tabulation of results by avoiding human errors (McCormack, 2016; Qu, Wu, Wang, Liu, & Wang, 2020).

On the other hand, a multilingual e-voting system can be used, which can serve multilingual voters and addresses cases where there is more than one official language in the country, as voting in one language may hinder the process of political participation by excluding those with other tongues, which undermines the electoral process, which affects the effectiveness of the democratic system and dramatically affects the will of the people (Olumide, Olutayo, & Adekunle, 2020).

The use of the e-voting system highlights the country’s development in technological and scientific terms. It reflects its image and international experience to be an essential reference for other countries to emulate through the use of modern fingerprint scanning methods to confirm the identity of the voter, such as biometric fingerprint or retina scanners, or DNA fingerprinting, also by reading the smart ID card that contains...
an electronic chip that includes voter data, or by using a secret code number obtained from the authority organizing the elections via email or phone (Mostafa, & abdel Jalil, 2022).

4.2 FEARS AND RISKS OF E-VOTING

But more important is the absence of oversight and potential risks to ballot confidentiality. In contemporary states, ballot confidentiality is seen as essential. Numerous Western democracies have ratified it in a variety of conventions and declarations, including the European Convention on Human Rights (Article 3), the International Covenant on Civil and Political Rights (Article 25), and the Universal Declaration of Human Rights (Article 21 (3)). Ironically, in traditional voting, oversight ensures that the ballot remains secret. The polling station's election officers ensure that voters enter the booth alone, are free from undue influence, and may cast their ballots discreetly. Both the vote's confidentiality and impersonation risk are protected via supervision. This kind of oversight will end with the implementation of eDV, which jeopardizes ballot confidentiality. The hazards associated with voting becoming more private range from actual physical intimidation and coercion in other uncontrolled situations to social pressure within the home ("honor your father," "obey your spouse").

The debate over a secret ballot extends beyond the notion that those who desire to cast a secret vote should be able to do so, as Buchstein demonstrates. He makes a compelling argument for "mandated secrecy," which holds that voters should never be required to disclose their ballots to other parties. This required confidentiality is not simply preferable because there are situations in which having the ability to show something can become a duty to prove it. Additionally, it stops individuals from selling their votes. Furthermore, as some e-voting skeptics contend, one more risk of e-voting could be the potential for vote selling (Ohlin, & Hällgren, 2002; GROSE, 2008).

Lastly, some eDV detractors contend that implementing eDV might cause significant and undesirable alterations to representative democratic systems. Since representative democracy ensures discussion, deliberation, and consensus development, many political scientists view it as a welcome departure from direct democracy. As some observers have noted, there may be pressure to hold public consultations and new elections more frequently—possibly even every day—once e-voting systems are implemented because the marginal costs of doing so could be extremely cheap (Instant
democracy). This may be viewed as a danger and would undoubtedly damage the concept of representative democracy. Likewise, as stated in the IPI report: “E-voting in the long run could lead to referendums and threaten the deliberative nature of the political system and the protection of the minority” (Hall, 2012; Colton, & Hale, 2009; Aboelazm, 2022b).

The widespread use of computers and the Internet has led to an increase in information crimes. Therefore, the Internet knows no borders and can be accessed from any connected device. Hackers have proven their ability to penetrate information networks and break codes to maintain data confidentiality. It is known that the CIA and the FBI have specialized teams of hackers whose mission is not limited to protecting their vital information networks but also goes beyond penetrating the networks of others when necessary (Ibrahim, Ravindran, Lee, Farooqui, & Mahmoud, 2021; Jackson, 1975).

In addition to the possibility of the e-voting system being exposed to electronic hacking, a well-encrypted security system must be put in place to use it in e-voting to ensure the confidentiality of the vote and the absence of data penetration. The greatest danger to e-voting systems is the possibility of external interference continuing undetected, affecting the election results. Therefore, there was a need for intensive security monitoring, oversight, and cross-auditing to be an essential part of the e-voting system (Kneuer, 2016; Aboelazm, 2021).

In addition, there are technical errors in the design of programs approved for e-voting, and this occurs when there is a failure to have secure encryption programs, secure encryption programs, or electronic virus protection programs, or an inability to apply procedures for backing up information and data, which is what was discovered in the systems of some countries. In e-voting (Melenchuk, 2021).

E-voting systems are vulnerable to denial-of-service attacks, phishing attacks, malicious code attacks, spyware attacks, remote administration attacks, and automated systems for selling votes. These attacks are considered strong enough to make large numbers of votes vulnerable to hacking, which leads to either the disenfranchisement of voters or from voting, spying on their votes, changing them, or buying them. These attacks can often succeed and may lead to changing election results without ever being detected (Moynihan, 2004).

Information transmission networks are also not secured, which is the network through which transmissions are exchanged between different devices during the electoral process. Therefore, it is necessary to provide instruments for examination and conducting
operating experiments that contribute to detecting any infiltration into the network through encryptions associated with communication lines without using algorithms. Sports and other means to prevent network security penetration. Methods of destroying data and programs vary, starting with computer viruses, passing through worm programs, and ending with logic or time bombs. Information drama is one of the many aspects of the infringement affecting this technology, which poses an extreme danger (Mensah, 2020).

Thus, the increasing use of automated information processing methods has not always had positive effects, as the reality is witnessing many aspects of abusive exploitation and acts of service associated with lousy faith in performing automated information processing, in addition to the possibility of destroying information systems that do not aim to merely obtain a benefit from the computer whatever it may be. Its form causes damage to the information system and hinders it from performing its function by destroying information systems (Musiał-Karg, 2022).

Failure to follow preventive measures to maintain the polling sites that contain the devices used in e-voting places the responsibility of the authority supervising the elections to create an integrated system to secure the electoral sites from the danger of fires, power outages, or other security risks such as armed robbery, which requires the creation of emergency systems to secure Electric power and high-security gates are used to search all individuals before entering and casting their votes (Rana, Williams, Dwivedi, & Williams, 2012).

