Examining the Impacts of Technology and Trust on I-Voting Acceptance in the COVID-19 Aftermath

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ABSTRACT
This article presents an empirical study of influence of the domain-specific factors of trust in the electoral system and administration, trust in technology, citizens’ attitudes toward voting, and COVID-19 conditions on the intention to use i-voting. The study examines and assesses the relationships and effects of the various factors that influence the intention to use i-voting. Survey data from 633 adult Slovenian citizens were collected in 2022, when voters were still burdened by the pandemic and needed to visit the polling place at least five times to participate in all scheduled voting. Structural equation modeling was used to analyze the data and develop the model. The study provides important findings, such as (1) trust in the voting system has a significant impact on voters’ intention to use i-voting, (2) fear of COVID-19 does not persuade people to use i-voting, and (3) previous attitudes toward voting do not have a significant impact on voter intention to use i-voting.

KEYWORDS

INTRODUCTION
The current digital revolution is undoubtedly forcing humanity to change the way people receive information, communicate, and interact. The recent COVID-19 crisis has brought an additional push towards the digital in private and public life. In democratic countries, this phenomenon is also changing the way democracy functions, thrives, or is weakened. As research in recent decades has shown that democratic and participatory tendencies are on the decline, and “digital transformation” is seen as an opportunity to research ways to re-engage people in democratic decision-making processes, including voting. In an analysis of 1,114 elections in 169 countries between 1975 and 2011, Bishop and Hoeffler (2016) found that the quality of elections has declined over the years and that only about

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half met the criteria for free and fair elections. Moreover, statistics from the International Institute for Democracy and Electoral Assistance (International IDEA) show a steady downward trend in voter turnout in most countries around the world over the past several decades (International IDEA, 2022a). In addition to socioeconomic, political, individual, and institutional factors, studies point to the importance of a variety of other influences that are reflected in voter turnout (Solijonov, 2016). Carreras and İrepoğlu (2013) found that low voter turnout is usually the result of voter apathy and lack of trust in government, the political process, and the electoral system and administration, which is addressed in this research. Some authors have examined whether emergencies, such as the recent COVID-19 pandemic, have an impact on these trends and whether trust in government has also increased in countries that have successfully managed the crisis (Goldfinch et al., 2021; Yu et al., 2022). Therefore, the impact of the pandemic is one of the main foci of this research.

Trust in its broadest sense has also been identified as a key factor in the acceptance and use of new technologies (Mcknight et al., 2011). This is particularly true for e-participation, especially i-voting (Ehin et al., 2022), where trust in technology and trust in government as a service provider have been highlighted as the most important aspects (Licht et al., 2021; Mensah, 2020). This is because the reputation of the electoral process is often affected by malpractices such as fraud, manipulation, corruption, and scandals. Therefore, public trust in the integrity of elections is shaken, and adding the element of technology is not helpful. Ultimately, trust in technology and trust in government form the basis of this study.

In the last years of the COVID-19 epidemic, information and communication technologies (ICTs) proved to be an important factor in overcoming various obstacles. The COVID-19 crisis has fundamentally shaken the way societies live and function, including democratic processes. In many countries, COVID-19 had an impact on the organization and conduct of elections. For governments responsible for conducting elections, this situation presented new and unprecedented challenges to ensure a way of voting that minimized the risk of contagion. Governments and their institutions responded to this situation with various measures: postponing elections, expanding remote voting options, or restricting the proximity of polling places to reduce the risk of contagion. Of the options used, Krimmer et al. (2021) reported in-person voting with security measures, absentee voting, and i-voting, while Herrnson et al. (2022) noted more elections in which more voters used the remote voting option (e.g., absentee voting was exceptionally allowed for all). Between February 2020 and February 2022, at least 160 countries and territories decided to hold national or subnational elections despite concerns related to COVID-19, of which at least 130 held national elections or referendums (International IDEA, 2022b). The same survey found a decline in voter turnout in 71 of 108 countries where turnout was measured. We can conclude that pandemics threaten not only the health of people but also the health and legitimacy of democracies, posing an additional challenge to e-democracy that must therefore be carefully considered.

Thus, to sustain elections during pandemics and other possible future crises while reaping the benefits of ICT for democracy and participation, it is necessary to thoroughly study and adapt the system environment (e.g., electoral rules and institutions), develop appropriate technology, and convince people to use it. Indeed, a robust and proven i-voting system needs to be in place, as is the case in Estonia today (Ehin et al., 2022). Studies that have examined the impact of COVID-19 on the electoral process have so far focused mainly on decreasing voter turnout (Fernandez-Navia et al., 2021; International IDEA, 2022b; Noury et al., 2021) and the possibility and use of alternative voting methods (Adamescu, 2021; Krimmer et al., 2021). In addition, we found some recommendations and articles on the potential impact on electoral systems and turnout in the post COVID-19 period (Delfi.en, 2020; Herrnson et al., 2022; Krimmer et al., 2020). However, we have not found any studies that look at the intention to use i-voting to find out how this type of voting is affected by the COVID-19 crisis. Such a study would make it clearer whether or not the intention to use i-voting is driven solely by fear of COVID-19. Moreover, it is still unclear whether the intention to use i-voting is also or solely influenced by the newly expressed expectation or demand of voters to vote online, a
Our work addresses the challenges of i-voting adoption by examining the factors that influence the intention of using i-voting. The proposed research model is the first to examine the impact of domain-specific trust factors, attitudes toward voting, and COVID-19 conditions on the intention to use i-voting. In addition, we explore lessons learned from the COVID-19 crisis regarding the prospects of i-voting to stimulate a broader debate on the feasibility of i-voting after COVID-19. Our empirical investigation focused on Slovenia, a country that faced the unusual situation of a so-called super election year in 2022. In that year, parliamentary, local, and presidential elections as well as referendums were held in the country, which was still under the influence of COVID-19. As a result, voters had to go to polling stations five times that year to participate in all the scheduled votes.

Section 2 provides the theoretical background of the research. Section 3 presents the research hypotheses and the conceptual model of the interrelated research concepts. Section 4 explains the research methodology used to test the theoretical model and the results obtained. In Sections 5 and 6, we present the results and their implications for the hypothesis. In the discussion, we explain the reasons for the results and relate them to previous research by other authors. Finally, we present conclusions and suggestions for future work that will contribute to a better understanding of i-voting adoption.

