Voting beyond borders: A pilot study investigating preferences and trade-offs in remote voting among the Albanian electorate

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Abstract. This study investigates remote voting preferences, the trade-off between vote secrecy and integrity, and vote verification among the Albanian electorate using an online survey. The results show that remote voting via an Internet voting system is the preferred option. The findings also reveal the importance of ensuring vote secrecy while prioritizing vote integrity, supported by participants' preferences for vote verification. This study contributes with insights for the future design of a remote voting system that could be accepted and trusted by the majority of voters, ultimately enhancing democracy in Albania.

Keywords: Remote Voting · Preferences · Secrecy · Integrity · Verification

1 Introduction

Elections are the cornerstone of democracy. Elections uphold the principles of representation, participation, and legitimacy that are vital for a functioning democratic system [1]. It should be emphasized that representation [42] and legitimacy [11] are intrinsically tied to participation. In many mature democracies, election participation has decreased noticeably in recent years. Among others, changing demographics is a crucial factor contributing to a decline in election participation [17]. In response to this trend, many countries are actively pursuing convenience voting reforms. These reforms include initiatives such as early voting, same-day registration, and remote voting [20].

Today, many countries use remote voting for people living abroad or are unable to attend a polling station on Election Day. In Estonia, Internet voting has been used since 2005 [15]. Switzerland also embraces remote voting, offering its citizens both postal [25] and Internet voting [47]. Furthermore, both Germany [55] and Australia [63] have implemented comprehensive postal voting. Brazil has implemented internet voting for certain segments of the population [51]. However, there are countries that allow but have not yet implemented remote voting, for example, Albania [53].

Despite strong advocacy from the Albanian diaspora and substantial efforts from a legal [53] and social [13] perspective, remote voting was not implemented for the parliamentary elections in April 2021. Given the historically low turnout

in the past three parliamentary elections[1], the introduction of remote voting addresses a critical concern by providing convenient and accessible means for citizens to engage in the electoral system. The impact of this initiative extends beyond mere convenience, as it addresses the significant diaspora population that constitutes 48% [12] of the eligible voters. By enabling remote participation, Albania aims to empower its diaspora by overcoming the logistical challenges (e.g., limited accessibility and long waiting times) they face in physically attending elections.

Furthermore, unlike the local population, diaspora members are less influenced by the ruling parties and societal coercions in Albania. Therefore, the diaspora may be more inclined to prioritize integrity in the electoral process, potentially sacrificing some vote secrecy. However, careful consideration of voters' preferences for remote voting and robust security measures must accompany its implementation. This is to safeguard vote secrecy and the integrity of the electoral process, as well as to ensure public trust in this transformative endeavor.

Currently, there is a lack of empirical studies on voters' preferences for remote voting in the Albanian context. Hence, this pilot study aims to bridge this gap by investigating the preferences of voters from the Albanian electorate, particularly the diaspora, for different remote voting options. Moreover, as the diaspora operates independently of local societal pressures and ruling parties, we aim to delve into their preferences regarding electoral processes. We examine whether there is an inclination towards prioritizing stronger integrity even at the expense of sacrificing some level of vote secrecy. Given the close association between integrity and verification in the context of elections, our investigation includes preferences related to the verification of electoral processes. Based on these considerations, this study is guided by the following research questions: (RQ1) *What are voters' preferences regarding different options for remote voting?*; (RQ2) *How do voters weigh the trade-off between vote secrecy and integrity?* and; (RQ3) *What level of vote verification is acceptable for voters when voting remotely?*. These questions were addressed using an online survey.

