

E-VOTING AS A TOOL TO REDUCE UNEQUAL VOTER TURNOUT IN THE CZECH REPUBLIC

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Electronic voting is one of several tools that have the potential to reduce the cost of voting for citizens and thus motivate them to vote. However, the results of previous research have shown that this effect is not achieved in every case. Our research examines the potential consequences of the introduction of e-voting in the Czech Republic, where the introduction of this tool is the topic of public discussion. More specifically, we examine whether the introduction of this tool has the potential to increase voter turnout and for which groups of citizens the potential is highest. For this purpose, we use data from a survey conducted on a representative sample of respondents. To test the hypotheses, we employ binary and multinomial logistic regression models. The results of the analysis show that the introduction of electronic voting, compared to other tools facilitating voting, has the highest potential to increase voter turnout in the Czech Republic. The increase in voter turnout is particularly noticeable among groups of citizens that usually do not participate in voting.

Key words: e-voting; voter turnout; Czech Republic; vote-facilitating rules.

1 INTRODUCTION

Declining voter turnout (Alvarez et al. 2009), citizen convenience (Henry 2003) or the development of e-government (Anane et al. 2007) contribute to the political discussion on e-voting. While in some countries this rule facilitating voting has been an integral part of the electoral system for several years, in other countries politicians are still discussing the introduction of e-voting. This discussion is also taking place in the Czech Republic. In this country, which is part of the Central and Eastern European countries, there are still no tools to make voting easier for citizens (e.g., postal voting, proxy voting, early voting) and the

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introduction of e-voting is now offered as one of the options to motivate citizens to vote.

The arguments for the introduction of electronic voting can be seen in the savings in travel costs associated with the traditional method of voting at polling stations. Another advantage of e-voting may also be the possibility for a citizen to vote from work or on holiday without having to significantly change his or her scheduled programme. However, the results of research examining the consequences of e-voting suggest e-voting may not increase citizens' interest in voting (Chevallier 2009; Goodman and Pyman 2016). Moreover, it may cause deeper differences among voters because only some citizens use this rule (Alvarez and Nagler 2000; Gibson 2001).

The conclusions of the previous literature on e-voting are often ambiguous and limiting. This research has examined the implications of the introduction of e-voting using the ex-post method in countries where e-voting has been introduced in combination with other voting facilitation tools (e.g., postal voting), such as Switzerland and Canada. In contrast, research using the ex-ante method to examine the effects of e-voting is poor, especially in countries where no voting facilitation instrument has been introduced.

This paper aims to address gaps in current research by providing an ex-ante analysis of the potential impacts of introducing e-voting in the Czech Republic. No similar studies have been conducted in the country, which has recently faced low voter turnout (Bláha 2023; Maškarinec 2023). The country was under a totalitarian regime with a centrally planned economy until 1989, and it transformed into a market economy during the 1990s. At the turn of the millennium, the Czech Republic became a member of international organizations like NATO and the European Union. Since 2010, there has been a polarization and extremization of citizens' political preferences (Rolník 2023; Kuba et al. 2022), leading to a gradual decline in voter turnout and uneven distribution among different social groups (Linek 2013; Stanley 2017). E-voting has been suggested as a potential solution to reverse these trends and improve voter turnout (Gerlach and Gasser 2009; Kenski 2005).

The paper is arranged as follows: Section 2 presents theoretical background and hypotheses, followed by the methods in Section 3. Then, Section 4 details the results followed by the discussion and conclusion in Section 5.

2 THEORETICAL BACKGROUND

E-voting is one of the ways in which a citizens can vote in an election without visiting a polling station. The introduction of this vote-facilitating rule reduces the direct and objective voting costs of citizens (Berinsky 2005), but also the costs perceived by citizens individually (Blais et al. 2019). Subjectively perceived costs may differ from actual costs. E-voting facilitates voting for citizens by reducing the time and effort required to vote (Gainous and Wagner 2007; Kenski 2005; Powell et al. 2012). The advantages of e-voting can be seen primarily in the removal of some barriers to the citizen's entry into the political market. It eliminates obstacles to voting for citizens with reduced mobility or citizens living abroad. However, it also offers flexibility and convenience for all other citizens to vote (Henry 2003). Citizens can vote at any time and from anywhere - for example, from home, from work, and even while on vacation. In addition,

electronic voting can encourage voting by young citizens who traditionally show low interest in elections (Smets and van Ham 2013).