One of the most critical challenges facing e-voting in elections is the electronic errors that may result during counting and sorting as a result of fraud or duplication of votes, which led to the ongoing dispute over the results of the presidential elections in America in 2000 as a result of doubts about the number of votes obtained by the candidates, despite them being counted electronically. Manual counting was used, and the dispute between the candidates was resolved. However, this defect can be avoided by providing e-voting machines with printers that issue a printed sheet of paper in two copies, one of which is given to the voter showing his choice. At the same time, the other is kept by the committee responsible for managing the elections (Robertson, 2006).
5 NO ULTIMATE JUDGEMENT, E-VOTING AS A SUBJECT OF STRUCTURATION

We have discussed the advantages and disadvantages of e-voting in the earlier sections. As a result, we were able to dodge a few queries that some readers could have felt. How accurate are these risks and opportunities (e.g., will eDV truly make elections more vulnerable, or will turnout increase)? How can we balance the several points of contention in a comparative analysis? In the end, how should we evaluate eMV and eDV? Finally, what advancements in e-voting are we likely to see soon? There are three reasons, which we shall address in this section, why these questions should not be addressed:

There are three reasons not to respond to these questions:

a. There is still much doubt over the integrity of the statements made by supporters and opponents.
b. Claims' validity and weight vary depending on the context in which they are assessed. Rather than being viewed as a straightforward issue of objective, logical requirements.
c. The development of e-voting should be seen as a process of structure in which actors make decisions within the confines of preexisting institutional frameworks.

5.1 VALIDITY OF CLAIMS

The critical points e-voting supporters and opponents made were covered in the preceding sections. We made an effort to clarify the main points each side made. These arguments were primarily reflections of original ideas and anxieties and lacked the empirical foundation necessary for a more in-depth analysis. Thus, one of the first things we want to address is the extent to which the statements currently have any empirical backing (Robertson, 2006).

The empirical data on e-voting still needs to be more sparse and typically inconclusive. To our knowledge, only a few significant, legally binding trials have been conducted worldwide. The most well-known of these are the ones listed below:

b. The Voting over the Internet experiment of the US Department of Defense during the 2000 US presidential elections.
The referendum in Bristol and Croydon, UK, was conducted via online Voting.

The UK's 2002 local election test program.

It is evident, nevertheless, that we may need more clarification about the integrity and absoluteness of some of the statements, given the scant evidence. Regarding the central claims made by e-voting proponents regarding its cost-effectiveness, convenience of use, and increased turnout, we discover that these claims are unsupported by the available data. In the UK tests, when the elections were contracted out to a contractor that charged 30 pence for each telephone vote and 60 pence for every Internet vote, the cost-effectiveness claim, on the one hand, was partially supported. But it's important to remember that in this instance, there was also a separate charge for general services, the government covered the cost of the free phone number, and internet voters were naturally required to supply their own devices and internet connectivity. However, the US military's Voting over the Internet project can be used to mock the cost-effectiveness claim. In this case, the US government paid $73,809 for each of the 84 votes, which was undoubtedly the result of high initial expenditures. The expenses of implementing e-voting are also discovered to be far greater than anticipated in Switzerland and the Netherlands, not least because of the required security precautions (Remenyi, 2003).

Likewise, there is no factual basis for the ease-of-use argument. Conversely, the results of current tests show that eDV has significant real-world issues. Every project evaluated needed help with the software and hardware used to cast votes online. Approximately 1800 voters, or 4% of non-internet voters in the Arizona Democratic primary, attempted in vain to cast their votes online before the deadline. In the US military trial, 128 eligible voters were found to be motivated. Only 91 of them registered to vote online, and only 84 of them were able to do so. Meanwhile, 71 inquiries about various issues, including the use of digital certificates, installing the necessary software, and access issues, were made to the help desk (Sigelman, Roeder, Jewell, & Baer, 1985).

Grave doubts have also been raised over whether the deployment of eDV will result in higher voter turnout. According to Philips, Spakovsky, and the IPI, prior efforts to streamline the voting process, such as mail-in voting, longer voting hours, and more accessible voter registration, have had little to no impact on voter turnout. Pratchett et al. similarly conclude that there is little chance of a rise in voter turnout due to the relative insignificance of variables like "time poverty," inconvenience, and difficult-to-access
voting places, not explaining the fall in turnout. Several distinct factors contributed to the higher voter turnout in the 2000 Arizona primary compared to the 1996 primary. There was just one contender in 1996, a much smaller number of actual polling locations, far less media coverage, and fewer efforts to encourage voters to cast ballots. With internet voter percentages of 2.7 and 3.4 in Bristol and Croydon, respectively, the UK Electoral Commission concluded that the technology-based voting pilots had no discernible effect on turnout (T M, & Sumathi, 2020).

While the trials that are now available provide us with very little information regarding the viability of the critics' arguments, further analysis indicates that some of their assertions may also be softened.

On the one hand, as e-voting becomes more common, several e-voting system developers have devised innovative ideas for fending off potential dangers. Giving the voter a "distress pin"—an identification code they could enter in place of their actual one—would allow them to cast their vote normally, with the caveat that it wouldn't be counted. This would address concerns about compulsion, secrecy, and vote selling. In a similar vein, it might be possible to limit voting to in-person on-paper balloting on election day, allowing voters to replace any prior ballots with their final one (Warf, 2014; Markovic, 2022).

In addition to these more technical remedies, there is a suggestion that some of the hazards might be overstated. For example, the notion that computerized voting has less symbolic value is questionable and may not apply to younger generations. There is also no correlation between the usage of e-voting and the rise in referenda; permitting more referenda will ultimately come down to political decisions rather than luck (McCormack, 2016; Xu, 2012).

