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The Impact of Social Media Use on Voter Turnout and Voting Mode Preferences: Analysis of Estonian Parliament Elections in 2019 and 2023

Master's Thesis

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Tartu 2024

Authorship Declaration

I prepared this thesis independently. I have cited other authors' views and data from literary sources and elsewhere.

Word count of the thesis: 20 286

Kirill Jurkov, 19.05.2024

Abstract

This thesis examines the influence of social media exposure on voter turnout and voting mode preferences during the 2019 and 2023 Estonian Parliament elections. Employing cross-sectional post-election survey data, the study evaluates how exposure to political content on social media platforms correlates with voter participation and the choice of voting methods, particularly Internet voting. The research employs multinomial and logistic regression analysis to ascertain the extent to which social media exposure fosters electoral participation and influences decisions to vote online rather than at traditional polling stations. Findings suggest that social media exposure can affect voter turnout numbers. Moreover, this study provides little evidence that this influence depends on the age of the voting-age population. The analysis of social media's impact on voting mode preferences shows that social media exposure plays a marginal role in voters' choice of voting mode regardless of their party affiliation. These results indicate that social media has a moderate effect on voting behaviour in Estonia. However, more research is needed to ensure the generalisability of the results.

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Introduction

Social media has become increasingly significant in shaping individuals' worldviews over the years, as it has become one of the primary sources of information on what is happening in the world. This way, social media has rivalled media outlets and arguably become the primary source of information. The influence is also present in the domain of political participation, which makes it an important factor in shaping political behaviour. The discourse of social media influence expects it to take one of the two forms. From an optimistic perspective, social media is hoped to boost political engagement through enhanced communication and diverse opinion spaces beyond traditional institutions (Dahlgren, 2013; Imhof, 2015). Conversely, there's concern that it may also spread misinformation and feed anti-democratic views (Margetts, 2019; Bergmann, 2020). However, the findings of studies on the topic are often inconclusive and context-dependent.

The objective of this thesis is to assess how social media use influences political behaviour, specifically voter turnout and voting mode preferences. I look into four associations with two dependent variables, two associations for each. Firstly, based on the idea that most parties and party representatives are interested in mobilising their voters, social media users exposed to political information are more likely to turn out in the elections. This association might not stand for countries that have parties with extensive voter suppression campaigns, such as in the United States and especially over social media channels, where party representatives have actively sponsored ads with misinformation to lower turnout in specific target groups (see Kim, 2018). However, no relevant voter suppression campaigns in the Estonian case were observed during this period. Therefore, the expectation is that exposure to political information should increase turnout.

Secondly, I expect social media to have more influence on younger age groups, which are traditionally target groups with low turnout rates in Estonia. This expectation derives from two bases. Academic research has highlighted that younger adults are more affected by the same amount of social media use compared to adults (Lin & Lachman, 2020). Additionally, younger people are more frequent social media users and use social media for extended amounts of time than older people. Therefore, if younger people are generally more affected by the same amount of social media consumption and consume more, the effect is likely to be stronger. However, there is no proof that this logic works the same way with political behaviour and exposure to

political information on social media. This paper looks into this potential association for voter turnout descriptively and inferentially with statistical models.

The third and fourth expectations rely on the idea that voting behaviour is influenced by social media, but the effect depends on the type of information voters are exposed to. This is especially relevant for voting mode preferences, which means how people cast their votes in the elections. If voters are exposed to positive campaigns on convenience voting modes, they are expected to be more likely to vote using a convenience voting method. Conversely, if voters are exposed to negative campaigns on modes of convenience voting, they should be less likely to cast their votes using them. These expectations are supported by research on social media. Social media platforms act as significant arenas for political discussion and opinion formation, potentially reinforcing existing political beliefs and biases based on users' party preferences (Weeks *et al.*, 2017). Additionally, social media algorithms can lead to asymmetric ideological segregation in political news exposure, further reinforcing biases (Garcia, 2023). Therefore, exposure to information is expected to be causal for voting mode preferences.