THEORETICAL BACKGROUND

I-Voting as an E-Government Service

I-voting is classified as an electronic government (e-government) service. If a country wants to achieve successful implementation as an e-government provider, the service must be designed according to the principle of user-centeredness. This principle emphasizes that the effectiveness of the service and user satisfaction are closely related, which is particularly evident in e-services (Ma & Zheng, 2019). In the case of i-voting, recent research cites the following factors for user acceptance: (1) convenience and the associated time savings, as online voting takes only three minutes, ten times less than traditional voting (Delfi.en, 2020); (2) the voter’s existing attitude toward using digital services; and (3) the voter’s socioeconomic status (Licht et al., 2021).

I-voting also refers to the use of ICT to support democratic processes to express the will of the people. More specifically, it is a process that allows for the remote casting of votes over the Internet and the electronic counting of those votes. The technology must ensure the confidentiality of the vote and the security of the processing and presentation of the results, thus complying with the concept of free and fair elections. Therefore, the digitization of the electoral process brings additional technological, organizational, and social challenges in solving the dilemma of implementing i-voting (Baudier et al., 2021). There is a broad discourse on this topic in the political, professional, and academic communities that is constantly conflicting and divisive. Proponents of i-voting often cite three main aspects as advantages.

First, they cite convenience and accessibility for the displaced, physically disabled, and other absentees. They praise efficiency in the form of faster voting, quick and error-free vote counting, and immediate and accurate publication of results, in addition to cost savings and higher voter turnout. Researchers found positive effects on voter turnout for certain special groups, such as citizens abroad (Applegate et al., 2020; Germann, 2021). Melenchuk and Khutkyy (2020) argue that i-voting would lead to higher turnout among otherwise apathetic young voters because they are more familiar with the digital environment and have mastered the necessary skills. Several other studies have also confirmed that i-voting changes voting behavior, especially among young citizens (Nemeslaki et al., 2016), which could counterbalance the perceived apathy of this population group identified by the Electoral Knowledge Network (2021). Also of importance is the research finding of Solvak and Vassil (2018) that citizens remain loyal to the new voting method due to a positive experience, ensuring at least that existing turnout levels are maintained. Second, research shows the social influence of environment
on intention to use i-voting, meaning that existing i-voters attract others by example, leading to an increase in participation (Agbesi, 2020; Fuster & Grandón, 2021; Powell et al., 2012). Third, the cost-effectiveness of i-voting was also demonstrated by Krimmer et al. (2021) using a case study in Estonia. Based on several years of experience, it was found that voting via the Internet is the most cost-effective compared to other voting methods. Finally, the COVID-19 epidemic has introduced a new factor into the plethora of i-voting factors. Namely, in favor of i-voting is the promotion of the “how to vote and stay healthy” voting method.

_opponents of i-voting base their opposition on drawbacks such as the over-glorification of the technology by i-voting vendors, election authorities, enthusiasts, and computer security laypeople, which obscures perceptions of the real vulnerabilities of i-voting technology (Cheeseman et al., 2018). There are known cases in the U.S. where government solution providers have misled the public with false information about the security of their Internet voting solutions, distorting the true picture of the state of i-voting technology adoption (Greenhalgh, 2022). The reasons and motivations for most abuses have been summarized by Lehoucq (2003), who emphasized that elections are processes to convert voters’ votes into political power. Finally, Germann and Serdült (2017) claim that even the most desirable and expected impact, an increase in participation rates, has so far not been demonstrated to be remarkable or universally significant in practice.

In summary, the use of i-voting is primarily in the hands of the individual voter and his or her trust, framed by the digital dimension. Although, with the advent of digital social media platforms, political digital disinformation poses an additional challenge (Power Wogu et al., 2020). In the context of e-government, trust in its broadest sense is a widely researched factor that has been shown to play a key role and have a characteristic influence on the adoption and use of e-services (Alomari, 2016; Alzahrani et al., 2017; Bélanger & Carter, 2008; Colesca, 2009; Li, 2021). These authors highlight (1) trust in technology and (2) trust in the government as a provider of e-services (in this case, as a provider of i-voting) as the most important aspects of trust.

(1) Trust in technology: Trust in technology is a fairly broad term and refers to the set of technologies that enable the use of an e-service. Trust is crucial when ICT is used to support democratic processes (e-democracy), as it has been shown to have a positive impact on citizen engagement in the functioning of government and society (Choi & Song, 2020). Trust becomes a critical factor in the adoption of technology in creating an enabling environment for e-participation, especially i-voting (AlAbri et al., 2022; Mensah, 2020). Therefore, citizens should be surveyed prior to the implementation of i-voting to obtain information about their attitudes, concerns, and confidence in this method of voting. The information thus obtained will then be used to find reliable and effective solutions in a transparent manner (Melenchuk & Khutkyy, 2020). Existing accepted technological solutions that voters already trust can be helpful. Estonia, the most successful country in i-voting, already had an e-government system in place, and it was widely used by citizens before the first i-voting took place. A well-accepted ecosystem of digital services for citizens, to which voting was then added, was a good guarantee of voting success (Melnykova et al., 2020; Plantera, 2020).

(2) Trust in government: In the context of public services, trust in government refers to the perception of the government’s capabilities and integrity as a service provider (Bélanger & Carter, 2008), which is part of the broader notion of political trust and concerns the degree to which citizens trust the government and its broadest political environment (the legislature, political leadership, and public institutions) (Mensah & Adams, 2020). Thus, in the context of i-voting, research mostly defines trust in government as trust in the electoral system and institutions directly related to election administration (Agbesi, 2020; Ali & Al Mubarak, 2018; Bélanger & Carter, 2008; Mensah, 2020), which addresses their electoral integrity in terms of ensuring free and fair elections (Norris, 2013).
The aforementioned aspects of trust in the i-voting environment have been addressed in several studies (Agbesi, 2020; Baudier et al., 2021; Licht et al., 2021; Mensah, 2020; Powell et al., 2012; Warkentin et al., 2018). Therefore, as suggested by Schaupp and Carter (2005), trust in i-voting is considered collectively in this paper by combining both aspects of trust described earlier, i.e., trust in technology and trust in the government, voting system, and election administration.