5.2 THE IMPORTANCE OF CONTEXT

The significance of the election's environment is the second reason it is impossible to provide a definitive assessment of e-voting (Boucher, Butler, de Groot, Lironi, Russack, Stratulat, Youngs, & Zacharzewski, 2019). This context might change significantly. For example, even though we have already discussed the Arizona primary, it is evident that unusual circumstances surrounding this primary prevented it from occurring in Europe. In addition to being an exceptionally particular kind of election, this primary is being held in a large, sparsely populated state, with a restricted number of
polling places accessible and a historically low voter turnout (below 10%). (Falck, Gold, & Heblich, 2014; Fan, Wu, Zheng, Chen, Alam, & Xiao, 2020) As a result, the benefits of e-voting—such as increased accessibility and turnout—do not apply in the same way as they do to the parliamentary elections held in the Netherlands, where voter turnout in 2002 was 78.9%. Residents live much closer to one another (Damore, Waters, & Bowler, 2012).

Disparities in context seem particularly significant when discussing the potential dangers of voting (Giraldo, Milton, & Gamboa, 2020; Ibrahim, Ravindran, Lee, Farooqui, & Mahmoud, 2021). As previously mentioned, a young, fragile democracy would likely pay far more attention to the potential of extensive inside manipulation than a vested democracy with robust democratic institutions. This also applies to concerns regarding ballot secrecy (Judge, Pal, & Centre for International Governance, 2019; Ohlin, & Häggren, 2002).

Indeed, there are some situations where these anxieties could be unfounded. E-voting may even strengthen the right to a free and secret ballot in nations and locations when elections are marred by violence and intimidation (Pyroha, Tokarchuk, Perezhniak, Nikitenko, & Berch, 2022; Hoy, 1971).

Given that the digital divide argument is contextual, variations in context appear to be especially significant (Giraldo, Milton, & Gamboa, 2020; Fan, Wu, Zheng, Chen, Alam, & Xiao, 2020; Warf, 2014). The content that is currently available also reflects this. On the one hand, the concerns about digital division are validated in Arizona primary. The findings indicate that compared to their counterparts in rural counties with sizable percentages of minority voters, large urban counties with predominately white voter populations cast online ballots in significantly higher numbers (Stromer-Galley, 2003; Remenyi, 2003). However, Pratchett and colleagues conclude that eDV turnout would probably resemble traditional voting trends. Regardless of how broadly accessible the pertinent technologies are in society; the evidence indicates that e-voting will maintain the current socioeconomic and demographic divides between those who vote and those who do not (Giraldo, Milton, & Gamboa, 2020; Gustafsson, 2002; Harfst, Blais, & Bol, 2018).

It also becomes evident from this final point that many risks and possibilities could evolve. On the one hand, in the next 20 years, the current digital divisions may vanish. However, some "strong democracies," which have embraced e-voting, may
eventually become dictatorships (CALISTA, & MELITSKI, 2007; Bund, 2016; Baxter, 2017).

5.3 HOW E-VOTING IS STRUCTURED?

Lastly, we must admit that even if specific eDV scenarios were assured to result in particular outcomes in particular locations, this would not require different actors in various nations to reach the same conclusions. The growth and uptake of technology, particularly ICT, cannot usually be explained by such antiquated logic as technical determinism or straightforward rational choice, as is well established from several prior studies. It is more likely to be considered an intricate process of institutional forming or structuration, in which actors make a series of decisions, both big and small, over time under the tutelage of a socially institutionalized context that changes as a result of their choices, rather than as the development of such radical and complex technologies as e-voting (Ahmad, Rehman, Ayub, Alshehri, Khan, Hameed, & Yetgin, 2020; Agarwal, Haider, Jamwal, Dev, & Chandel, 2020).

This implies that a wide range of other factors influence how e-voting develops. The evolution of e-voting, for instance, may be impacted by:

- specific standards and ideals related to elections in various nations;
- specific electoral objectives of influential political players (where we may anticipate that politicians from wealthier and better-educated backgrounds will be less concerned about the risks of a digital gap than their peers);
- specific policy objectives, such as those about e-government and e-society, that are linked to or compatible with e-voting;
- factors related to the economy and industry, such as lobbying efforts by industry groups to persuade governments to fund the development of innovative technology.

6 LEGAL AND TECHNICAL GUARANTEES FOR E-VOTING

One of the application problems is the inadequacy of national legislation to accommodate changes in technological infrastructure and keep pace with the introduction of e-voting technologies and the provision of communication networks and equipped polling centers. In addition to the weak economic capabilities of the state and the lack of allocating a budget for the use of electronic means and their technologies, which requires
pumping sums of money to prepare the infrastructure and provide electronic devices and electronic security. The greater the accuracy and security guarantees of electronic devices, the higher their price and protection programs (Kaudare, Hazra, Shelar, & Sabnis, 2020; Kerschbaum, & Centre for International Governance Innovation, 2022).

Information technology has witnessed significant qualitative advances in the current period, and the use of technology has spread in most government systems of all types: financial, judicial, administrative, and others. Despite this, no significant efforts have been made to prevent rogue applications from carrying out unwanted actions or making changes, so this environment has become unsafe despite the presence of so-called firewalls and anti-virus programs, especially those found in homes, as there is no A present-day method by which designers of e-voting systems can ensure that voters' home computers are not compromised in a way that calls into question the reliability and integrity of the voting process (Mostafa, & abdel Jalil, 2022; WARREN, 2011).

A particular concern raised by the rapid development of technology is whether such systems include technical safeguards to prevent unintended, erroneous, or malicious use and what programming or other technical safeguards have been put in place. On the other hand, the necessary legal guarantees must be available, including the matters that must be available in e-voting systems and the precautions that these systems need (Robertson, 2006).

6.1 LEGAL GUARANTEES FOR THE SUCCESS OF E-VOTING

E-voting is closely linked to representative democracy through elections as one of individuals' constitutional and political rights. It occurs through three stages: voting, counting, and announcing the results. Therefore, before implementing the e-voting system in any country requires a set of legal controls to overcome the loopholes of this system, which are as follows:

6.1.1 The existence of legal legislation that supports the e-voting system

The principle of the rule of law includes a legal framework for any decision issued in the state. The decision to vote electronically must be supported by a legal system consistent with any country's election laws. Despite the existence of these laws in many countries, it is noted that there is resistance to change by the government and a failure to activate legal texts. An example of this is the Egyptian law, which stipulates that the
National Elections Authority shall be solely responsible for managing referendums, presidential, parliamentary, and local elections and organizing and supervising all operations related to them with complete independence and impartiality in the manner regulated by law. The Authority may use secure electronic communication, voting, and archiving in all or some stages of holding referendums and elections (Article 3 of Law No. 198 of 2017 regarding the National Elections Authority). Despite this, the e-voting system was not used at any stage (Sigelman, Roeder, Jewell, & Baer, 1985; Qu, Wu, Wang, Liu, & Wang, 2020).