To assess these expectations, this study conducts statistical analysis with cross-sectional post-election survey data from Estonian national elections in 2019 and 2023 (Johan, 2023). Estonia is a perfect case for observing the influence of social media on voter turnout and voting mode preferences. The electoral system and dataset enable researchers to distinguish between non-voters, on-site voters and convenience voters. Convenience voting possibility has been provided with a remote Internet voting option since 2005 in addition to standard vote casting in the polling station either on Election Day or early voting period. The dataset is representative of the Estonian voting-age population and also enables the use of other variables that influence voter turnout and voting mode preferences in statistical models to identify the importance of social media use relative to different variables.

Most importantly, the dataset includes respondents' social media use and exposure to political information, age, and the party they voted for in the national elections. In combination, voters' party preference and social media use help understand what kind of information influenced the voting mode preference, as Estonian parties have strong positions on the i-voting system. Most parties and their candidates have either argued in favour of and encouraged using novel voting methods or remained neutral on the issue. Two parties have strongly displayed critical views. In recent years, this has especially been the case for the Conservative People's Party of Estonia,

but it has also been the case for the Estonian Centre Party in the past. These different views have also been present in social media posts and debates. Therefore, there is an expectation that voters who follow and vote for different parties are affected differently.

The topic is both relevant and important. In recent years, scholars have started to acknowledge the effect of digital technology, particularly social media, on political behaviour. Social media platforms have become a prime channel for political information dissemination, enabling citizens to engage in political discussions and express their opinions freely. However, the impact of social media use on the choices of participation in elections and different voting modes remains understudied. Understanding this association could be crucial as it may reveal insights about the broader implications of digital technology on democratic processes. This topic is especially relevant to Estonia, which is known as a pioneer in digital governance, the primary showing of which is Estonia's diverse voting system enabling on-site and Internet voting (i-voting) options. It is also unknown how the effect of social media use interacts with other individual factors, such as age or voters' party preferences.

Although voter turnout and voting mode preferences' drivers have been identified and thoroughly studied in previous studies in Estonian and other countries' national elections, these studies have not focused on the social media component or mainly even included it as an explanatory variable in the analysis. Therefore, this paper will fill in a gap in the existing literature. Generally, this paper seeks to answer the following research question:

RQ: How does social media use impact voter turnout and voting mode preferences?

This paper will continue with a theoretical framework chapter, including a literature review of the findings from previous studies. The literature review focuses on the main concepts of the research: voter turnout, voting mode, and social media influence. The review will summarise the existing knowledge on these topics and outline expectations for the analysis results. The literature review will end with a statement of hypotheses supported by secondary literature. The case and methods chapter will show the research strategy, thoroughly explain why the case of Estonia fits to study this research problem and discuss the methods this paper uses to answer the research question. This chapter will also outline the principles of data analysis and the limitations of the results related to data and methods. The third chapter will focus on analysing the results of statistical models and the main findings. It includes both descriptive and

inferential statistics. The inferential statistics part follows a step-by-step modelling principle. The first model only consists of the dependent and social media use variables, then the interaction with age and party preference, and finally, the model is based on all relevant predictors of dependent variables identified in the literature. Lastly, this paper ends with a conclusion that briefly summarises the whole paper.

1. Participation in elections and social media influence

This chapter analyses the existing research on voter turnout in elections, voting mode preferences and social media influence on voting behaviour. The first subchapter overviews voter turnout studies to date, focusing on factors influencing general turnout in elections. Understanding the factors that influence voter turnout is vital for an analysis that seeks to measure the effect of social media on political behaviour. Providing foundational knowledge of traditional factors influencing voter turnout will establish the baseline that later highlights how social media emerges as a new, possibly influential factor alongside traditional ones. The second subchapter will provide the same type of information on factors influencing voting mode preferences. Understanding these preferences is crucial to contextualise further findings within electoral processes' broader digital transformation narrative. Finally, the subchapter on social media influence is essential to understanding the general expectations for social media influence on political behaviour and how it may relate to voter turnout and voting mode preferences.

1.1. Voter turnout

Evidence shows that global voter turnout has been in decline since the 1960s (Kostelka & Blais, 2021). The authors note that any democratic nation in the world could expect around 77% of its citizens to turn up to vote in legislative or presidential elections; then, nowadays, this expectation has gone down to about 67%. The article identified two factors that influence such shifts. Firstly, economic development fosters a generational change, where people born into more affluent societies develop values that are less conducive to participation. The authors explain that ’once countries reach a certain level of economic wealth, new generations become less deferential to authorities and less likely to conceptualise voting as a civic duty’ (Kostelka & Blais, 2021). However, a meta-analysis by D. Stockemer (2016) shows that less than half of studies find a positive relationship between development and turnout. Another cause is the rise in the number of elective institutions, which makes elections more frequent and causes voter fatigue.