Although e-voting reduces citizens' voting costs, the results of empirical observations have not clearly confirmed the increase in citizens' turnout since the introduction of e-voting. The reason for this trend can be seen primarily in the interest of voting. If voters voted regularly in the form of paper ballots in polling stations, some of them began to vote electronically. Citizens who did not participate in the elections regularly did not participate even after the introduction of e-voting. This is confirmed by evidence from Canada, Switzerland, and Estonia (Chevallier 2009; Goodman and Pyman 2016; Goodman and Smith 2017; Solvak and Vassil 2016; Vinkel and Krimmer 2017). The increase in interest in voting after the introduction of e-voting can be observed especially among citizens who have ever participated in previous elections (Madise and Martens 2006). From the above, e-voting could increase overall turnout by facilitating voting for irregular voters. In this context, we have established hypotheses that examine the effects of the introduction of electronic voting on citizen participation in elections. The hypotheses are as follows:

H1: Introducing electronic voting in the Czech Republic will boost the total turnout.

H2: Voter turnout rises among irregular voters after introduction of e-voting.

However, e-voting is not the only way to make voting easier for citizens. Studies show that, for example, optimal location of the polling station can increase voter turnout (Haspel and Knotts 2005; Orford et al. 2011). Bringing the polling station closer to the citizen's residence by 0.245 miles can increase voter turnout by up to 4-5 % (Cantoni 2020). For citizens, who are often busy, changing the opening hours of polling stations may be a suitable rule to facilitate voting. Extending polling station opening hours by 10 % may increase voter turnout by 0.5-0.9 percentage points (Potrafke and Roesel 2020). Garmann (2017b) postulated the conclusion that extending the opening hours of polling stations in the Saarland and Rhineland-Palatinate by 3 hours would increase citizens' turnout by 2.1 percentage points. Sometimes, however, even extending the opening hours of polling stations may not make it possible for workers to vote in elections, so Bradfield and Johnson (2017) recommend introducing a special "election day" when the whole nation should have time off and thus the opportunity to vote.

Although in many studies the factors of polling station location, polling station opening hours, or election dates have been shown to be significant, researchers prefer the technical conduct of elections. One of the possible measures to increase voter turnout is to combine multiple elections at the same time. There is evidence that many elections negatively affect voter turnout (Franklin 2001; Rallings et al. 2003). According to Garmann (2017a), there can be several reasons for this trend: citizens' fatigue from voting; high voting costs; saturating interest in politics; the feeling of fulfilment of civic duty after the first vote; less media coverage of individual elections; lower mobilization efforts of political parties. If two elections are scheduled in a relatively short period of time, turnout in later elections is significantly reduced. The concurrence of several elections increases turnout (Björk 2017). In addition to the concurrence of several elections in one term, turnout can be increased by introducing two consecutive voting days (Kaplan and Yuan 2020), or by introducing other instruments, such as: postal voting, proxy voting, special polling booths, transfer voting, and advance voting (Norris 2004).

However, the above-mentioned tools facilitating citizens' voting in elections do not sufficiently reduce citizens' costs. It is obvious that a citizen who votes by postal voting must complete the journey to the post office, a citizen voting proximally must authorize another citizen. Voting at a different time or place reduces costs, but citizens still must go to the polls. In addition, as the Internet and social networks are gradually becoming the main communication tool (Gerlach and Gasser 2009; Germann 2020; Oostveen and van den Besselaar 2004), we consider e-voting to be the most effective way to increase voter turnout and we establish the following hypothesis:

H3: In the Czech Republic, e-voting will increase voter turnout more than the implementation of additional vote facilitating rules.