2 Background

Remote voting, particularly Internet voting, has been extensively explored over the last decade, engaging researchers across different disciplines. For instance, studies have investigated and evaluated the usability of Internet voting systems, providing recommendations to improve the design of these systems and, consequently, enhance their user-friendliness [2,19,24,33–36,40,57]. Additional studies have focused on identifying factors that influence trust [4, 48, 49, 56] and transparency [3] within Internet voting systems. These investigations have resulted in a compilation of factors aimed at enhancing transparency and fostering trust in such systems. Other studies have evaluated various aspects of verification in the

[1] 46.33% in 2021, 46.77% in 2017, and 49.86% in 2013. Statistics provided by the Central Electoral Commission at `https://kqz.gov.al/parliamentary-elections/`.

context of Internet voting. For example, some researchers have investigated voters' experiences regarding verification [44], others compared and evaluated how voters cope with different verification mechanisms [27], and a third contingent has explored voters' mental models with respect to verification [39, 41, 61, 62].

Although remote voting offers numerous advantages, its disruptive characteristics may result in a perceived deficit in legitimacy. Hence, this can lead to reduced levels of trust and acceptance [6]. Therefore, understanding voter preferences is crucial for the design and implementation of a voting system that is both accepted and trusted by voters [30, 38, 58]. Consequently, a plethora of research has been conducted to investigate voters' preferences and attitudes toward remote voting systems. The majority of such studies have focused on U.S. voters. For instance, some studies have investigated voters' attitudes towards remote electronic voting systems in general, concentrating on the impact on voter participation, demographic differences, and voters' intention to use such systems [5, 23, 59, 60]. While other research with U.S. voters [7–9, 43] have explored voters' attitudes towards Internet voting, particularly regarding voters' intentions to use such systems and their perceived usefulness, only a few have assessed voters' perceptions regarding voting by mail [5, 50].

Notably, few studies have been conducted in international contexts. Kimbi and Zlotnikova [26] explored voters' readiness for remote electronic voting in Tanzania. They highlighted voters' preference for electronic voting but expressed concerns related to security, privacy, and reliability. Faraon et al. [16] examined voters' attitudes towards Internet voting in Sweden. The study challenged previous research by indicating that age was not a significant factor influencing voters' participation when using Internet voting. Fragnière et al. [18] aimed to understand bottlenecks and sociological obstacles in the perception of Internet voting in Switzerland. However, few studies have been conducted on German voters. For example, Marky et al. [37] investigated voters' perceptions of individual verification of Internet voting and provided recommendations (e.g., verify the cast vote, minimize human effort) for developers and policymakers based on their findings. Furthermore, Kulyk et al. [28] explored attitudes towards voting online using a verifiable system, highlighting convenience as a primary motivator and emphasizing the importance of verification. Finally, but not least Marky et al. [32] assessed voters' perceptions of state-of-the-art practices in Internet voting, emphasizing the role of expert evaluations and individual verification in building trust, while noting the negative impacts of vote updating due to voter unfamiliarity.

Existing studies on voters' perceptions and attitudes offer valuable insights into various aspects of remote voting. These include demographics, accessibility, trust, security, and verification. However, most investigations focus on a single remote voting option, limiting a comprehensive understanding across the spectrum. Furthermore, cultural and legal factors may influence the acceptance and implementation of remote voting [30]. These factors can vary widely between countries and regions, and may play a significant role in shaping public opinion. For instance, Estonia [15], Switzerland [14], and Germany [22] have implemented

different options for remote voting. To the extent of our knowledge, no empirical investigations have been conducted on voters' preferences for different remote voting options. Furthermore, our study adds to a more comprehensive understanding by focusing on Albanian voters, and considering a new socio-political context.

3 Methodology

3.1 Participants

A total of 55 participants completed an online survey. Two participants were excluded due to missing data. The final sample consisted of 53 participants with an age range of 15 to 54 years ($M = 34.06$[2]; $SD = 9.88$), see Table 1 for an overview. We included participants aged 15 years and older since they would be eligible to vote in the next parliamentary elections scheduled for 2025.

Furthermore, we included participants who are currently not eligible to vote in Albania as they do not possess Albanian citizenship. Note that many Albanians living in the diaspora had to give up their citizenship because other countries, for instance, Germany does not allow double citizenship for non-EU citizens. Nevertheless, public opinion indicates that these citizens will consider regaining their former citizenship once Albania joins the EU. Last but not least, we also included those currently living in Albania. The reason for this is twofold: (1) Given the constant high number of Albanian citizens emigrating[3], these participants might be part of the diaspora as well; (2) Investigate and better understand differences in voters' perceptions, between those residing in Albania and those living in the diaspora.