COVID-19 and Voting

COVID-19 brought a new and very important element to the discourse on i-voting, namely, an answer to the question, “How can one vote and stay healthy?” Elections must not only be free and fair, but also safe. For the 2020 Italian local elections, Cipullo and Moglie (2022) demonstrated a significant prevalence of infections even before the elections, during the campaign. Moreover, findings from the Electoral Integrity Project (James et al., 2022) indicate that these risks need to be addressed with appropriate measures throughout the electoral cycle, not just during voting.

Consequently, elections under epidemic conditions are more costly and complex, whether by offering additional alternative voting methods or introducing security measures at polling stations (barriers, masks, disinfection booths, social distancing, disposable pens, hand sanitizers, etc.), which in turn increases the time needed to cast a ballot. On average, voters in the 2020 U.S. elections waited about ten minutes longer in queues than in previous years (Coll, 2022) due to such measures. In some places, postponing the election date has also been considered, but as James (2020) notes, there is a risk of prolonging the government’s reign indefinitely. In addition, Yu et al. (2022) argue that greater trust in government in the form of perceived competence, good faith, and fairness in decision making in the event of a pandemic leads to better electoral outcomes for politicians in power in the event of immediate elections. As Krimmer et al. (2021) describe, absentee voting and i-voting have also emerged as possible attractive alternatives to voting at polling stations. However, these two options are not always feasible, especially in the short term.

Regarding voters’ turnout in the COVID-19 period, International IDEA (2022b) found that in 66% of the 108 countries analyzed, turnout in the 2020 and 2021 elections decreased by an average of 10.01 percentage points compared to the average turnout between 2008 and 2019. In France, turnout in the 2020 local elections was historically 18.8 percentage points lower than in the previous elections in 2014 (Leromain & Vannoorenberghe, 2022; Noury et al., 2021). In the 2020 regional elections in Spain (Basque Country), turnout was 2.6 to 5.1 percentage points lower in cities with higher infection rates (Fernandez-Navia et al., 2021). Constantinou et al. (2021) also demonstrated a temporal and spatial correlation of turnout with the number of infections in the 2020 Brazilian elections.

The pandemic has exposed many weaknesses in existing electoral methods, reigniting the debate on electoral systems and i-voting. The situation provides an opportunity to study the impact of a pandemic on voting in a “real-world” experimental setting. Furthermore, there is no success story from the COVID-19 era to promote i-voting as a solution for secure elections in a pandemic situation. Therefore, we should learn more from the given circumstances than simply accepting lower voter turnout. Wolf (2020) ironically noted that the longer the COVID-19 crisis lasts, the more opportunities there are for progress in the field of i-voting. Thus, current and future thinking about electoral innovations such as i-voting should certainly include lessons from the COVID-19 pandemic. We are talking here about the potential implications for the post COVID-19 era, because even if the world gains control over COVID-19, voters may remain reluctant to vote in public places due to other safety concerns (Jayasinghe & Samarajiva, 2020).

RESEARCH MODEL AND HYPOTHESES

The aim of this study is to investigate causal relationships between domain-specific determinants of trust, attitudes toward voting, COVID-19 conditions, and intention to use i-voting. The empirical setting of the study is Slovenia, a country (1) where i-voting is not yet available, (2) that had a “super
election year” in 2022, when presidential (two rounds), state, and local elections, and referenda were held, and (3) that was still suffering from the effects of COVID-19. Given these circumstances, and research suggestions of Applegate et al. (2020) and Kulyk et al. (2022), we wanted to determine the weight and priority of the above factors influencing intention to use i-voting to determine the reasons for i-voting acceptance. These are: (i) attitudes toward voting, (ii) attitudes toward ICT and i-voting technology, (iii) trust factors, and (iv) the COVID-19 situation. We attempted to find answers to the changes in voting that the use of ICT would bring to the Slovenian electoral system by applying the proposed conceptual model of intention to use i-voting.

The Conceptual Model

As of April 2023, there were 5.18 billion users of the Internet and related services worldwide (Statista, 2023). In 2021, there were 2.14 billion users shopping online (Statista, 2021). By 2024, the number of online banking users is expected to exceed 3.6 billion (Juniper research, 2022). These are services that involve the transfer of money. Given the user numbers, it is safe to assume that users trust the Internet as a supporting technology for these services. On the other hand, experts still doubt that the Internet, even with the use of blockchain technology, is a sufficiently secure platform for i-voting. So, the fact is that trust in the Internet does not convince the skeptics. The counterarguments to the benefits of i-voting largely relate to the weaknesses in ensuring the security and secrecy of data and the privacy of the voter. The strength of these arguments rests on the fact that for citizens, their political beliefs and voting decisions are very intimate opinions. This is supported by both national and European data protection legislation, which classifies a person’s political identification as sensitive personal data. The fact is that in the case of i-voting, trust in technology addresses a number of factors that ensure free and fair elections, with trust in the Internet being only one component. For this reason, we place the TIT and TiVT constructs separately in our model.

To define the conceptual model of i-voting intention, the building blocks of trust in government and trust in technology, known from existing research of i-voting acceptance research (Agbesi, 2020; Alomari, 2016; Li, 2021; Powell et al., 2012), were used. Consistent with the research context, we specify them as variables of trust in the election provider and its ability to conduct free and fair elections (Table 1).

The proposed conceptual model was used to analyze the factors that influence the intention to use i-voting and to propose the research hypotheses described in the next section.