I used data from the International Institute for Democracy and Electoral Assistance (International IDEA) to confirm that voter turnout has indeed been in decline in democratic countries. To assess this issue, I looked at the change in the EU countries’ earliest and most

recent Parliamentary elections. The results showed that for all but three countries (Hungary, Malta and Sweden), the decline has indeed proven to be the case. However, looking at the first elections may not be reasonable. The first election in a newly democratic country or a country that has undergone significant political change can be an outlier due to the novelty and excitement of the democratic process or specific historical circumstances. Therefore, I opted to look at the difference between the second and most recent elections, as by the time of the second election, voters are more familiar with the electoral process and the initial enthusiasm or urgency that might have driven unusually high turnout in the first election may have normalised. However, the results of changing the base year made little to no change, and the results of the change in the second and last Parliamentary elections are shown in Figure 1. The results indicate that voter turnout has indeed been in decline.

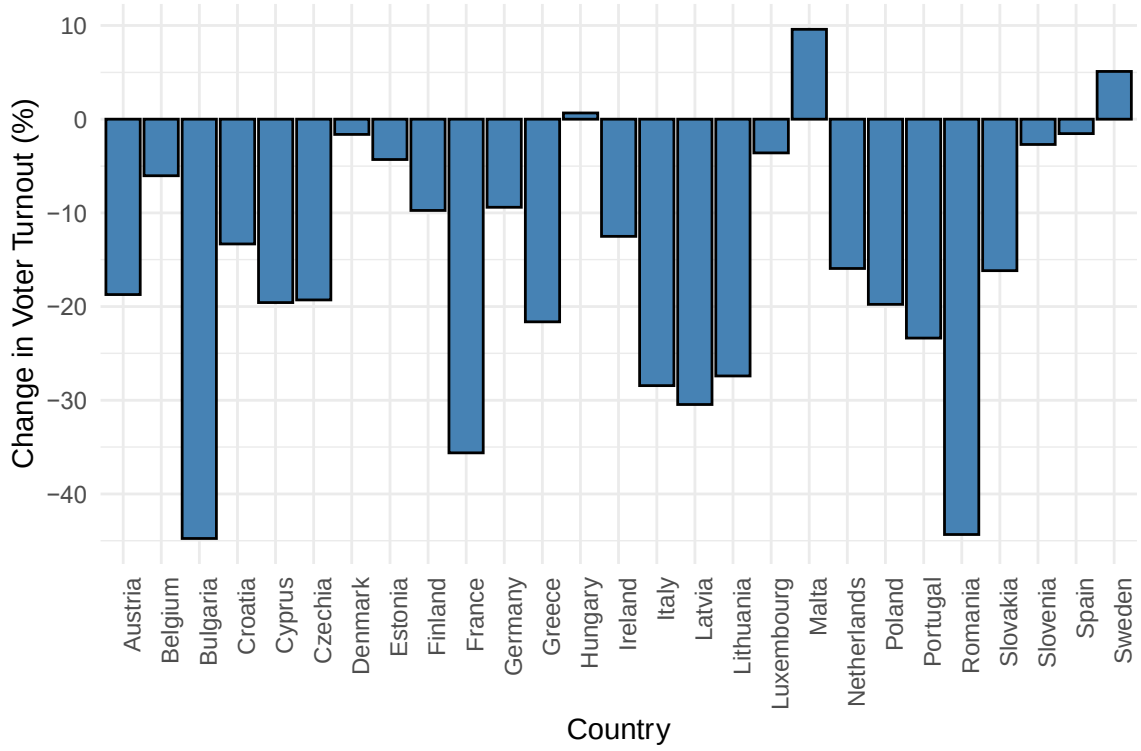

Figure 1. Change in voter turnout between the second and most recent Parliamentary elections (*International IDEA*, n.d.)