6.1.2 Criminalizing rogue electronic acts

They were keeping pace with the legislative process of technological development and creating special legislation to provide the necessary protection and combat information technology crimes in their modern form and tighten penalties for them, especially those related to hacking government networks (Pyroha, Tokarchuk, Perezhniak, Nikitenko, & Berch, 2022; Olumide, Olutayo, & Adekunle, 2020). This is what the UAE legislator did, as the Anti-Cybercrime Law stipulates that anyone who intentionally and without permission introduces an information program onto the web shall be punished with imprisonment for not less than five years and a fine of not less than five hundred thousand dirhams and not exceeding three million dirhams, or one of these two penalties. Information technology, electronic information systems, or one of the information technology means, and this led to it stopping or disabling it from working or destroying, erasing, deleting, damaging or changing the program, system, website, data, or information (Article 5 of Law No. 5 of 2012 regarding combating Information technology crimes).

6.1.3 Judicial supervision of elections

The electoral committees must be monitored and ensure their integrity and the availability of impartiality and transparency in all stages and procedures. This can only be done by establishing judicial supervision of the work of the election committees due to the fundamental constitutional guarantees available to the judiciary that guarantee their independence and distance from political conflicts (ALONSO, 2009; Grönlund, 2002).
6.1.4 Expedited resolution of electoral appeals

The slowness of adjudicating electoral appeals regarding voting results wastes individuals’ fundamental rights and freedoms, as this right to appeal is considered a guarantee for individuals in choosing their candidate. Therefore, all countries must provide a mechanism for adjudicating disputes related to electoral appeals and their results quickly and urgently to ensure the stability of legal centers (Kumari, Rathee, & Maheshwari, 2020; Kaudare, Hazra, Shelar, & Sabnis, 2020; Norris, 2010).

6.1.5 Raising awareness of voters’ rights and duties

The weakness of awareness of voter rights and duties in many countries would subject the voter to blackmail and pressure from various political forces. The state is committed to protecting and educating voters through effective monitoring of modern means of communication on the Internet and monitoring public opinion, which is represented by the media. And the use of modern communication devices that contribute to spreading the electoral culture related to e-voting among voters (Stromer-Galley, 2003; Gustafsson, 2002).

6.2 TECHNICAL GUARANTEES FOR THE SUCCESS OF E-VOTING

There must be a balance between the potential benefits of e-voting and the risks to which this system may be exposed. Regardless of the means of conducting them, elections must adhere to the basic principles of confidentiality, integrity, accuracy, and transparency. Voting systems, whether the paper system or the electronic system, must ensure that voters are accurately identified, their votes are accurately counted, and there is no link between the voter’s identity and his vote. Therefore, any voting system that relies entirely on e-voting must consider maintaining the accuracy of the vote-counting process (Fan, Wu, Zheng, Chen, Alam, & Xiao, 2020; Disparte, & Tillemann, 2020; Devanesan, & Chandrasekaran, 2011).

Also, when mentioning the dangers of e-voting, it appeared that the voting process via the Internet might be exposed to many risks due to a lack of security or the possibility of hacking, whether through the user’s device or the network connection through which it connects to the central server or the tabulator. Based on the risks discussed and the advantages achieved by the e-voting system, several guarantees will ensure the success of the e-voting system, which are as follows:
6.2.1 Respect the right to privacy

Privacy is the right of individuals not to disclose or publish information about themselves. Some matters fall within the category of private issues, such as casting an electoral vote. However, what is worrying is that privacy has been violated due to communication technology. A new type of crime has emerged thanks to information technology, which has become known as information technology crimes, and these types of crimes include theft of hard and floppy disks, theft of time, theft of information, and sabotage of computers. Protecting the right to privacy requires ensuring that it is not violated by artificial intelligence techniques used in e-voting applications (ALONSO, 2009; Ch, A, & A, 2022; Damore, Waters, & Bowler, 2012).

6.2.2 Use open-source software

Advocates of the open-source approach argue that although publishing code can reveal problems, it ensures that solutions are found quickly. For open-source advocates, keeping code secret is seen as "security through obscurity" and creates a situation where only a few insiders know about the system's vulnerabilities; while some efforts to develop open-source e-voting systems are underway, such methods are not currently available (Boucher, Butler, de Groot, Lironi, Russack, Stratulat, Youngs, & Zacharzewski, 2019; Mensah, 2020).

6.2.3 Reliability

An e-voting system can take a long time to be socialized, a loss of trust can occur quickly if there are technical problems or severe political disagreements, and a poorly implemented or failed e-voting solution can stall when the technology has been developing for years. Reliable e-voting systems require continuous reviews, upgrades, and replacement, in addition to amendments to new requirements, as well as allowing sufficient time to implement the project. The technical implementation of e-voting systems usually takes a not long period, but social acceptance of the e-voting system requires a much longer time (Otchere-Darko, 2010; Ohlin, & Hällgren, 2002).

6.2.4 Confidence building measures

Certification and audits are essential confidence-building measures and should be conducted transparently, with public access to relevant documents and procedures. It is
worth noting that any requirements for access to information, such as non-disclosure agreements, would hinder transparency, potentially be a sign of weakness, and should be avoided wherever possible. Among the confidence-building mechanisms are the following (Olumide, Olutayo, & Adekunle, 2020; Ibrahim, Ravindran, Lee, Farooqui, & Mahmoud, 2021; Judge, Pal, & Centre for International Governance, 2019; Kerschbaum, & Centre for International Governance Innovation, 2022):

a) Create results output interfaces. Voting machines often have a printer. However, some devices only use digital displays once. This interface can be used to display or print the results recorded by the voting machine. If the results are published, they can be used as physical evidence of the results they produce. Voting machine copies can be distributed to stakeholders at the voting station and posted for public display.

b) Create unique interfaces for disabled voters, including Braille or voice input devices for blind people, easy accessibility for voters with physical disabilities, and simpler interfaces for illiterate voters.