Table 1. Factors of the conceptual model of intention to use i-voting

<table>
<thead>
<tr>
<th>Factor</th>
<th>Abr.</th>
<th>Description</th>
<th>Based On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust in the voting system</td>
<td>TVS</td>
<td>The degree to which voters trust the voting system and electoral administration to run free and fair elections.</td>
<td>Mensah, 2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Turper and Aarts, 2017</td>
</tr>
<tr>
<td>Trust in Internet and online services</td>
<td>TIT</td>
<td>The degree to which voters trust the security of Internet services.</td>
<td>Ehin et al., 2022</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alomari, 2016</td>
</tr>
<tr>
<td>Trust in i-voting technology</td>
<td>TiVT</td>
<td>The degree to which voters trust the use of the i-voting system to ensure free and fair elections.</td>
<td>Licht et al., 2021</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Kulyk et al., 2022</td>
</tr>
<tr>
<td>Voting attitude</td>
<td>VoAtt</td>
<td>Attitude towards voting at elections, measured as the degree of participation in elections and referendums to date.</td>
<td>Franklin, 2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Solvak and Vassil, 2018</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Licht et al., 2021</td>
</tr>
<tr>
<td>Fear of COVID</td>
<td>FoC</td>
<td>The perceived level of fear of COVID-19.</td>
<td>Ahorsu et al., 2020</td>
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<td></td>
<td></td>
<td></td>
<td>Coll, 2020</td>
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<td></td>
<td></td>
<td></td>
<td>Fernandez-Navia et al., 2021</td>
</tr>
<tr>
<td>Intention to use i-voting</td>
<td>IUIV</td>
<td>The level of intention to use i-voting in national, local, or presidential elections.</td>
<td>Agbesi, 2020</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Powell et al., 2012</td>
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</table>
Research Hypotheses

Turper and Aarts (2017) found that trust in political institutions is a key indicator of the legitimacy of democratic regimes. Citizens who have less trust in political institutions are less likely to participate in formal political participation. Trust in the voting system and electoral administration as a guarantor of free and fair elections (TVS) is closely related to participation rates, particularly voter turnout (Carreras & İrepoğlu, 2013; Solijonov, 2016), which has been declining for years (International IDEA, 2022a). In our research, voter attitude (VoAtt) is the voter’s attitude toward voting, measured by past turnout in various elections and referendums. Given statistics on the state of trust (Bertelsmann Stiftung, 2022; OECD, 2021; Transparency International, 2022), we expect to demonstrate a positive impact of the electoral system and election administration (TVS) on the voting attitudes of Slovenian citizens. We restrict TVS to trust in the Electoral Commission, which is responsible for ensuring the integrity of elections (Mensah, 2020).

H1: Trust in the voting system and electoral administration (TVS) has a positive impact on voters’ voting attitudes (VoAtt).

Voting systems are only as trustworthy as the institutions that control them (Kulyk et al., 2022). Moreover, the fact that voters trust an existing electoral system does not necessarily mean that they will trust a new system. Therefore, we cannot speak of a simple transfer of trust from the old to the new way of voting, such as i-voting (Licht et al., 2021). At the same time, we doubt that voters who do not trust the traditional voting system would change their attitude in the case of a new system that includes i-voting. This is especially true in environments with low trust in public institutions and in environments where i-voting is not yet available. The case study from Estonia confirms that prediction as well (Ehin et al., 2022).

H2: Trust in the voting system and electoral administration (TVS) has a positive effect on trust in an i-voting system (TiVT).

To further clarify H2, we tested the direct effect of TVS on IUIV, i.e., intention to use i-voting. Licht et al. (2021) ranked low trust in the voting system and electoral administration as barriers to i-voting adoption at the individual level. We hypothesize that, again, characteristically low trust in government, the electoral system, and election administration affects intentions to use i-voting.

H3: Trust in the voting system and electoral administration (TVS) has a negative impact on the intention to use i-voting (IUIV).

Government agencies responsible for ensuring the integrity of the electoral system are key actors in building trust in e-services (Warkentin et al., 2018). In our case, trust in the i-voting system refers to the belief that the government is a trustworthy provider capable of conducting free and fair elections in a digital environment. Baudier et al. (2021) found that TVS is the most important factor in the election process environment. Similarly, Ali and Al Mubarak (2018) and Mensah (2020) have shown that trust in electoral bodies has a significant impact on IUIV. Trust in the i-voting system, described by the two dimensions of trust (TVS and TIT), plays a crucial role in the decision to use such a system (Sindermann et al., 2022), and we expect this to be the case here as well.

H4: Trust in i-voting technology (TiVT) has a significant influence on the intention to use i-voting (IUIV).
Trust in technology is a key determinant of technology acceptance in its broadest sense. Existing studies related to i-voting acceptance primarily address the segment of trust in technology that relates to the Internet alone (Alomari, 2016; Powell et al., 2012). The Internet is, of course, a familiar environment for potential i-voters in more developed countries through the use of e-commerce services, although other components of i-voting systems are not as well understood and therefore less trusted (Licht et al., 2021). We assume that voters perceive the Internet and related services as a platform they can trust when using i-voting.

H5: Trust in the Internet and online services (TIT) has a positive effect on trust in i-voting systems.

It has been shown that voter turnout is a habit-forming phenomenon (Krimmer et al., 2020). That is, if someone has a positive attitude toward elections and participates once, there is a high probability that he or she will do so again. Franklin (2004) found that those who find reasons to vote in the first election continue to do so, and vice versa. The same has been demonstrated for the i-voting environment (Solvak & Vassil, 2018). The question is whether these attitudes are retained by the voter when the possibility of a different voting system arises. We assume that attitudes towards participation in elections using traditional voting methods are also reflected in internet voting as suggested by Melenchuk and Khutkyy (2020) and Nemeslaki et al. (2016).

H6: Voting attitude (VoAtt) positively influences the intention to use i-voting (IUIV).

The COVID-19 pandemic has moved our lives to the Internet. Data from the United States show that as many as 77% of full-time office workers worked remotely in the first months of the pandemic, up from only 9% previously; 45% worked from home at least some of the time. Remote access to health services (telemedicine) increased by 50% in 2020 compared to pre-pandemic levels (Hylton et al., 2022). In 2020 alone, e-commerce grew two to five times faster than pre-pandemic levels (Lund et al., 2021).

I-voting enables remote voting without the risk of contagion. Therefore, we expect COVID-19 to encourage this type of voting. We anticipate that participation in i-voting in a COVID-19 situation (and in a similar situation) would also be a positive user experience, with the potential to make this type of voting a permanent voting intention, even after the crisis, along with other benefits.

H7: The level of perceived fear of COVID-19 (FoC) has a positive effect on the intention to use i-voting (IUIV).

Our research model is depicted in Figure 1.