Political allegiance was grouped based on the following categorization that reflects the political landscape in Albania: *left* (Partia Socialdemokrate, Partia Socialiste e Shqiperise, Levizja Socialiste per Integrim), *center* (Partia Nisma Thurje, Partia Levizja e Re, Partia Lëvizja Për Ndryshim), and *right* (Partia Balli Kombetar, Partia Lëvizja Demokratike Shqiptare, Partia Bindja Demokratike, Aleanca Bashkimi Popullor Emigracioni - Ora e Shpresës dhe Konservatorët, Partia Demokratike "Aleanca për Ndryshim", Partia Aleanca Demokracia e Re).

3.2 Materials and measures

A survey consisting of five sections was used.[4] The first section introduced the participants to the study (e.g., purpose of the study, estimated completion time,

[2] The median age is close to the median age of the entire population ranging from 32.6 in 2011 to 38.8 in 2023. Official statistics retrieved from the Albanian Institute of Statistics at `http://databaza.instat.gov.al`.

[3] Refer to the statistics provided by the Albanian institute of statistics at `https://www.instat.gov.al/media/11653/popullsia-e-shqiperise-1-janar-2023.pdf`.

[4] The survey can be found at `https://osf.io/vztec/?view_only=4e70c99fe2dc4d448fc7c696102f7b69`

Table 1: An overview of participant demographics.

Measure	Items	Frequency	Percentage
Gender	Male	26	49.1
	Female	27	50.9
Education	Compulsory school	1	1.9
	Professional school	1	1.9
	High school	3	5.7
	Bachelors or equivalent	10	18.9
	Masters or equivalent	31	58.5
	Doctoral or equivalent	5	9.4
	Other	2	3.8
Employment	Student	2	3.8
	Unemployed	4	7.5
	Self-employed	7	13.2
	Employed (private)	29	54.7
	Employed (government)	7	13.2
	Retired	2	3.8
	Other	2	3.8
Citizenship	Albanian only	33	62.3
	Albanian and other country	16	30.2
	Other	4	7.5
Living outside Albania	Yes, only another country	41	77.4
	No, only in Albania	7	13.2
	Both in Albania/another country	5	9.4
Political allegiance	Apolitical (voted blank/abstain)	28	52.8
	Left	2	3.8
	Center	4	7.5
	Right	12	22.6
	Other	7	13.2
Computer skills	Basic	3	5.7
	Intermediate	14	26.4
	Advanced	36	67.9

ethical considerations, and author information). The second collected demographics, such as age, gender, education, employment, citizenship, living place, political allegiance, and computer skills. In addition, participants reported voting eligibility, voting in past elections, voting in future elections, number of times voting in parliamentary, local, and other elections, and voting methods used in the past. Questions to capture voters' behavior and experiences were developed based on guidelines from previous research [29]. The third focused on questions related to remote voting preferences (e.g., If remote voting was available, which option would you prefer most?). For these questions, we drew insights from a compiled list by the European Commission [31] and confirmed our list using real-world deployments [15, 22, 45, 54]. The fourth relates to vote secrecy and integrity (e.g., If remote voting is available, what would you prefer

to be ensured?). These questions were based on definitions from existing research [21, 46]. The fifth featured questions about election verification (e.g., If remote voting was available, which verification steps should the voting system support?). These questions were derived using definitions from a systematization knowledge paper [10], which divides verification into: (1) individual verification, consisting of cast-as- and recorded-as-cast; and (2) universal verification, also known as tallied-as-recorded.