The topic of voter turnout has been studied extensively since the early 1980s. The pioneering influential studies in the field are G. Bingham Powell's *Contemporary Democracies: Participation, Stability, and Violence* (1982), Powell's *American Voter Turnout in Comparative Perspective* (1986) *and* Robert W. Jackman's *Political Institutions and Voter Turnout in industrial democracies* (1987). Powell (1982) posited electoral participation as one of the three main indicators of democratic performance, which paved the way for more nuanced inquiries into the subject. For example, Powell continued with a description of an association

between the turnout and the American institutional setting, outlining that the voter turnout in the United States was severely inhibited by the low level of competition in electoral districts, weak linkages between parties and social groups, and voluntary registration system – a system where it is the responsibility of the individual voter to register themselves before they can participate in elections (Powell, 1986: 25-26).

Similar to Powell, Jackman (1987) also aimed to explain the differences in voter turnout among industrial democracies. Like Powell, Jackman concludes that the most notable influencers of turnout are political institutions and electoral law. The author outlines explicitly the competitiveness of elections, the proportionality of the vote shares translated to legislative seats, multipartyism, unicameralism and mandatory voting laws as significant variables that predict voter turnout. Jackman's research confirms that the more competitive the elections are, the larger the turnout. Additionally, Jackman points out that disproportionality in the translation of votes into legislative seats lowers turnout. This means that without considering other factors, the electoral systems with proportional representation are expected to have higher turnout rates than majoritarian systems. Jackson notes that multipartyism generally assigns elections a less decisive role, depressing turnout. Unicameralism, however, provides a more explicit link between elections and legislation, increasing turnout. Finally, mandatory voting laws produce a disincentive not to vote, therefore increasing turnout.

The robust patterns established in the pioneer studies were further developed by Andre Blais (2006). Blais zoomed in on the institutional factors identified in previous research, including Powell (1982 & 1986) and Jackman (1987), to develop a deeper understanding of the associations between voter turnout and institutional factors. The author focused on the variables with robust and inconclusive earlier findings regarding influence at the time, namely socioeconomic environment and party systems. Drawing from the knowledge of the factors influencing individual-level turnout, Blais assumed that turnout is associated with economic development and the country's current economic situation. Blais reports that influential factors often depend on other factors or simply do not have a linear effect (Blais, 2006: 117). Such cases include the interaction between economic downturns during the time of election and voters' welfare spending level on the turnout (see Radcliff, 1992). These interactions and non-linear association possibilities also need to be kept in mind while interpreting the results of this study.

1.1.1. Individual characteristics influencing voter turnout

Institutional variables, however important, only explain part of voter turnout. Another crucial part that explains voter turnout comes from an individual rather than the system level. Powell (1986) also recognised these individual factors. This strategy was not particularly novel. The impact of individual-level characteristics has been studied since the 1940s (see Lazarsfeld *et al*., 1948). Other notable studies in the field following Lazardfeld *et al*. (1948) include the authors of *The American Voter* (1960), A. Campbell, P. Converse, W. Miller, and D. E. Stokes, who further advanced the study of individual voter behaviour. The authors highlighted party identification as the most influential factor influencing voting behaviour, later known as the Michigan model. Another noteworthy contribution was S. Verba and N. H. Nie, whose book *Participation in America: Political Democracy and Social Equality* (1972) used statistical analysis to investigate how social status and political participation, including voter turnout, were influenced by factors like education and income. However, these studies focused not on voter turnout but on general voting behaviour.

Powell (1986) and Jackson (1987) focused on the narrow topic of voter turnout. Interestingly, Powell found that the effect of personal characteristics on voter turnout depends on a country-specific context, meaning that, for example, age and education levels had a different impact on voting turnout in the countries analysed in his study (Powell, 1986: 26-32). The study found that in most aspects, American voters were significantly different from voters in other nations, whereas the results among other nations were similar. On the other hand, attitudinal effects towards state authorities were similar. However, Powell notes that data quality and comparability proved to be a significant issue in the reliability of results (Powell, 1986: 27). Nevertheless, studying the influence of individual characteristics on voter turnout using LOGIT and PROBIT statistical models paved the way for further research, taking into account that gathering valid and representative data became more straightforward and less costly over time.