METHODOLOGY

To test our hypotheses, we conducted an online survey that focused on the factors that determine citizens’ intentions to use i-voting. Our survey focused on the intention to use i-voting at subnational and national levels in Slovenia. I-voting technology was seen as an environment in which the state, as the provider of free and secure elections, guarantees the legal basis, secure digital identities for citizens, a web-based or mobile application for voting, and a system for recording and counting votes, as well as enabling the final publication of results. This made it clear to respondents that i-voting is not mandatory and that the state guarantees the security and fairness of the process and technology.
Case Study Background

The Republic of Slovenia is considered the most successful of the transition countries of the former Yugoslavia (Gracer, 2013). After its independence in 1991, it became a member of NATO, the European Union (EU), and the OECD. Although Slovenian digitalization indicators paint a fairly favorable picture in terms of digital transformation and e-government (European Commission, 2022), the reputation of state (administrative and political) institutions and accountability bodies is low in terms of perceived corruption risks and trust (Transparency International, 2022), which certainly has a negative impact on citizens’ willingness to participate in democratic processes. Comparative data on voter turnout in recent elections show that Slovenia is close to the EU average, except for elections to the EU Parliament.

Because Slovenia does not yet have experience with i-voting, it has taken other measures to ensure secure elections during the COVID-19 epidemic. For example, in the 2022 super election year, it responded to the challenges of secure voting related to the COVID-19 epidemic with additional measures and recommendations to reduce the risk of infection by offering the already well-established options of voting without face-to-face contact (early voting, voting from home, and postal voting for certain groups). However, not a single online service (supporting a candidate, casting a vote) was available to Slovenian citizens in connection with their right to vote.

Because researchers argue that in the context of i-voting trust issues should be addressed before the technology is introduced into the electoral process (Applegate et al., 2020; Górny, 2021; Melenchuk & Khutkyy, 2020), we consider Slovenia an appropriate setting to study the prospects of i-voting from the perspective of trust in the pre-implementation phase.

Research Procedure and Data Collection

The data collection instrument was a structured telephone interview. The interview consisted of 19 closed-ended questions (see Appendix) designed to collect quantitative data on respondents’ attitudes and behaviors in order to test the research hypotheses and the proposed model. The questions were carefully worded to be clear, concise, and free of bias. The pretest questionnaire was hand-delivered to five experts and academics from public administration and five citizens.
The survey was conducted in two phases from January to March 2022. First, a private company was contracted to conduct the telephone survey. A simple, random sample was used for the study, with a publicly available telephone directory serving as the sampling frame. The telephone book contained a comprehensive list of telephone numbers for households in all target regions of the country. Each telephone number in the phone book was assigned a unique numeric identifier within the region. A random number generator was used to select telephone numbers for the survey, ensuring that each number had an equal chance of being selected. Trained interviewers made the telephone calls and conducted the interviews. Each interview lasted approximately 15 minutes. We collected 311 questionnaires, but the proportion of young respondents was low. Therefore, in a second step, data were collected using the online survey tool 1ka.si, because according to the latest report of the Slovenian Statistical Office, about 90% of the population uses the Internet on a daily basis (SURS, 2022). A link to a survey website was sent to individuals through various social networks to cover different age groups and regions of the country. A total of 322 valid online questionnaires were received. Responses were captured electronically and stored in a secure database for later analysis. As a result of the two phases, the questionnaires of 633 participants were included in our analysis. Demographic data on the distribution of the data are shown in Table 2.

According to the recommended 15 to 1 sample-to-variable ratio (Hair, 2006), at least 285 responses are required for the 19 independent variables, so our research sample is adequate. This is also consistent with Krejcie and Morgan’s table (KMT, Krejcie & Morgan, 1970), which states that a sample of 384 is sufficient for a population of 1,000,000 or more. Kline (2016) provides sample size guidelines (using maximum likelihood estimation methods) for structural equation model analysis and suggests that a sample of 100 is considered small, a sample of 100 to 200 is considered medium, and a sample of over 200 is considered large. Thus, we can conclude that our sample size is appropriate for further analysis.

**RESULTS**

**Data Analysis and Validation**

The data were merged and analyzed using IBM SPSS 27 and AMOS 27. Table 3 shows the results of the construct validity test, namely the standardized factor loadings, which are all greater than .6 and considered significant (Hair, 2006), especially considering a large sample defined as “very good” by Comrey and Lee (2013, p. 151). SPSS was also used to test for multicollinearity. However, no problems were found (Kaiser-Meyer-Olkin KMO = .849; Bartlett’s test of sphericity was significant $p < .001$). All Cronbach’s $\alpha$ values are greater than 0.7, indicating that the internal consistency

<table>
<thead>
<tr>
<th>Statistical Variable</th>
<th>Option</th>
<th>Frequency ($n$)</th>
<th>Percentage (%)</th>
<th>Percentage of the Slovenian Population (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>281</td>
<td>44.4</td>
<td>49.9</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>352</td>
<td>55.6</td>
<td>50.1</td>
</tr>
<tr>
<td>Age</td>
<td>21–34 years old</td>
<td>161</td>
<td>25.4</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>35–54 years old</td>
<td>194</td>
<td>30.6</td>
<td>28.8</td>
</tr>
<tr>
<td></td>
<td>55 years old or older</td>
<td>278</td>
<td>43.9</td>
<td>35.2</td>
</tr>
<tr>
<td>Education</td>
<td>Primary education and below</td>
<td>87</td>
<td>13.7</td>
<td>20.6</td>
</tr>
<tr>
<td></td>
<td>Secondary education and below</td>
<td>247</td>
<td>39.0</td>
<td>36.2</td>
</tr>
<tr>
<td></td>
<td>Higher education and above</td>
<td>299</td>
<td>47.2</td>
<td>43.2</td>
</tr>
</tbody>
</table>
reliability of the scale is good and meets the requirements for questionnaire design (Cortina, 1993). The composite reliability (CR) of the potential variables is greater than 0.7 and the average variance extraction (AVE) of each factor is greater than 0.5, indicating that the internal consistency reliability of the scale is good and meets the requirements for questionnaire design (Fornell & Larcker, 1981).

Discriminant validity between factors was tested based on the rule that the square root of each AVE should exceed the correlation value between any pair of factors or constructs (Fornell & Larcker, 1981). These results showed that the conditions of reliability, convergent validity, and discriminant validity were met (Table 4).