3.3 Procedure

The survey was created using Qualtrics Core XM and designed in both Albanian and English. Following the snowball sampling method, the survey targeting the Albanian electorate was distributed via different online channels. The first channel included social networks, namely a private WhatsApp group managed by the *Diaspora për Shqipërinë e Lirë (DPSHL)* movement, LinkedIn, and Facebook. The second channel was the official website of the DPSHL movement (votaediaspores.com). Following the closure of the survey, all data were exported to SPSS for conducting the corresponding statistical analysis.

3.4 Ethical considerations

This study adhered to the ethical guidelines of the Swedish Research Council for data collection [52]. All participants received an introduction to the purpose of the study upon opening the online survey. They were informed that all collected data was processed and protected according to the mentioned ethical requirements. Participants were informed that participation was voluntary and confidential and that all responses were anonymized. In addition, they were provided with information that the collected data would only be used for research purposes and not shared with third parties. Finally, participants were made aware that they could end their participation at any time during the survey.

4 Results and analysis

4.1 Voting behavior and experience

Participants were asked to report on their eligibility to vote, their participation in past and future elections, the number of times voting for parliamentary, local, and other elections, and the voting method used in the past. The participants' responses are summarized in Table 2.

The results reveal a contrast between eligibility to vote and low turnout in the last election. This could suggest a disconnect between being able to vote and voting, but may also indicate underlying barriers to voting participation. Looking into the future, while the data show that the majority of participants reported that they intended to vote in the next election, a significant number are uncertain or do not plan to vote. This highlights the need for further investigations to better understand what type of interventions, including the use of technological advancements, should be considered to increase voter turnout and engagement.

Table 2: Participants' voting behavior and experience.

Measure	Items	Frequency	Percentage
Eligible to vote	Yes	49	92.5
	No	4	7.5
Voted in last election*	Yes	20	37.7
	No	33	62.3
Voting in future election**	Yes	30	56.6
	No	23	43.4
Number of times voted			
Parliamentary, local, others	0	10, 15, 49	18.9, 28.3, 92.5
	1	14, 10, 2	26.4, 18.9, 3.8
	2	10, 10, 2	18.9, 18.9, 3.8
	3	7, 9, 0	13.2, 17.0, 0
	4	6, 3, 0	11.3, 5.7, 0
	5	4, 4, 0	7.5, 7.5, 0
	7	1, 1, 0	1.9, 1.9, 0
	9	1, 1, 0	1.9, 1.9, 0
Past voting method used	Polling station (paper)	48	90.6
	Polling station (electronic)	1	1.9
	Not used any method	4	7.5

Notes. * Parliamentary election of 2021. ** Expected parliamentary election in 2025.

4.2 Remote voting preferences

Participants were asked about their preferred remote voting option. The data show that voting remotely on an electronic device via an Internet voting system was the most preferred option, followed by voting on an electronic voting machine in a remote polling station and voting remotely on a paper ballot via postal mail. Few participants chose voting on a paper ballot in a remote polling station and voting remotely via phone call, SMS, and e-mail, see Table 3. The data

Table 3: Participants' preferred voting method.

Voting method	Frequency	Percentage
Voting on paper ballot in remote polling station (e.g. embassy)	2	3.8
Voting on electronic voting machine in remote polling station (e.g. embassy)	9	17.0
Voting remotely on paper ballot via postal mail	8	15.1
Voting remotely on electronic device via Internet voting system (e.g. desktop, laptop, tablet and smartphone)	24	45.3
Voting remotely via phone call	3	5.7
Voting remotely via SMS	3	5.7
Voting remotely via e-mail	4	7.5

demonstrate a trend that favors online-based voting methods over traditional ones like voting in person or through postal mail. This reflects a desire among the Albanian electorate towards digitally integrated methods of participation in elections and a willingness to adopt new voting technologies if they are made available. In addition, participants were also asked to indicate which two other options they would prefer if the most preferred would not be available. The results are presented in Table 4.

Table 4: Participants' second and third options for remote voting.