Although e-voting can be an effective rule for increasing turnout (Svensson and Leenes 2003), it should be noted that it undermines voter representativeness by disadvantaging already disadvantaged groups (Alvarez and Nagler 2000; Gibson 2001). E-voting is preferred primarily by citizens who are regular Internet users. These citizens are mainly educated and wealthy (Gainous and Wagner 2007; Norris 2001; Oostveen and van den Besselaar 2004). Another determinant of e-voting is the age of the citizens. Young citizens are typical users of e-voting, while the oldest voters use this method of voting the least (Alvarez et al. 2009; Goodman 2010; Kenski 2005). Differences in the use of e-voting services can also be seen between the gender of citizens. Although the difference in studies is not statistically significant, men are more interested in e-voting than women (Slovak and Vassil 2016). This is because men often have a higher socio-economic status (including education and income) than women but are also more technologically proficient (Bimber 2000). However, other researchers see e-voting as a positive societal impact because it reduces inequalities in turnout by motivating young citizens or irregular voters to vote (Gerlach and Gasser 2009; Krueger 2002; Kenski 2005; Vassil et al. 2016). Based on these findings, we define the following hypothesis:

H4: The introduction of e-voting in the Czech Republic will have a positive effect on the reduction of disparities in voter turnout.

As noted in the previous section, research on electronic voting has some limitations. It typically uses an ex-post method to investigate the consequences of introducing e-voting in countries where it has already been introduced - Switzerland, Estonia, Norway, Canada, the UK (Binder et al. 2019; Clarke et al. 2012; Petitpas et al. 2021). In Central and Eastern European countries, the issue of e-voting has not received sufficient attention, although the introduction of this tool can have positive social impacts. However, Poland is an exception, where researchers Musiał-Karg and Kapsa (2021, 2020) have recently started to look more closely at the issue of e-voting. In this context, our research will focus on another Central and Eastern European country, the Czech Republic.

3 DATA AND METHODOLOGY

The input data of the analysis are the responses of the respondents, which were obtained through a questionnaire survey in the Czech Republic. Respondents' answers were collected through an online web survey. The questionnaire was prepared by sociological company Sociores. A representative sample of respondents (n = 807) was selected from users of the Czech National Panel. The

quota selection of respondents (gender, age, education) ensures that the sample is representative. The answers were obtained in May 2020. The questionnaire survey was preceded by a pilot survey in which the comprehensibility of the questions asked, and a sufficient range of answers were verified. The description of the sample of respondents is described in Table 1.

TABLE 1: SAMPLE OF RESPONDENTS

Category	Frequency
Age	18-29 years: 127; 30-49 years: 301; 50-64 years: 188; 65 years and over: 191
Education	Primary: 119; lower secondary: 296; higher secondary: 281; university: 111
Sex	Male: 395, Female: 412

Source: Sociores research (2020).

The analysis is based on basic statistical methods, but also on multinomial logistic regression and the Parson chi-square test (Ramsey and Schafer 2002). These methods are applied to verify the significance of the relationships between dependent and independent variables. A list of variables, information on their calculations and basic statistical data is provided in Table 2.