6.2.5 Results transmission system

Many voting machines can be moved via the Internet, telephone, mobile phone, or satellite without communications links. They can also be physically moved using electronic storage media such as memory cards (Harfst, Blais, & Bol, 2018).

6.2.6 Results tabulation systems

Results processing centers usually have results tabulation systems at the end of Election Day, which receive electronic results from polling stations and automatically tabulate results for various contests and districts (Giraldo, Milton, & Gamboa, 2020).

6.2.7 Results dissemination systems

Preliminary and final results can be disseminated in many different formats, including websites, CD-ROMs, geographic visualization of systems, and, if necessary, at all levels of detail down to individual polling stations. The more detailed the results published, the greater the transparency of the elections (Fan, Wu, Zheng, Chen, Alam, & Xiao, 2020).
6.2.8 Confirmation code systems

Some e-voting solutions allow control codes intended to enable individual verification of each vote by the voter in question (Devanesan, & Chandrasekaran, 2011).

6.2.9 Identity verification

On polling day, election workers need to verify the voter's identity in the electoral register, and this becomes much easier if polling stations have accurate access to up-to-date voter information, which is used in the United Arab Emirates, Norway, and more than 17 other countries (Colton, & Hale, 2009).

6.2.10 Voter registration

Accurate voter registers must be created to enable eligible people to exercise their right to vote and eliminate fraud. Digital technology facilitates the process of creating records, and most EU countries extract data from population registers to hold elections in countries where electoral rolls are made from scratch. For example, in Australia, voters register via an online form, while in Tanzania, they fill out a readable paper form that is then entered into a scanner (Alvarez, Hall, & Trechsel, 2009; Devanesan, & Chandrasekaran, 2011).

7 TYPES AND SYSTEMS OF E-VOTING

7.1 TYPES OF E-VOTING

7.1.1 Direct e-voting

Voting via devices located at polling sites, "the public network for direct e-voting." It is done through a direct e-voting machine, which uses a public communications network for electronic data, and the voting data is transmitted to the central electronic site at the end of the electoral process (Dawes, 2008; Duenas-Cid, Janowski, & Krimmer, 2022).

This system is characterized by ease of procedures. It allows voting from anywhere using the Internet or telephone or from any geographical location inside or outside the country, as long as a computer can send data to the voting website (Gustafsson, 2002; Moynihan, 2004).
7.1.2 Voting through modern communication devices and smartphones

This is done by the voter contacting the telephone voting registration center, which records the voice and call data and keeps the voice recording to prove the vote with the authority in charge of the elections. It is through the voter using a secret number or identification data specified by the electoral officer (Roztocki, 2022; Xu, 2012).

This system is also distinguished by the fact that in the event of a dispute over the elections, the voice fingerprint is used to identify the person of the voter who cast his vote electronically (Warf, 2014).

7.1.3 E-voting at the polling site

In which voters cast their votes over the Internet from practical devices physically located in official polling places, in which client hardware and software are subject to the oversight of election officials, and in which voters’ identities may be verified by traditional means (Stromer-Galley, 2003; T M, & Sumathi, 2020).

This method ensures speed in verifying identity, storing votes, sorting and counting, calculating votes, and announcing results. It also works to transfer votes to the central voting districts quickly and easily. Polling centers can also be equipped with computers that issue cards or receipts in two copies to the voter after he finishes voting, one of which is kept and the other remains with the electoral district to be used. To re-verify the validity of electoral results in the event of electoral appeals or a defect or malfunction in electronic devices (MELITSKI, & CALISTA, 2016).

7.1.4 E-voting in kiosks

In it, voters cast their votes using practical devices, and the devices and software are subject to the supervision of election officials. Still, they are distributed in public places (shopping centers), and the physical environment and the process of verifying voters’ identities are not subject to officials' direct control (Lee, Chang, & Berry, 2011).

7.1.5 Remote e-voting

It takes place over the Internet from anywhere in the world, and using this technology, a secret number (code) is sent to the voter via email or using a smart ID card that contains an electronic chip containing all the voter’s data, and voting is done via the Internet or mobile phones. In remote e-voting, neither the practical equipment nor the
physical environment is subject to the control of election officials (Damore, Waters, & Bowler, 2012).

7.2 E-VOTING SYSTEMS

7.2.1 Punch card voting method

With the punched card method, voters make holes in the cards using perforation tools provided to them, indicating which candidates they choose. The voter may feed the card directly to the vote tabulator at the polling place, place the card in the ballot box, and later transport it to the polling place 'central tab' (Kersting, 2012).

This method achieves several advantages, including: a) The possibility of counting and calculating votes and ballots manually, thus avoiding malfunctions that may occur in the electronic electoral process. b) By using this method, voters' ignorance of technology is avoided (Ahn, 2022; Ahmad, Rehman, Ayub, Alshehri, Khan, Hameed, & Yetgin, 2020).

On the other hand, there are also several negatives: a) the improper hole in the electronic card is considered a reason for spoiling the vote. b) It is possible that a malfunction may occur in the machine used to count and count the punched cards, leading to damage to the cards and thus spoiling the vote (Baxter, 2017; WARREN, 2011).

7.2.2 Scanner counting and voting method

The scanning devices capture a clear image and convert it into data that a computer can read. This image appears in the form of marks such as a triangle or circles to indicate the voter’s choice, or it may be in the form of letters such as handwriting, and the electronic scanning technology stores it in the form of readable data only (Stromer-Galley, 2003; Falck, Gold, & Heblich, 2014).