### Table 3. Factor analysis of intention to use i-voting (N = 633)

<table>
<thead>
<tr>
<th>Factors (Constructs)</th>
<th>Items</th>
<th>Mean</th>
<th>Stand. Loadings</th>
<th>Cronbach’s α</th>
<th>Composite Reliability (CR)</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust in Technology</td>
<td>TIT_EBA</td>
<td>3.92</td>
<td>0.661</td>
<td>0.781</td>
<td>0.801</td>
<td>0.582</td>
</tr>
<tr>
<td></td>
<td>TIT_EH</td>
<td>3.66</td>
<td>0.836</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TIT_PA</td>
<td>3.64</td>
<td>0.860</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust in i-voting Technology</td>
<td>TiVT_COUN</td>
<td>3.32</td>
<td>0.844</td>
<td>0.914</td>
<td>0.917</td>
<td>0.735</td>
</tr>
<tr>
<td></td>
<td>TiVT_INFL</td>
<td>3.28</td>
<td>0.747</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TiVT_FIX</td>
<td>2.95</td>
<td>0.931</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TiVT_PRIV</td>
<td>2.97</td>
<td>0.905</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust in the voting system</td>
<td>TVS_COM</td>
<td>3.65</td>
<td>0.873</td>
<td>0.873</td>
<td>0.877</td>
<td>0.590</td>
</tr>
<tr>
<td></td>
<td>TVS_VOLI</td>
<td>4.25</td>
<td>0.670</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TVS_VOTE</td>
<td>3.90</td>
<td>0.671</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TVS_SIS</td>
<td>3.47</td>
<td>0.760</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TVS_SCOM</td>
<td>3.71</td>
<td>0.841</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voting Attitude</td>
<td>VoAtt_DZ</td>
<td>4.19</td>
<td>0.937</td>
<td>0.935</td>
<td>0.936</td>
<td>0.831</td>
</tr>
<tr>
<td></td>
<td>VoAtt_LOK</td>
<td>4.12</td>
<td>0.875</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VoAtt_PRED</td>
<td>4.16</td>
<td>0.923</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of COVID-19</td>
<td>FoC_WOR</td>
<td>2.82</td>
<td>0.944</td>
<td>0.778</td>
<td>0.793</td>
<td>0.570</td>
</tr>
<tr>
<td></td>
<td>FoC_MED</td>
<td>2.81</td>
<td>0.663</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FoC_INF</td>
<td>2.57</td>
<td>0.617</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention to Use i-voting</td>
<td>IUIV</td>
<td>3.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The item codes are explained in the Appendix.

### Table 4. Evaluation of discriminant validity for directly linked factors (correlations)

<table>
<thead>
<tr>
<th></th>
<th>TVS</th>
<th>TTT</th>
<th>FoC</th>
<th>VoAtt</th>
<th>TiVT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVS</td>
<td>0.768</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TTT</td>
<td>0.321</td>
<td>0.762</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FoC</td>
<td>0.098</td>
<td>0.025</td>
<td>0.755</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VoAtt</td>
<td>0.404</td>
<td>0.112</td>
<td>0.131</td>
<td>0.911</td>
<td></td>
</tr>
<tr>
<td>TiVT</td>
<td>0.409</td>
<td>0.476</td>
<td>0.064</td>
<td>0.091</td>
<td>0.857</td>
</tr>
</tbody>
</table>

**Note:** The diagonal elements in the correlations represent the square root of the AVE for the corresponding factor.
Model Testing

In this study, AMOS 27.0 structural equation modeling (SEM) software was used to analyze the model using SEM path analysis (Figure 2). SEM was used because it is a powerful statistical technique that allows testing of complex models with multiple variables and relationships. It is particularly useful in studies where the relationships between variables are complex and involve latent variables. The following measures of model fit were tested: the root-mean-square error of approximation (RMSEA), the incremental fit index (IFI), the normed fit index (NFI), the Tucker-Lewis index (TLI), and the comparative fit index (CFI). The fit assessment indices are listed in Table 5. All indices meet their respective standard values, indicating that the model has a good fit to the observed data. The RMSEA is within the range of a fair fit (0.05–0.08).

Testing Measurement Invariance and Group Differences

In the second phase of the model test, we sought to determine whether the measurement model is group invariant. More specifically, whether certain structural regression paths in a given path-

Table 5. Results of the goodness-of-fit of the suggested model

<table>
<thead>
<tr>
<th>Fit Index</th>
<th>RMSEA</th>
<th>NFI</th>
<th>IFI</th>
<th>TLI</th>
<th>CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured value</td>
<td>0.058</td>
<td>0.938</td>
<td>0.957</td>
<td>0.943</td>
<td>0.957</td>
</tr>
<tr>
<td>Acceptable value</td>
<td>&lt; 0.08</td>
<td>&gt; 0.80</td>
<td>&gt; 0.90</td>
<td>&gt; 0.80</td>
<td>&gt; 0.90</td>
</tr>
<tr>
<td>Adaptation judgment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Figure 2. The model fit

*Note: Bolded arrows indicate a significant impact.*
analytic structure are the same across groups. There were three main adjustment variables in the questionnaire, namely gender, age, and education level. Respondents were divided into two groups for each variable. Chantala et al. (2006) suggested that the mediation of the adjustment variables could be analyzed through multi-group analysis. To facilitate the analysis, the following dummy variables were established: the male group (gender = 1, N = 281), the female group (gender = 2, N = 352), the under 55 group (agegroup = 1, N = 355), the 55 and older (agegroup = 2, N = 278), the lower education group consisting of individuals with secondary education level or less (edu = 1, N = 334), and the higher education group (edu = 2, N = 299). The results of the multigroup analysis for the three pairs of groups regarding the fit of the constrained model (measurement weights, i.e., loadings) compared with the unconstrained model show no significant worsening of the model fit ($p < .05$) for age, education, or gender (Table 6). In all cases, constraining the structural weights results in no significant change in model fit ($p = .065, .957, \text{and } .319$) relative to the unconstrained model. These results suggest that restrictions on factor loadings across age, gender, and education groups do not lead to a statistically significant worsening of the overall model fit.

**HYPOTHESIS TESTING AND MODEL VALIDATION**

Our hypotheses presented in the path model are tested using SEM with maximum likelihood estimation. The results (Table 7) show that hypotheses 1, 2, 3, 4, 5, and 7 are all supported. However, hypothesis 6 is not supported, indicating that attitude toward voting does not significantly influence intention to use i-voting.