TABLE 2: LIST OF VARIABLES

Variable	Comment	Frequency/Mean ± St. Dev.
Dependent variables		
PVOT	Citizen since 2010: participated in all elections (Regular voter), only some elections (Irregular voter), did not participate in any elections (Non-voter), could not participate (First-time voter)	Non-voter: 110; Irregular voter: 196; Regular voter: 449; First-time voter: 52
FVOT	The citizen expects to participate in the next parliamentary elections in 2021	Definitely yes: 430; Probably yes: 219; Undecided: 68; Probably not: 62; Definitely not: 28
Independent variables		
AGE	Age of the citizen	48.315 ± 17.184
SEX	The citizen is a female: no (0); yes (1)	(0): 395; (1): 412
EDU	Highest completed citizen education: primary (1); lower secondary (2); higher secondary (3); university (4)	(1): 119; (2): 296; (3): 281; (4): 111
RURL	Size of the municipality in which the citizen lives: less than 1,999 (1); 2,000-4,999 (2); 5000-9999 (3); 10,000-99,999 (4); more than 100,000 inhabitants (5)	(1): 182; (2): 127; (3): 90; (4): 240; (5): 168
INFO	The citizen is watching the news. Measured in the interval 0-1, where 1 express that the citizen watches on all media channels (television, internet, radio, newspapers) and 0 expresses that the citizen does not watch news at all. Each media channel is expressed on a scale of 0.25.	0.459 ± 0.310
KNOW	The citizen can recognize differences in the programs of political parties: definitely not (1); probably not (2); I do not know / I did not watch these elections (3); probably yes (4); definitely yes (5)	(1): 26; (2): 208; (3): 152; (4): 283; (5): 138
UNEM	The citizen is unemployed: no (0); yes (1)	(0): 774; (1): 33
MODE	A comprehensive index of citizen satisfaction in the 2017 elections, created from 4 categories: satisfaction with life, personal financial situation, economy and political situation of the country. Each category measured using a scale (-2.2), where -2 means strongly dissatisfied and +2 strongly satisfied. For each category, a value in the interval (-1.1) is added, which considers whether the citizen's situation has changed for the better (+1) or for the worse (-1) from the elections to 2017. Subsequently, an average is calculated from the resulting values.	-0.094 ± 1.193
RVOT	The citizen voted in the previous elections: no (0); yes (1)	(0): 237; (1): 570
EVOT	Citizen requests electronic voting: no (0); yes (1)	(0): 272; (1): 535

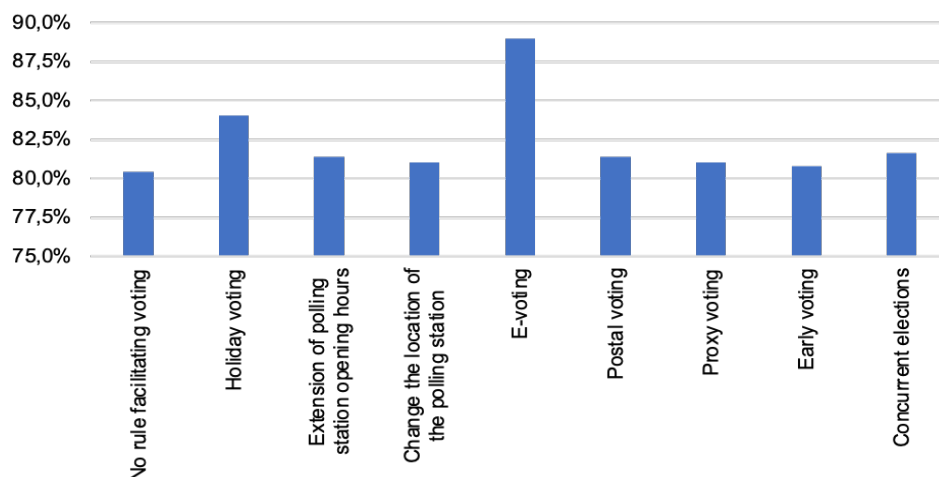
Source: Sociores research (2020).

Selected independent variables were identified as significant for voter turnout by previous literature (Smets and van Ham 2013; Trechsel 2007; Brady et al. 1995; De Vreese et al. 2006; Tuorto and Blais 2014).

4 RESULTS

The aim of the first phase of the analysis is to determine whether the introduction of electronic voting in the Czech Republic would have a positive effect on increasing voter turnout. Furthermore, a comparative assessment of the effect of e-voting in comparison with other selected tools that facilitate the electoral process for citizens is conducted. The results of the analysis are shown graphically in Figure 1.

FIGURE 1: DECLARED VOTER TURNOUT AFTER THE INTRODUCTION OF SELECTED FACILITATION RULE



Source: own processing based on Sociores research (2020).