This technology can also be used in the pre-voting stage to verify identity, such as images of fingerprints or facial features, converting them into digital images, and storing them on smart cards. The advantages of this method appear at the results stage by accelerating the process of announcing results in countries that use the manual voting method (Khaustova, 2022; Fan, Wu, Zheng, Chen, Alam, & Xiao, 2020).
7.2.3 Direct electronic registration method

It uses optical-electronic equipment operated by the voter, whether by touching the screen, pressing a button, or using a light pen on an electronic screen after the device recognizes him through a standard biometric scanner. These devices use more than one biometric feature to verify identity. They use combined elements such as the retina fingerprint, fingerprint, or smart card PIN (Judge, Pal, & Centre for International Governance, 2019; Kerschbaum, & Centre for International Governance Innovation, 2022).

One of the advantages of this method is that it does not require ballot papers since voting data is stored in the computer on a hard disk, portable disk, CD-ROM, or smart card for backup and verification purposes (Kneuer, 2016).

8 E-VOTING IN EUROPE: DIVERGENT DEMOCRATIC PRACTICE

As things are, the assessment of e-voting primarily depends on a person's situation, values, and preferences. We must acknowledge that different actors may make other judgments about e-voting under various conditions (Kumari, Rathee, & Maheshwari, 2020).

In practical terms, what does this imply, and how does it affect the widespread use of e-voting? Do many nations genuinely come to distinct conclusions given their disparate circumstances? Or is there a convergence in policy due to tiny variances in events and institutions that support or oppose e-voting?

We have gathered information from thirteen Western European nations to respond to this query (McCormack, 2016; Melenchuk, 2021; MELITSKI, & CALISTA, 2016). We contacted the organizations in charge of conducting national elections in each of these nations and any individuals within them who may have information on any advancements being made toward e-voting (Rendon, 2018; ALONSO, 2009). We have enquired about their plans to implement new e-voting policies and voting technology (Duenas-Cid, Janowski, & Krimmer, 2022).

The paper has gained insight into the most recent advancements in e-voting and the justifications that can be offered for the unique changes in various nations thanks to this survey and other data.
8.1 USING TECHNOLOGY: TAKING DIFFERENT ROUTES

Using technology: Taking different routes A synopsis of the various voting technology and policy strategies used in federal and national elections is given in Table 1. We can observe significant variations here. Examining "Paper technologies," we find that while traditional polling booths are still used in every country, many also provide the option of voting by proxy or mail. Furthermore, eMV has been implemented in four countries: Belgium, the Netherlands, Germany, and Ireland. Of these, the Netherlands has been utilizing eMV for more than ten years, and 90 percent of votes are cast electronically. Conversely, no European nation has yet approved e-voting (eDV) (Disparte, & Tillemann, 2020).

Regarding the explicit e-voting aims in our sample, we observe distinct variations, and three special country groups can be identified. Together with the Nordic nations, Spain makes up the first group. These nations need to have policy plans regarding e-voting, which suggests they are content with how things are now done. They rely on the conventional "paper and pencil" voting systems (Arafah, Hasyim, & Kapoyos, 2021).

Second, a few nations with conventional voting systems have implemented eMV or are in the process of implementing it; nevertheless, they do not intend to proceed to eDV (Portugal is the nation that has implemented e-voting the furthest, having implemented voting via kiosks) (Boucher, Butler, de Groot, Lironi, Russack, Stratulat, Youngs, & Zacharzewski, 2019).

The Netherlands, Switzerland, the United Kingdom, and maybe Germany comprise the third group of nations. These nations want to implement eDV in its entirety. The UK and Switzerland are making a more significant step, while the Netherlands is considering gradually expanding the already existing eMV to include voting from kiosks and, eventually, eDV. With its ambitious e-voting ambitions, the UK hopes to implement e-voting beyond 2006. During the 2002 municipal elections, several eDV tests had already been conducted (with legally binding results). To make voting easier for voters and organize referendums and elections, Switzerland has put policies covering the testing and introduction of ICT in the voting process (CALISTA, & MELITSKI, 2007).
8.2 A DIVERGING OF THE EUROPEAN UNION?

What, then, do these findings indicate? Can we interpret these disparities as an indication of policy divergence, or are they simply reflecting differences in policy speed, with all European countries eventually adopting eMV and eDV?

The latter is true in light of the background data supplied by our respondents and our theoretical assessments in the preceding sections. Searching for why different nations are not choosing eDV, we discover this cannot be attributed to governments falling behind. As a first broad comment, it is remarkable that, despite being considered eDV laggards, most e-society and e-government research places Scandinavian nations at the vanguard of the worldwide ICT revolution. Therefore, it is odd to argue that these same nations would be behind in adopting e-voting (Colton, & Hale, 2009; Ch, A, & A, 2022).

But the more significant observation is the second one. These ostensibly trailing nations have all given us compelling justifications for not making eMV and eDV investments. For instance, we received a web link to a policy statement from the Norwegian Minister of Local Government and Regional Development along with the completed questionnaire from Norway. In it, she argues that e-voting (eDV) would be "a pivotal electoral system change." Still, she declines, citing several concerns, including the possibility of fraud, the loss of vote confidentiality, and the worry that "voting over the
Internet can turn politics into a spectator sport." (Agarwal, Haider, Jamwal, Dev, & Chandel, 2020; Robertson, 2006).

Olsson and Åstrom contend that despite its advancements in electronic service delivery, Sweden is not seriously pursuing e-voting due to its strong democratic history and security concerns. Moreover, responders from Finland and France vehemently oppose the implementation of e-voting in their nations—as well as in most European countries—claiming that e-voting would conflict with the international agreements and declarations mentioned in the preceding section (Prandini, & Ramilli, 2012; Olumide, Olutayo, & Adekunle, 2020).

Naturally, the issue of why other nations are striving to become e-voting champions arises in light of these firm conclusions opposing the deployment of e-voting. Can we explain why countries like the Netherlands, Switzerland, and the United Kingdom have accepted e-voting? As indicated, the unique conditions and organizations supporting the development of e-voting in different nations may be explained. As a result, we shall now examine them more closely (Ohlin, & Hällgren, 2002).