More recent studies have further identified and narrowed down the individual-level factors influencing voter turnout. These factors are well summarised in a meta-analysis of individual-level research on voter turnout by K. Smets and C. van Ham (2013). The study analysed a total of 90 research papers focusing on national elections published in 10 top journals in political science (Smets & van Ham, 2013: 345). The authors also accounted for case selection bias, including research from the United States and European countries. Even more recent studies

largely focus on the impact of social networks and social influence while also highlighting several individual-level factors that influence voter turnout (Kernell & Lamberson, 2023).

Smets and van Ham (2013) identified consistent predictors of voter turnout overall in the national elections of established democracies. The most common and strongest predictors were levels of education, age and age squared, home ownership and residential mobility (the resource model), organisational membership, mobilisation programs such as phone calls to boost turnout, exposure to political news such as reading newspapers (the mobilisation model), parental income and social class, taking part in political discussions (the socialisation model), previous voting experience, caring who wins (the rational choice model), party identification and interest in politics, the ambivalence towards politics or mixed feelings towards parties, having hardworking personality (the psychological model), and compulsory voting in the elections (the political-institutional model). More recent literature continues to affirm the significant impact of socioeconomic status on voter turnout, highlighting factors like education and income (Stockemer, 2016).

Most of these aspects positively affected voter turnout, which means the more of or the higher level of something, the higher the likelihood of turnout. The ambivalence is the only aspect with a significant negative effect, so the more mixed feelings people have about politics, the less likely they are to vote. However, not all aspects can be measured with either continuous or ordinal scales; for example, work ethics is a categorical variable measured either on a nominal or binary scale. Additionally, not all aspects have linear effects. Aspects such as age might have curvilinear effects. Some aspects might also be interdependent, such as social media exposure. The authors note that exposure to negative news affects voters differently from news aimed at raising knowledge, with negative campaigns possibly demobilising the turnout (Smets & van Ham, 2013: 351). However, the study did not cover the interaction effects of different variables. Literature on the issue indicates that such effects can be highly important. For example, C. Zhu (2021) identified that commonly known factors influencing the general population's voting participation have a markedly different level of influence on younger current and future voters. Therefore, age is a factor to consider in the analysis.

Finally, the meta-analysis by Smets and van Ham (2013) identified aspects with mixed effects and those that consistently have no effect. The authors identify mixed effects with personal income and electoral system factors. Some studies tend to show a positive association between

individual income and voter turnout, but half of the studies show no effect (Smets & van Ham, 2013: 350). The electoral system factor depends on the probability of a voter influencing the outcome of elections, which can run both ways depending on the country's context. For example, the likelihood of one voter influencing the results can be as likely in the United States as in Estonia. The findings show numeral factors that generally did not affect voter turnout, such as gender, ethnicity, urbanisation and region, marriage, religious affiliation, exposure to advertisements, economic health in the country, trust in democracy, ideological affiliation, alienation, mental health, and the competitiveness of elections. However, some of these factors, such as gender and political ideology, have been proven to be important in qualitative studies (see Sener et al., 2023). Additionally, these factors might still influence turnout in specific cases and in interaction with other variables.

G. Kernell and P. J. Lamberson (2023) also highlighted several individual-level factors that influence voter turnout, focusing largely on the impact of social networks and social influence. Using different theoretical models, the authors identified that important individual-level turnout drivers include the number of social contacts, connectivity of individual's network, socio-economic status, sense of voting costs, and social pressure are likely to influence voter turnout (Kernell & Lamberson, 2023). These factors were integrated within a broader model that accounts for how individual decisions aggregate in social contexts to affect overall voter turnout patterns. The authors underscored the complexity of predicting voter turnout due to the interplay of individual behaviours within social networks and the presence of multiple potential outcomes influenced by initial conditions and social dynamics. This study confirms that statistical models can never account for all factors.

1.1.2. Voter turnout in Estonia

Estonia is an established liberal democracy with consistently high liberal and electoral democracy levels since its restoration of independence in 1992 (*V-Dem Institute*, 2023). The country has held nine national elections since 1992. Since 1995, the national elections have been held every four years. During this period, the voter turnout was the highest in 1995, reaching 68,9% and lowest in 1999 with 57,4% (*Vabariigi Valimiskomisjon*, 2024). The average turnout in the national elections is 63,2%. The voting age in national elections is 18, and the country uses the open-list proportional representation electoral system. Voter registration does not require any action from citizens; the list is compiled based on the

Population Registry. The votes can be cast with a ballot either on the election day, during the early voting period on a designated week, or, since 2005, over the Internet during the early voting period. Voting is also simplified for citizens with special needs and citizens residing abroad (for further reading, see Ehin *et al.*, 2022).