The figure shows that the declared participation of citizens in the system without facilitation tools is 80.4%. This declared turnout is higher than the actual turnout over the last 10 years. Actual turnout during this time has been above 60%. Although the declared turnout is higher than the actual turnout, it can still be seen that there are rules that have a positive effect on the turnout of citizens. The latter is calculated as the difference between citizens who do not plan to participate in the next elections (or are undecided) but would be willing to participate if the chosen instrument were implemented. As can be seen, turnout increases the most with the introduction of e-voting (by 8.5 percentage points). An increase in turnout can also be achieved with the introduction of holiday voting (5.0 percentage points). Other rules facilitating voting are less effective. In addition to the question of the effect of e-voting on turnout, it is also necessary to look at who is motivated to vote by this rule. This is described in Table 3.

The results show which individual characteristics of citizens influence the regularity of their participation in elections. The basic group is non-voters. The table shows that irregular voters are older, more educated and have a higher level of political knowledge than non-voters. The same is true for regular voters. It should be noted here that regular voters are also employed and more satisfied with their lives. However, the variable under study, "e-voting", is important for this analysis. This variable is significant only for regular voters. It shows that compared to non-voters, regular voters do not ask for e-voting. In other cases, e-voting is not significant.

TABLE 3: DEMAND FOR E-VOTING BASED ON VOTER TURNOUT IN PREVIOUS ELECTIONS

	Irregular voter	Regular voter	First-time voter
INTERCEPT	-2.625***	-4.427***	176.887**
	(0.784)	(0.783)	(69.979)
AGE	0.033***	0.059***	-8.505**
	(0.009)	(0.009)	(3.381)
SEX	0.325	-0.193	5.454**
	(0.265)	(0.252)	(2.707)
EDU	0.398***	0.749***	1.539
	(0.153)	(0.151)	(1.177)
RURL	-0.030	-0.021	-1.176
	(0.088)	(0.084)	(0.765)
INFO	0.179	0.694*	-8.039
	(0.425)	(0.404)	(5.276)
KNOW	0.272**	0.471***	-2.061
	(0.115)	(0.110)	(1.267)
UNEM	-0.657	-0.982**	19.612
	(0.495)	(0.489)	(12.759)
MODE	0.015	0.315***	3.492
	(0.106)	(0.101)	(2.275)
EVOT	-0.262	-0.578**	2.496
	(0.273)	(0.261)	(2.319)
N	807		
Cox & Snell	0.486		
Nagelkerke	0.544		

Notes: *p < 0.1; **p < 0.05; ***p < 0.01; Logit Coefficients/ Standard errors in parentheses; dependent variable PVOT. Source: own processing based on Sociores research (2020).

The next part of the analysis focuses on the declared turnout and the impact of e-voting. The results are presented in Table 4.

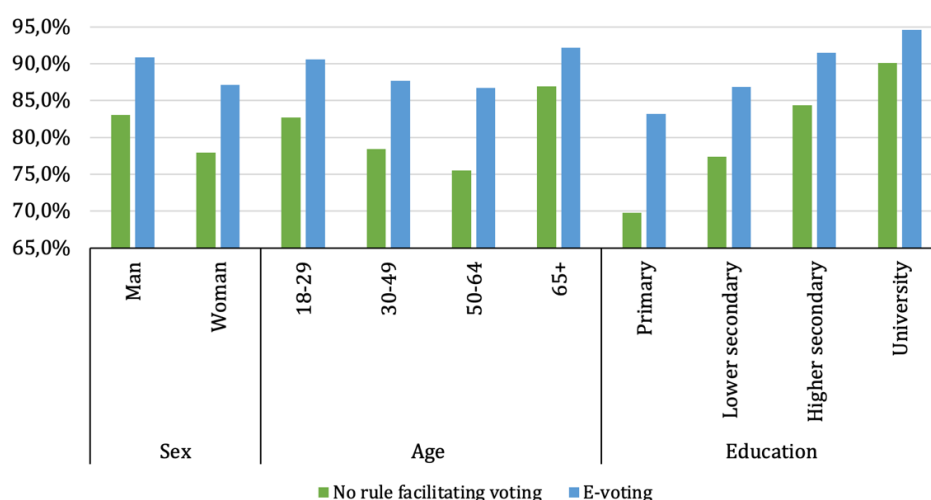
TABLE 4: DEMAND FOR E-VOTING BASED ON THE EXPECTED TURNOUT IN THE NEXT ELECTIONS