Measure	**Frequency**	**Percentage**
Second option		
Voting on paper ballot in remote polling station (e.g. embassy)	11	20.8
Voting on electronic voting machine in remote polling station (e.g. embassy)	11	20.8
Voting remotely on paper ballot via postal mail	6	11.3
Voting remotely on electronic device via Internet voting system (e.g. desktop, laptop, tablet and smartphone)	9	17.0
Voting remotely via phone call	0	0
Voting remotely via SMS	3	5.7
Voting remotely via e-mail	10	18.9
Voting remotely via proxy (e.g., friend, family, colleague)	3	5.7
Third option		
Voting on paper ballot in remote polling station (e.g. embassy)	12	22.6
Voting on electronic voting machine in remote polling station (e.g. embassy)	11	20.8
Voting remotely on paper ballot via postal mail	5	9.4
Voting remotely on electronic device via Internet voting system (e.g. desktop, laptop, tablet and smartphone)	10	18.9
Voting remotely via phone call	8	15.1
Voting remotely via SMS	1	1.9
Voting remotely via e-mail	3	5.7
Voting remotely via proxy (e.g., friend, family, colleague)	3	5.7

For the second option, the data indicate that paper ballots and electronic voting machines in remote polling stations are the top alternatives, each receiving 20.8% of participants' preference. This implies a desire for tangible and traditional voting within a controlled environment. Voting remotely via e-mail and Internet voting via an electronic device are the next preferred methods at 18.9% and 17.0%, respectively. Notably, no participants selected phone call as their second choice. For the third option, the results reflect the second option with the exception for phone call which was selected by 15.1%. Phone call voting as a third preference shows that participants may be willing to adopt less traditional

methods when more preferred options are not possible. Furthermore, participants were asked to indicate a maximum of three reasons behind using remote voting if it was available, see Table 5.

Table 5: Participants' reasons for using remote voting.

Reasons for using remote voting	**Frequency**	**Percentage**
I like to vote without having to leave work (e.g., saving money)	30	56.6
I want to avoid polling stations (e.g., not standing in long queues)	19	35.8
I want to save time (e.g., long travel distance to polling stations)	44	83.0
I have dependents at home (e.g., taking care of children)	7	13.2
I have mobility limitations (e.g., being disabled)	5	9.4
I feel it is convenient (e.g., easy participation)	26	49.1
I feel it is a modern approach (e.g., using digital technology)	26	49.1
Other	2	3.8

The data suggest that saving time because of the distance to a polling station was the most prevalent reason. This was followed by saving money by not leaving work. In addition, perceiving remote voting as convenient and modern were also seen as strong drivers. Reasons related to personal circumstances, such as, taking care of children or mobility limitations, seem less common reasons. Overall, practical and efficient factors seem to have a higher impact than personal or situational considerations.

4.3 Vote secrecy and vote integrity

Participants were asked about their preferences regarding the ensurance of vote secrecy and vote integrity. When asked about these requirements in general, the results show that while many participants preferred vote integrity over vote secrecy, the majority considered both equally important.

However, when asked about these requirements in the context of remote voting, the preference for both increased slightly. Participants expect that a remote voting system provides means to ensure both the secrecy and the integrity of their vote against unauthorized attempts to access or change votes, see Table 6. Moreover, participants were asked what they prefer to be ensured: vote secrecy, vote integrity, or both. The results are presented in Table 7. It is clear that a majority would prioritize vote integrity even if vote secrecy could be at risk. Only a few participants considered the reverse. Interestingly, a sizable minority would not consider using a remote voting system if both vote secrecy and vote integrity were not guaranteed. While vote integrity is considered more important by participants, failing to also ensure vote secrecy could potentially lead to a decrease in voter turnout when using remote voting systems.

Table 6: Participants' preferences for ensuring vote secrecy and vote integrity.

Measure	Items	Frequency	Percentage
In general	Vote secrecy	2	3.8
	Vote integrity	16	30.2
	Both equal	34	64.2
	Other	1	1.9
Remote voting	Vote secrecy	1	1.9
	Vote integrity	14	26.4
	Both equal	36	67.9
	Other	2	3.8

Notes. Vote secrecy refers to voters' choice being confidential and only known to them, while vote integrity means voters' choice not being modified by unauthorized parties.