**DISCUSSION**

**Key Findings**

The purpose of this study is to examine the factors that influence voters’ willingness to use i-voting, even in an emergency situation such as the COVID-19 pandemic. We followed previous research

<table>
<thead>
<tr>
<th>Grouping</th>
<th>DF</th>
<th>CMIN</th>
<th>P</th>
<th>NFI Delta-1</th>
<th>IFI Delta-2</th>
<th>RFI rho-1</th>
<th>TLI Rho-2</th>
<th>Group Diff.?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age groups</td>
<td>17</td>
<td>25.563</td>
<td>.065</td>
<td>.004</td>
<td>.004</td>
<td>-.002</td>
<td>-.002</td>
<td>No</td>
</tr>
<tr>
<td>Education groups</td>
<td>17</td>
<td>8.410</td>
<td>.957</td>
<td>.001</td>
<td>.001</td>
<td>-.005</td>
<td>-.005</td>
<td>No</td>
</tr>
<tr>
<td>Gender groups</td>
<td>17</td>
<td>19.170</td>
<td>.319</td>
<td>.003</td>
<td>.003</td>
<td>-.003</td>
<td>-.004</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothesis testing results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table 6. Multigroup analysis (structural weights – equal loadings), nested model comparisons</strong></td>
</tr>
<tr>
<td><strong>Table 7. Hypothesis testing results</strong></td>
</tr>
<tr>
<td><strong>Estimate</strong></td>
</tr>
<tr>
<td>H1 VoAtt</td>
</tr>
<tr>
<td>H2 TiVT</td>
</tr>
<tr>
<td>H3 UIUV</td>
</tr>
<tr>
<td>H4 UIUV</td>
</tr>
<tr>
<td>H5 TiVT</td>
</tr>
<tr>
<td>H6 UIUV</td>
</tr>
<tr>
<td>H7 UIUV</td>
</tr>
</tbody>
</table>

*** $p < .05$
and examined the influence of voter trust in a setting where i-voting technology has not yet been deployed, as suggested by Applegate et al. (2020) and Kulyk et al. (2022).

The results are as follows. Of the five factors we hypothesized to influence voter intent to use i-voting, four were found to be significant and one (VoAtt) was not significant. The factors that showed significant influence were TVS, TIT, TiVT, and FoC. Specifically, these results confirm the following. First, the overall aspect of trust (TVS, TiVT) is the most important factor with a demonstrated direct effect and has a significant influence on the intention to use i-voting (H3, H4), which is in line with our expectations and adds to the existing context of i-voting acceptance research.

Second, FoC surprisingly showed an extremely weak but still significant influence on the intention to use i-voting. It has the lowest influence (-.07) among all significant influences and even shows that those who are more afraid of COVID-19 are less interested in using i-voting (a negative value). In a context where contagion in a polling place can be deadly, we would certainly have expected a stronger intention to use a voting method considered safer, such as i-voting. There are several possible explanations for this. (a) In a crisis, voters want another option that involves secure voting. (b) Voters are not bothered by the risks associated with voting in person at a polling place, although statistics suggest lower voter turnout and an increase in infections during elections in times of pandemics. One has to wonder if there is a motive stronger than protecting health or even life that would be strong enough to drive even more voters to i-voting. (c) The general attitude of voters toward the use of i-voting might be reflected in this result.

Third, trust in the broadest sense remains the strongest predictor of i-voting in our case. The results show that traditional voting is strongly dependent on trust in the government’s ability to conduct free and fair elections (H1). A similar effect on voter turnout was found by Hooghe (2017). However, the results show that VoAtt do not have a statistically significant impact on the intention to use i-voting (H6). Carter and Bélanger (2012) also confirmed that voting propensity has no effect on the intention to use i-voting.

Previous research has found that citizens trust the electoral system as much as those who proposed and established it (Licht et al., 2021). However, this concept of trust in the voting system and electoral administration (TVS) changes when digital technologies are introduced to support electoral processes (TiVT). Research shows that the intensity of the impact of TVS and TiVT on IUIV is not balanced. Although the impact of TiVT on IUIV has been clearly demonstrated (Ali & Al Mubarak, 2018; Carter & Campbell, 2011; Nemeslaki et al., 2016), quite a few studies have refuted the impact of TVS on IUIV (Agbesi, 2020; Nemeslaki & Ali, 2016; Powell et al., 2012; Warkentin et al., 2018). Our study supports the former (TiVT- > IUIV) but does not agree with the latter results. As for the technological side, the results show the important role of all technological trust factors used. The high influence of TIT and TiVT is reflected in a strong direct (H4) and indirect (H5) influence on IUIV. This influence is significantly stronger (.66 and .39) than the otherwise equally significant influence of TVS on IUIV (.18). In addition, the influence of TVS is negative with respect to intention to use i-voting. When trust is high and voters believe that the existing electoral system provides free and fair elections, they are less likely to use new forms of voting, such as i-voting. Despite the results presented, trust in voting technologies alone is not sufficient. As Kulyk et al. (2022) confirm, the success of i-voting technology is questionable if there is not a high level of trust in state institutions. The existence of the described dependence was demonstrated by confirming hypothesis H2.

Finally, our results show that IUIV does not depend on age, gender, or education of voters.

Implications and Recommendations

Based on our findings, we can make some recommendations on how to create a technical and organizational environment to increase the chances of success of i-voting. Similar to Kulyk et al. (2022), building a secure and transparent system for the use of voting technologies is the main challenge. In addition, the state must provide sufficient opportunities for citizens to acquire the digital skills needed to vote, and even enable a test environment. The introduction of i-voting at less
influential levels (within sectors, organizations, at the local level) should give voters more confidence and familiarize them with the technology. Widespread use of other e-government services will enable better understanding and growth of TIT and TiVT.

Transparency in election administration should be provided to make citizens aware that these institutions are trustworthy, that they can conduct free and fair elections, and that they are skilled in using the technologies that support the i-voting process. Of course, this has to be proven in practice over time.

The introduction of i-voting certainly has a better prognosis if it is embedded in an existing and accepted e-Government service environment, with the necessary corresponding values of the parameters TIT and TVS, as was the case in Estonia (Ehin et al., 2022).