	Probably yes	Probably not	Definitely not	Undecided
INTERCEPT	0.282	0.877	-0.054	-0.370
	(0.520)	(0.839)	(1.080)	(0.812)
AGE	0.011*	0.036***	0.036**	0.045***
	(0.006)	(0.011)	(0.014)	(0.010)
SEX	0.472**	0.294	-0.049	0.622**
	(0.193)	(0.341)	(0.449)	(0.314)
EDU	0.050	0.308*	0.072	-0.249
	(0.106)	(0.187)	(0.258)	(0.180)
RVOT	-1.203***	-3.914***	-4.002***	-3.100***
	(0.245)	(0.421)	(0.584)	(0.366)
RURL	-0.015	-0.174	-0.031	0.015
	(0.061)	(0.113)	(0.155)	(0.106)
INFO	-0.905***	-2.729***	-1.753**	-1.635***
	(0.293)	(0.601)	(0.760)	(0.521)
KNOW	-0.216***	-0.607***	-0.446**	-0.373***
	(0.077)	(0.161)	(0.212)	(0.140)
UNEM	-0.530	0.694	1.504**	0.934
	(0.594)	(0.720)	(0.730)	(0.621)
MODE	-0.117	-0.348**	-0.350*	-0.414***
	(0.076)	(0.143)	(0.188)	(0.128)
EVOT	0.520***	0.251	-0.427	0.394
	(0.193)	(0.344)	(0.438)	(0.318)
N	807			
Cox & Snell	0.357			
Nagelkerke	0.391			

Notes: *p < 0.1; **p < 0.05; ***p < 0.01; Logit Coefficients/ Standard errors in parentheses; dependent variable FVOT. Source: own processing based on Sociores research (2020).

The results show what individual characteristics determine that a citizen chooses an answer (probably yes, probably no, definitely no, undecided) other than "definitely yes". Age, participation in previous elections and level of political knowledge or information are the main determinants of the answer. These variables are significant in all cases. Citizens who declared that they will participate in the elections are younger, have a higher level of political knowledge and information and have previously participated in elections. This is evidenced by the beta coefficients, which are the same for all other responses. However, for this analysis it is important to find out which citizens demand electronic voting. This variable is significant only for the "probably yes" response. This means that e-voting is mainly demanded by citizens who plan to vote but are undecided about voting. In the last part of the analysis, attention is paid to the effects of the introduction of electronic voting on the turnout of selected social groups. The change in turnout between different sexes, age groups and levels of education is examined. The results are shown in Figure 2.

FIGURE 2: DIFFERENCES IN TURNOUT BETWEEN SOCIAL GROUPS



Source: own processing based on Sociores research (2020).

As shown in the figure, the introduction of e-voting as a complementary measure to facilitate voting is expected to have a positive impact on voter turnout across all demographic groups. However, the question remains whether this approach can effectively mitigate differences in turnout rates between different groups. The figure does not provide conclusive evidence on whether differences in turnout rates between groups are statistically significant and, if so, whether the adoption of e-voting would reduce these differences. The statistical significance of the differences is shown in Table 5.

TABLE 5: SIGNIFICANCE OF DIFFERENCES IN VOTER TURNOUT BETWEEN INDIVIDUAL SOCIAL GROUPS

	No rule facilitating voting			E-voting		
	Pearson Chi-square	df	Significance	Pearson Chi-square	df	Significance
Sex	3.364	1	0.067	2.890	1	0.089
Age	9.151	3	0.027	3.762	3	0.288
Education	19.699	3	0.000	10.789	3	0.013

Source: own processing based on Sociores research (2020).

Table 5 shows whether the differences in voter turnout between social groups are significant. In an electoral system without e-voting, the differences in participation of all social groups studied are significant but differ only in the level of significance. However, even after the introduction of e-voting, there are

statistically significant differences in participation between men and women or between citizens with different educational backgrounds. It should be noted, however, that these differences are less pronounced than in a system without e-voting. However, the significant differences in participation between age categories have disappeared after the introduction of e-voting. This suggests that e-voting may eliminate some of the inequalities in participation.