Table 7: Participants' preferences for ensuring vote secrecy and vote integrity.

Measure	Frequency	Percentage
I prefer vote secrecy to be ensured, even if vote integrity can be at risk	3	5.7
I prefer vote integrity to be ensured, even if vote secrecy can be at risk	35	66.0
None of the above. I would not use a remote voting system that does not ensure both vote secrecy and vote integrity	15	28.3

4.4 Vote verification

Participants were asked which of the following three verification steps they consider a remote voting system should support: cast-as-intended, stored-as-cast, and tallied-as-stored. The results are presented in Table 8. Cast-as-intended ensures integrity of a voter's vote *during* vote casting while stored-as-cast ensures integrity of a voter's vote *after* vote casting, and *until* before tallying. Finally, tallied-as-stored ensures integrity of all cast votes *during* vote tallying.

Table 8: Participants' preferences for vote verification steps.

Measure	Frequency	Percentage
Cast-as-intended	5	9.4
Stored-as-cast	6	11.3
Tallied-as-stored	7	13.2
All steps. I would not use a system that does not support all steps of verification.	35	66.0

Notably, the majority of participants expressed that they would not use a remote voting system if not all verification steps were supported. The preferences for

the different verification steps are evenly distributed and less important than the ensurance of all the verification steps.

5 Discussion

The results of this pilot study give insights into the preferences of the Albanian electorate regarding remote voting options, vote secrecy, integrity, and vote verification. It has to be emphasized that given the lack of exploration in previous studies, a comparative analysis cannot be conducted regarding voters' preferences for various remote voting options. However, our findings regarding remote voting options reveal a trend among the Albanian electorate.

The majority of participants expressed a preference for adopting novel remote voting technologies if accessible. The favored options included: (1) remote voting on an electronic device via an Internet voting system, and (2) voting on an electronic voting machine in a remote polling station. In addition, participants attributed their preference to its perceived convenience and modernity. In summary, practical and efficient factors seem to have higher impact than personal or situational considerations. Our results regarding remote voting preferences align with previous studies [7,9,28] that emphasize convenience as a significant factor. In contrast, they diverge from Yao and Murphy's [59] emphasis on mobility and Powell et al.'s [43] identification of performance expectancy, social influence, and computer anxiety as crucial factors.

Regarding the trade-offs between vote secrecy and integrity, our findings indicate that a majority of participants view both aspects as equally important, although some prioritize vote integrity. These results align with previous research [4,16,26,28,61], highlighting the significance of security, encompassing both vote secrecy and integrity, in the perception of Internet voting systems by voters.

Finally, our findings show that a majority of participants would abstain from utilizing a remote voting system unless all verification steps are supported, which confirms previous research. For instance, Kulyk et al. [28] revealed participants' consensus on the importance of verification. Moreover, Marky et al. [32] proposed that practices like verification play a crucial role in fostering voters' trust.

A few limitations come to the fore when considering the methodology of our study. First, the limited sample size impede the generalizability of the findings. Second, given that the study focused on remote voting technology not yet accessible to participants, their responses could have been skewed by unfamiliarity with such technologies. This limitation underscores the importance of interpreting the results as indicative of perceived preferences towards remote voting, rather than definitive evidence of actual preferences. Despite these limitations, the results of this pilot study provide essential groundwork for future studies to further explore and understand the dynamics of remote voting preferences among the Albanian electorate. Future research could expand this study by including a larger group of participants across different segments of the Albanian electorate. In addition, it could be relevant to examine how attitudes towards vote buying/selling, voter coercion, and external influences impact remote voting preferences.

In conclusion, the implementation of a remote voting system by the Albanian electoral authorities should prioritize a design ensuring both vote secrecy and integrity. Additionally, the incorporation of end-to-end verification while considering recommendations on individual verification is recommended.

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