Because of the Soviet Union's colonial background, comparing the trend of Estonian voter turnout to other countries with similar backgrounds in the region, Latvia and Lithuania, seems logical. Figure 2 shows that the trends in voter turnout are somewhat different in the three Baltic states. The decline in Latvia and Lithuania from early election years is more evident. Although the turnout rate in Estonia is significantly lower than in the first elections, the level has remained relatively stable since the introduction of the i-voting option. Latvian and Lithuanian results show substantially more fluctuation since 2005. This comparison illustrates how Estonia's adoption of digital voting methods might influence voter participation relative to Latvia and Lithuania, which have more traditional voting systems. Nonetheless, cross-country comparisons in terms of turnout influencers remain out of this thesis's focus.

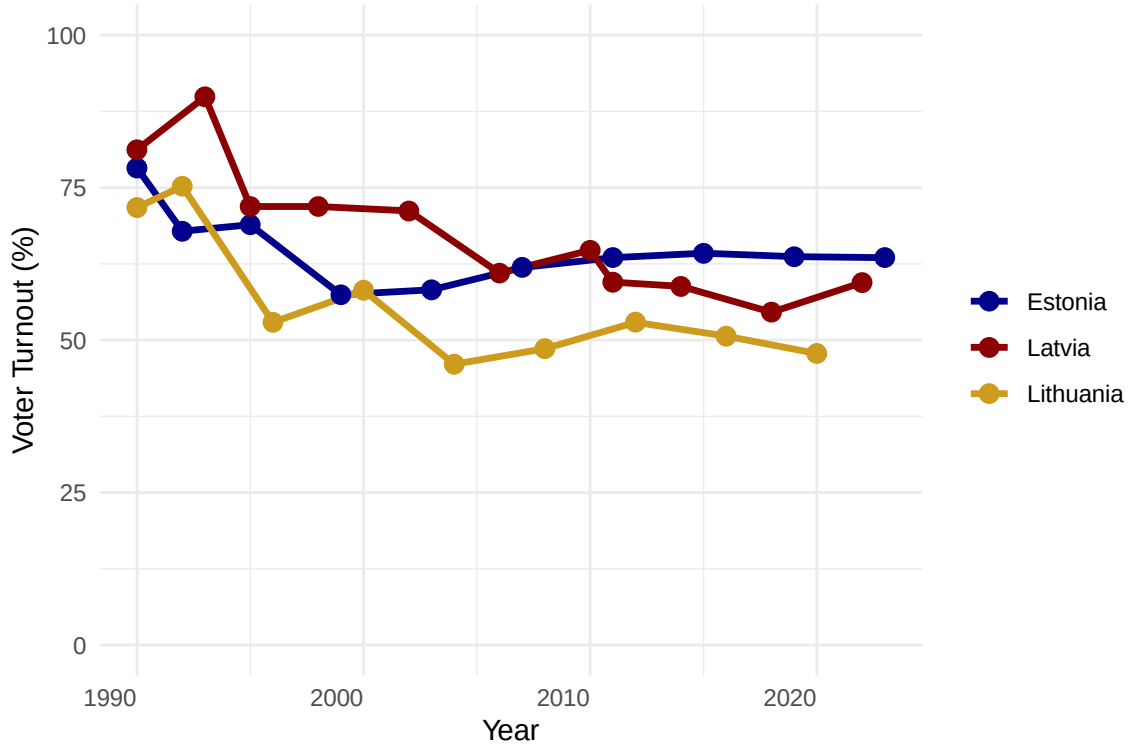

Figure 2. Voter turnout over the years in Baltic countries' Parliament elections (*International IDEA*, n.d.)