Study Limitations

Some shortcomings of the study should be considered. First, in terms of measurement invariance, the sample is not representative of the Slovenian population, since a smaller number of voters with only primary education were included compared to their share in the total population. Second, the results could be different in other countries around the world. However, countries with backgrounds similar to Slovenia’s, particularly those with persistently low trust in government and no experience with i-voting at any level, might rely more on the results than others. Finally, the inertia of Slovenia’s turbulent political circumstances in early 2022, dissatisfaction with the security measures put in place as a result of COVID-19, and consequently with the authorities at the time, drove a historic 70.97% voter turnout to the polls. Such conditions deviated from the norm, which should be taken into account accordingly when interpreting the results of the study.

CONCLUSION

The purpose of this study was to identify the factors that influence eligible voters’ intentions to use i-voting and the interdependencies among these factors. It also aimed to determine the influence of FoC as a driver of i-voting acceptance, suggesting that those who believe their health may be at risk at polling places are more likely to use i-voting.

From the quantitative analysis of IUIV, it can be concluded that the influence of FoC, even if reported as significant, is almost zero when it comes to the intention to use i-voting. Therefore, in this or any future crisis, voters will expect the government to propose and implement various alternative options to ensure a safe voting experience. However, the model tested proved to be a good fit and showed significant effects of other conceptual factors on the intention to use i-voting. TiVT proved to be a significant main influence on IUIV. Therefore, ill-prepared and failed attempts to use i-voting technology undermine trust in government and the electoral process as a whole (Górny, 2021) and should be avoided. Finally, we have shown that past voting behavior does not affect IUIV, i.e., voters who vote at the polling place do not automatically switch to new forms of voting. We also showed that those who have not previously voted are not automatically attracted to new online options.

The study therefore offers new insights into the complex relationship between the factors that influence the adoption of a new technology in e-democracy, namely i-voting. The survey results show that even after the pandemic, various aspects of trust remain the most important determinant of the intention to use i-voting. Given the large number of elections held during the COVID-19 situation, there are unfortunately untapped opportunities to promote secure voting as well as other benefits of i-voting. In many countries where the security measures taken have been successful in combating the spread of infection, trust in government has actually increased. We conclude, therefore, that proper presentation of i-voting as one of the measures to reduce the risk of infection or other risks lays the foundation for trust in the government as a provider of election security, which has been shown to be an essential prerequisite for acceptance and a favorable predictor of the prospects for future use of the service. Last but not least, a society that is now deeply engaged in strategies to ensure resilience
in a crisis situation would also benefit from the experience of the COVID-19 period in ensuring the conditions for democracy to function in its broadest sense. The results also show that age, gender, or level of education have no influence on the model parameters.

FUTURE RESEARCH DIRECTIONS

I-voting is a promising democratic tool of the future digital society, and there are several promising areas for future research. As security remains a key concern in Internet voting, future research should focus on developing technologies and protocols that ensure the integrity and confidentiality of voting. With tested and proven solutions, trust in i-voting technology would increase. Although i-voting systems aim to make voting more accessible and convenient, their usability is a challenge for many users. Future research should investigate how to design more user-friendly i-voting interfaces. In addition, the cost-effectiveness of i-voting and the potential of i-voting systems for other types of elections, such as referendums or local elections, need to be investigated. Because i-voting is still new, the legal and policy framework may need to be modified. Future research could therefore examine the impact of i-voting on election laws and regulations, the role of government in regulating i-voting, and the potential for policy changes to facilitate wider adoption of i-voting. Finally, there is a need for more empirical research on the impact of i-voting on voter turnout. Future research should aim to address these discrepancies and provide a more definitive answer.

NOTE

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REFERENCES


APPENDIX

Questionnaire (translated from Slovenian)

1. Trust in the Internet and online services
   How much do you trust the security and privacy of the Internet and various online services (1- strongly disagree, 2- disagree, 3- neutral, 4- agree, 5-strongly agree):
   - I believe that online banking is secure. (TIT_EBA)
   - I believe that health records from various electronic public records are only accessible to authorized personnel. (TIT_EH)
   - I trust that data in electronic public records (civil registration, tax data, financial data) are protected. (TIT_PA)

2. Attitude towards participation in democratic processes in Slovenia
   How often have you voted in (1- never, 2- rarely, 3- sometimes, 4- usually, 5- always):
   - National Assembly elections? (VoAtt_DZ)
   - Local elections? (VoAtt_LOK)
   - Presidential elections? (VoAtt_PRED)

3. Trust in the voting system and electoral administration
   Regarding the electoral system in Slovenia, how much do you trust: (1- not at all, 2- not very much, 3- some, 4- quite a lot, 5- completely):
   - The electoral system, in general? (TVS_SIS)
   - That the election committees are honest and fair? (TVS_COM)
   - That your privacy is guaranteed at polling stations (no one can influence your decision there)? (TVS_VOLI)
   - That nobody can find out the data about your vote? (TVS_VOTE)
   - That the election committee counts the votes correctly and publishes the correct results? (TVS_SCOM)

4. Fear of COVID-19
   How do you agree with the following statements about your personal attitude toward COVID-19: (1- strongly disagree, 2- disagree, 3- neutral, 4- agree, 5- strongly agree):
   - I am concerned when I think about COVID-19. (FOC_WOR)
   - I am worried when I follow the news and reports about COVID-19. (FOC_MED)
   - I am afraid of catching the COVID-19 virus. (FOC_INF)

5. Trust in i-voting technology
   If an i-voting application was available and used in Slovenia in addition to traditional voting, would you trust (1- not at all, 2- not very much, 3- some, 4- quite a lot, 5- completely):
   - That no unauthorized person would be able to see the votes cast via such an application? (TiVT_PRIV)
   - That votes cast online would be tamper-proof? (TiVT_FIX)
   - That no one would be able to influence voters casting their votes via such an application? (TiVT_INFL)
   - That all votes would be counted and published correctly? (TiVT_COUN)

6. I-voting intention (IUIV)
   If an i-voting application were available for computers and smartphones in 2022, how likely would you be to use it in national, local, or presidential elections: (1- not at all, 2- probably not, 3- maybe, 4- probably yes, 5- definitely yes)

7. Gender
   - male
   - female
8. Year of birth
   ◦ __________

9. Education status
   ◦ Primary education or less
   ◦ Secondary education
   ◦ Higher education

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