8.2.1 E-voting in UK

The paper discovers several reasons why the UK is more willing to implement e-voting than other nations, which helps explain the country's goals for e-voting. First and foremost, the UK government's strong modernization drive is an important consideration (Markovic, 2022; McCormack, 2016; Gustafsson, 2002). The aim to modernize government and invest in transforming it into an e-society, complete with e-government, is expressed in numerous global policy documents. While most of them primarily manufacture e-government rhetoric, the UK takes e-government seriously, as seen by establishing organizations like the Office of the e-Envoy and the designation of a senior Cabinet member as the person in charge of e-government (Rana, Williams, Dwivedi, & Williams, 2012).

Updating the voting process to reflect 21st-century living aligns with the overarching goals of e-governments. Second, the significant drop in voter turnout—considered a primary reason for concern—helps explain why the British are interested in e-voting (Melenchuk, 2021; Rendon, 2018). The following statistics are included in the e-Envoy's consultation paper on e-democracy: - The 2001 General Election saw 59% of voters turn out, the lowest since 1918 and a 12% decrease from 1997. In the UK, just 24%
of voters cast ballots in the 1999 European parliamentary election, down from 37% in 1994. Approximately 60% of 18 to 24-year-olds did not cast ballots in the 2001 General Election. In the 2002 local elections, 35% of voters turned out (Rana, Williams, Dwivedi, & Williams, 2012; Pyroha, Tokarchuk, Perezhniak, Nikitenko, & Berch, 2022). The PPERA (Political Parties, Elections and Referendums Act of 2000) was passed in response to the issue of declining voter turnout. This statute founded the Electoral Commission, and its main objectives are to promote democratic participation and raise voter turnout and voter registration rates. ICT may be an extra step in the direction of the postal ballots, which were introduced in response to worries about low turnout. The enthusiasm for e-voting is still primarily driven by declining turnout, even though both the e-Envoy and the Electoral Commission emphasize that introducing postal ballots and ICT will not raise voter turnout in and of itself (Kersting, 2012; Grönlund, 2002).

Furthermore, the PPERA has created opportunities for numerous local businesses who may be keen to try e-voting for various reasons since it permits local authorities to run trials with novel voting methods under the watchful eye of the Electoral Commission. In addition to being viewed as a fantastic opportunity for local governments to showcase their modern and efficient nature, e-voting is also perceived as a tremendous career opportunity by several local managers. International "election service providers" are supporting local government officials and their managers in this zeal, according to Ledbetter to ensure that these elections are successful, and everyone knows them, “spend like mad” (Harfst, Blais, & Bol, 2018; Duenas-Cid, Janowski, & Krimmer, 2022).

8.2.2 E-voting in Switzerland

We also observe associated factors regarding Switzerland that could account for the enthusiasm around eDV. Like the UK, Switzerland faces a significant issue with voter turnout, particularly in national parliamentary elections (43.22% of voters turned out in 1999, a tiny decrease from 1995). Switzerland has previously used postal voting, which is popular, to facilitate elections and boost voter turnout (Disparte, & Tillemann, 2020; Fan, Wu, Zheng, Chen, Alam, & Xiao, 2020). While e-voting is viewed as a reasonable addition to postal voting and can potentially increase voter turnout, its impact on turnout is also questioned in Switzerland. Furthermore, Scholer outlines four additional reasons why the Swiss political system is particularly vulnerable to e-voting:
a) The extraordinarily high volume of polling processes (elections and issue voting) that occur annually at the federal, cantonal, and local levels suggests that e-voting could have significant organizational and financial benefits;

b) The introduction of e-voting may be facilitated by the high degree of voter registration procedures in Switzerland, in contrast to local voter registration in many other nations;

c) Switzerland made significant progress toward "distant polling" by enacting postal vote regulations in the 1990s. As a result, voters are no longer required to show up at the polls, and voting has already been "desacralized";

d) Due to a lengthy history of public voting, in which votes are cast by raising hands, voting regulations about vote confidentiality are less strict than in many other Western countries, which facilitates the implementation of e-voting.

8.2.3 E-voting in Netherlands

The Netherlands, lastly. The Netherlands is the outlier in a way. On the one hand, there appears to be little support for eDV in this case for the most important reasons. Over the past few decades, voter turnout has declined, albeit not as sharply as in the UK or Switzerland (in fact, there was a modest uptick in the volatile 2002 elections). Since the Netherlands has the densest population in Europe, scheduling access to polling places has never presented a significant issue (Devanesan, & Chandrasekaran, 2011; Aboelazm, 2023E; Baxter, 2017). Since eMV is used in most municipalities, elections are conducted efficiently. Some smaller cities can even provide tabulated votes shortly after the polls shut. However, examining the counterarguments to e-voting reveals that the Netherlands has a record of exercising caution in safeguarding the person and encouraging the confidential nature of voting (Ahmad, Rehman, Ayub, Alshehri, Khan, Hameed, & Yetgin, 2020; Aboelazm, 2021). Because of this, proxy voting is restricted (a person can vote for no more than two proxy votes), and postal voting was never used in the Netherlands. Therefore, based on these arguments, it is unlikely that the Netherlands would be considered a leader in the field (Kneuer, 2016; Markovic, 2022).

Two structuration arguments remain when we truly need to explain why the Dutch appear to be moving toward eDV. The first is that it might be related to the broad and satisfying experience with EVM. To the best of our knowledge, the Dutch are the ones
who have utilized e-voting machines for the longest. Therefore, they are accustomed to using this technology during the voting process. This could cause the Netherlands' policymakers' reduced anxiety around eDV compared to other nations—arguments of the second kind center on political lobbying and aspirations (Olumide, Olutayo, & Adekunle, 2020; Qu, Wu, Wang, Liu, & Wang, 2020). The Dutch government aspires to lead the way in e-government, much like the British do, and there are some clear connections between the advancements in e-voting and e-government. In addition to being promoted by the same responsible ministry, the introduction of e-voting is seen as one of the best opportunities for implementing a national electronic identification system, which is regarded in the Netherlands as a challenging but necessary step in advancing e-government delivery of services. Furthermore, one of the leading proponents of e-voting, the now-former minister for e-government, is a member of D66, a political party that has supported the adoption of referendums and elected parliamentarians since its founding in 1966—goals that align well with the promises of e-voting (Sigelman, Roeder, Jewell, & Baer, 1985; Roztocki, 2022).