Voter turnout and its drivers in Estonia have also been studied. Firstly, it needs to be specified that Estonia has three types of elections where voters can vote: national parliament, local government and the European Parliament elections. Due to the difference in eligible voters and

general voter turnout, the drivers of voter turnout can vary depending on the type of election. At the time of this thesis writing, the analysis of only national elections had not been conducted. However, the study of aggregate data from five elections from 2009 to 2015 indicates that regardless of the type of election, voters' age, interest in politics, trust in institutions, the utility of voting choices, education level, income, and computer literacy are consistently associated with voter turnout (Solvak *et al.*, 2021). It also needs to be noted that the study used cross-sectional survey data with self-reported turnout, which is affected by problems such as recall bias and social desirability (Smets & van Ham, 2013: 347). Because of this, scholars mostly prefer the validated turnout data, and this limitation also needs to be considered in this study.

Validated data refers to information that has been confirmed or corroborated through objective methods, ensuring its accuracy and reliability. In the context of voter turnout studies, validated data typically means verifying self-reported voting behaviour against official records such as voter registries, poll lists, or log data for i-voters. This process helps to ascertain whether the individuals who claim to have voted actually appeared in the official records as having voted. Validated data is generally preferred over survey data for a couple of main reasons: accuracy and reliability. Accuracy might be reduced because of the recall and social desirability bias, and reliability can be reduced because of subjective recall rather than objective evidence in the case of survey data.

1.2. Voting mode

Voting mode is a mode of balloting or casting a vote in elections. P. Gronke *et al.* (2008) have summarised different voting modes, including classical ballot casting in the precinct polling site on Election Day and different 'convenience voting' modes. The term unites voting methods other than the Election Day ballot-casting in the electoral studies. Such methods include postal voting, in-person early voting, and internet voting, among others (Gronke *et al.*, 2008: 441). The systematic study of different voting modes, especially in the context of reducing voting costs and exploring alternatives like internet voting, began to gain notable attention in the early 2000s. This period saw increased experimentation with internet ballots in several countries, motivated by the potential to boost voter turnout by making voting more accessible and convenient.

Generally, the literature on different voting modes mainly focuses on two major questions. Firstly, it aims to profile people who use modes of convenience voting rather than the classical option. Secondly, it assesses how introducing convenience voting methods affects turnout. A literature review by Gronke *et al.* (2008) shows that convenience voting significantly impacts turnout. However, the authors note that the impact is relatively small, in the range of 2%–4%, and highly depends on the context (Gronke *et al*., 2008: 442). In established democracies, the context mainly depends on the country where convenience voting is implemented, the exact mode introduced (e.g. postal voting or Internet voting), and the intensity/level of turnout in the specific type of elections. The evidence shows that these three factors, in different combinations, affect turnout differently. However, the literature generally indicates that the lower the intensity of turnout, the stronger the effect of the convenience voting mode.

The earliest studies of voting mode preferences focused on postal voting, mainly in the USA. Already in 1990, D. & S. B. Jeffe found that convenience voting painted a portrait of conservative, middle- to upper-class, generally interested in politics Republican voters (Jeffe & Jeffe, 1990). However, the later studies have not confirmed these findings (see Gronke et al., 2008: 443-444). A. J. Berinsky *et al.* (2001) aimed to find characteristics associated with convenience voters. The findings showed that these voters were already predisposed to vote, were long-term residents, and were registered partisans. These findings also relate to the rational choice theory, where the main driver behind voting behaviour is that voters seek to maximise their benefits and minimise costs (see Downs, 1957; 1985). As these are the voters who have the most to gain and lose from the election results due to partisanship and residence in the area, they are also looking to minimise the costs of voting by opting for the most convenient voting mode. It shows that convenience explains an integral part of the choice of voting mode.

Another part of early work aimed to explain how introducing postal voting affected voter turnout. J. A. Karp and S. A. Banducci (2000) examined election data from Oregon to identify whether or not elections conducted through the mail increase turnout in both local and statewide elections. However, the authors note that the effect is the most significant in low-stimulus elections, such as local elections, where turnout is generally low. Additionally, another interesting finding in the study is that the effect of different factors, such as income, on voting mode preference depended on party preference (Karp & Banducci, 2000: 233–235). T. Kousser & M. Mullin (2007) used experimental matching methods with a larger dataset to

validate the results and avoid selection biases. The findings showed that postal voting did not increase participation in general elections. However, the authors outlined that results highly depended on the context (see above and Gronke *et al*., 2008).