5 CONCLUSION AND DISCUSSION

The findings of the analysis indicate that the implementation of electronic voting has the potential to increase voter turnout in the Czech Republic. These results support hypothesis H1 and are consistent with previous research conducted by Gerlach and Gasser (2009). However, they contradict the findings of other studies such as those by Breuer and Trechsel (2006). Electronic voting is considered effective primarily because it is currently the only alternative to traditional voting methods in the Czech Republic. It is an innovative solution that can streamline and expedite the voting process, making it the most effective option for facilitating voting (H3). When compared to other voting facilitation methods, e-voting incurs minimal costs for voters. This is because individuals who cast their votes via mobile phone or computer are not required to visit a polling station, post office (in the case of postal voting), or office (in the case of proxy voting).

According to some studies (Alvarez and Nagler 2000; Gibson 2001), e-voting may exacerbate the unequal distribution of voter turnout among different demographic groups, as it is primarily used by young and educated citizens. However, this claim is only partially supported. If e-voting were introduced as a complementary tool to the current system, it could reduce turnout differences between social groups. Results from our research (H4) suggest that this effect could be expected in the Czech Republic, which is consistent with some previous studies (Gerlach and Gasser 2009; Kenski 2005; Vassil et al. 2016).

Nevertheless, it is also interesting to examine who demands the introduction of electronic voting in terms of historical and expected turnout. Our findings show that regular voters do not request e-voting, whereas non-voters do. This contrasts with research conducted in Estonia, Canada, and Switzerland (Chevallier 2009; Goodman and Pyman 2016; Solvak and Vassil 2016; Vinkel and Krimmer 2017), where electronic voting has been found to be primarily used by citizens who have previously voted. Based on our results, we reject hypothesis H2, as it appears that those who are truly interested in voting do not require vote-facilitating measures. Moreover, our results indicate that e-voting is mainly requested by citizens who are contemplating participating in the upcoming elections but have not yet made a final decision. Thus, e-voting could encourage these individuals to vote.

6 LIMITATIONS

In conclusion, it is important to acknowledge some limitations of the study. Previous research has demonstrated that questionnaire-based data collection can be biased, and declared turnout rates tend to be higher than actual turnout. This distortion occurs for two main reasons: either voters do not answer truthfully for various reasons, or only citizens who habitually participate in elections respond to questionnaire surveys (Ansolabehere and Hersh 2012;

Burden 2000; Deufel and Kedar 2010; McDonald 2003). Similarly, when asked if they would vote if e-voting were introduced, citizens may answer in the affirmative, even if they have no intention of doing so (Alvarez et al. 2009). We are aware of these limitations, but a questionnaire survey currently represents the only feasible method to conduct an ex-ante analysis.

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E-GLASOVANJE KOT ORODJE ZA ZMANJŠANJE NEENAKE VOLILNE UDELEŽBE NA ČEŠKEM

Elektronsko glasovanje je eno izmed orodij, ki lahko državljanom znižajo stroške glasovanja in jih tako motivirajo za glasovanje. Vendar pa rezultati prejšnjih raziskav kažejo, da ta učinek ni dosežen v vseh primerih. Prispevek preučuje morebitne posledice uvedbe e-glasovanja na Češkem, kjer je uvedba tega orodja tema javne razprave. Natančneje, preverjamo, ali ima uvedba tega orodja potencial za povečanje volilne udeležbe in za katere skupine državljanov je potencial največji.

V ta namen uporabljamo podatke ankete, ki smo jo izvedli na reprezentativnem vzorcu anketirancev. Za preverjanje hipotez uporabljamo modele binarne in multinomske logistične regresije. Rezultati analize kažejo, da ima uvedba elektronskega glasovanja v primerjavi z drugimi orodji, ki omogočajo glasovanje, največji potencial za povečanje volilne udeležbe na Češkem. Povečanje volilne udeležbe je še posebej opazno pri skupinah državljanov, ki se običajno ne udeležijo volitev.

Ključne besede: e-glasovanje; volilna udeležba; Češka; pravila za olajšanje glasovanja.