A vibrant e-voting advocacy comprised of entities like PELS (the Portal E-voting) and EPN (Electronic Highway Platform NL) has proven effective in galvanizing policymakers to support e-voting (Pyroha, Tokarchuk, Perezhniak, Nikitenko, & Berch, 2022; MELITSKI, & CALISTA, 2016). Members of parliament have consistently demanded that e-voting be implemented further. However, we also feel that the relevant ministers have begun to reconsider in recent months, and we are not optimistic that the Netherlands will be among the first to introduce eDV despite the responses to our survey. The Netherlands may make perfect sense in the context of our other theories (Ohlin, & Hällgren, 2002; Judge, Pal, & Centre for International Governance, 2019; Gustafsson, 2002).

9 E-VOTING IN THE UNITED ARAB EMIRATES

The National Elections Committee is responsible for managing the electoral process for the Federal National Council and has issued Resolution No. (02/03/2019) regarding the executive instructions for the elections in implementation of Article (12) of the President of the United Arab Emirates' Resolution No. 3 of 2006, which stipulates that the National Elections Committee shall issue Electoral evidence necessary to carry out the tasks and powers assigned to it.
The legal framework, represented by the executive instructions for the Federal National Council elections, was developed and approved by the National Elections Commission, and various electronic systems were prepared to facilitate all operations and procedures, including:

a. An electronic system for dealing with electoral bodies.
b. Electronic system for candidates.
c. An electronic system for monitoring election campaigns.
d. Electronic voting system.
e. System for announcing winners’ names.

The electronic voting system was used in the first experiment for the Federal National Council elections in 2006, encouraging the National Elections Commission to continue using it.

9.1 TYPES OF ELECTRONIC VOTING IN THE UAE

9.1.1 Electronic voting in polling stations

In it, the voter casts his vote via electronic devices available inside the official polling centers. The working devices and software are subject to oversight by election officials, and the voter’s identity is verified by election officials or by electronic means.

In the Federal National Council elections held in 2006, the United Arab Emirates adopted an electronic voting system in polling centers by adopting an electronic approach approved by an international company.

9.1.2 Remote electronic voting

In it, the voter casts his vote via a website on the International Information Network from anywhere from which it is possible to access this website on the day specified for the elections. This is done by filling out the introductory form to prove identity using the password for each voter, then clicking on the word vote.

The method of voting in the elections differs depending on whether voting takes place inside or outside the country, as follows:

a. Voting in elections within the country takes place through the electronic voting system in the designated electoral centers in each emirate, starting with the procedures for identifying the voter’s identity before casting his vote through entering, processing, organizing, and monitoring the data.
b. Voting in elections outside the country is done through the manual voting system, that is, through ballot papers, in the electoral centers in the country’s embassies and consulates abroad.

A member of the Electoral College may cast his vote at the headquarters of the country’s diplomatic missions determined by the National Committee and by the voting system it adopts, provided that the counting committee counts the votes of those who cast their votes from abroad on the primary election day according to the electronic counting system.

A member of the electoral college who does not know how to read or write, or who is blind or has a disability and cannot vote on his own, may express his opinion orally and confidentially to the head of the committee at the election center or to one of its members who are delegated by the chair of the committee, all by the applicable voting system.

10 RESULTS AND DISCUSSION

This work demonstrated that a lot of general assertions supporting and opposing e-voting have not been empirically investigated. They typically rely on local conditions and specific institutions, interests, and beliefs. Because of this, decision-makers in various nations may view the benefits and drawbacks of e-voting differently, which could lead to disparate structures for the evolution of voting. Our survey has shown us that this is more than just theoretical conjecture. Policy differences exist across the thirteen somewhat comparable Western European nations, particularly regarding electronic remote voting. On the one hand, most European countries emphasize the integrity, openness, and confidentiality of the voting process, making them resistant to adopting e-voting. These nations can resist the alarms of hasty modernization, that is, if there are no significant issues with voter turnout. They often stick to the conventional paper-based voting methods, though they might choose to use machine voting, as it has comparatively fewer risks than e-voting. However, in some nations, eDV is accepted due to certain conditions. Voter turnout is a critical element in this case. The turnout promise of eDV becomes attractive if turnout drops significantly, even if empirical data has not supported this promise. In addition to voter turnout, several additional factors could impact the political choice to implement e-voting, including the nation’s unique stance on election sanctity and political aspirations to modernize governance.
11 CONCLUSION

Scientific progress is neutral about human values, which makes it a model for use in conducting the electoral process and making it easier for people with disabilities, such as blind people, by developing an application that reads the voting card by simply touching it or by providing the voter with an audio headset that enables him to hear the names and symbols of the candidates in preparation for choosing among them, as well as helping disabled people vote by casting the electoral vote through an intelligent assistant. In this way, interference by those responsible for the electoral process can be prevented, and the suspicion of influencing the freedom of will of each voter can be removed.

Providing the electoral process with innovative applications also helps alert the voter while casting his vote so that his vote will not be invalidated, by sending temporary warnings warning him against casting his vote in a way that would invalidate the casting of his vote.

Innovative applications also help prevent deviation in the electoral process from determining the electoral will to placing prohibited signs or statements, destroying electoral cards, corrupting the electoral process, or affecting its effectiveness.

Through the capabilities of identifying shapes and people, it is possible to reach the perpetrators of electoral crimes and prevent the access of hidden eavesdropping, spying, and photographing devices to the electoral committees. It is also possible to identify who used these devices and the timing of that, in addition to providing the system with the ability to prevent those prohibited from exercising their rights. Political parties are unable to cast their votes, whether intentionally or accidentally, by providing the system with the names and information of those mentioned in turn or linking the approach to the Civil Status Authority, the Prisons Service, and the Ministry of Health, to prevent those lacking legal capacity from exercising political rights.
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