The effects of postal voting on participation have also been assessed in European countries. The study with a large-N survey data analysis across cantons of Switzerland (Luechinger *et al*., 2007) showed that the introduction of postal voting significantly increased turnout. However, the authors found that voters needed time to get familiar with the voting system and the effect materialised with delay (Luechinger *et al*., 2007: 186). Additionally, the effect depended on factors such as previous turnout, age and income of the electorate, and type of election. All these factors discussed here and above are also essential to consider in further analysis and interpretation of the results.

1.2.1. I-voting

Firstly, what is considered i-voting in this study needs to be clarified. This study focuses specifically on remote Internet voting, meaning voters can cast their votes from a remote location over the Internet with an Internet-enabled access device. Other types of electronic voting, such as electronic voting machines in polling stations or voting kiosks, will not be considered in this study. Terms *i-voting*, *Internet voting* and *remote Internet voting* are used interchangeably in this study. However, all of them refer to remote Internet voting. Similar to the literature on other voting modes, the literature on i-voting focuses on its influence on turnout and aims to identify what characteristics are associated with i-voters. This subsection focuses on the main findings of i-voting influence on turnout.

From the rational choice theory (Downs, 1957) perspective, voter turnout is related to voting costs. Therefore, one would assume that when voting costs are significantly reduced, it also positively impacts turnout. Additionally, i-voting is often seen as a remedy for declining turnout across advanced democracies. Even though governments have introduced or at least trialled i-voting in different elections with reducing costs of voting in mind, the evidence shows that i-voting is not likely to solve the low turnout crisis. The relationship between i-voting and turnout itself is multi-faceted and complex. Introducing i-voting may result in slightly higher voter turnout. However, studies from Switzerland by M. Germann & U. Serdült (2017) and Canada by N. Goodman & L. C. Stokes (2020) found that introducing i-voting did not

significantly increase turnout if other convenience voting modes, e.g. postal voting, were available. The results from studies in Estonia show no significant effects on turnout at all (Solvak & Vassil, 2017). The results indicate that there is a limit to how much convenience methods can increase turnout, if there is an effect at all. Another relevant finding is that voter costs only account for part of the change in voter turnout. These findings also align with the normative critique of the rational choice theory (see Riker & Ordeshook, 1968).

1.2.2. Voting mode preferences

This subsection will focus on the characteristics of i-voters. A meta-analysis by U. Serdült *et al*. (2015) shows that a typical i-voter is relatively young, well-educated and has higher than average income, meaning these factors were consistently significant in explaining the choice of voting mode. The i-voter user profiles have also been studied in Estonia, most comprehensively by Ehin *et al*. (2022). The authors studied persistent predictors of i-voting usage across all national, local and European Parliament elections from 2005 to 2019. 2005 was also the first year i-voting was introduced. Across eleven elections, trust in i-voting was the only consistently strong influencer (Ehin et al., 2022: 10). Other factors do not consistently differentiate between i-voters and on-site voters. Interestingly, factors like IT literacy and trust in institutions were not consistently significant. However, the inconsistency of sociodemographic factors is to be expected due to the time change and differences in context, as discussed above.

Although context can mean many things, such as the type of elections and domestic stability, one of the latest cases that has influenced the world lately is the COVID-19 pandemic. The pandemic has definitely influenced people's everyday lives, and from the rational choice perspective, one would expect the pandemic to influence political participation and voting mode preferences. However, research by B. Romanov & M. Solvak (2023) and myself (Jurkov, 2022) shows that the pandemic did not affect general nor i-voting turnout. Nevertheless, important predictors for i-voter turnout in three elections from 2017 to 2021 were identified in these studies. These were consistently distance from the polling station, computer literacy and trust in i-voting, and occasionally age, income, and political interest. Earlier studies add that i-voting depends on habits, so if a voter voted over the Internet once, they were likely to continue i-voting (Vassil *et al*., 2016; Solvak & Vassil, 2017). Additionally, the level of education and gender have occasionally been significant in predicting voting mode preference.

1.3. Social media

In this paper, social media is understood as a means of interaction among people in which they create, share, and/or exchange information and ideas in virtual communities and networks. Online media, especially social media, has introduced an easy way to share all kinds of information to bypass the news gatekeepers, such as public broadcasting companies or newspapers. By avoiding the gatekeepers, social media channels make it easy to access a large audience with any kind of information, regardless of its reliability and verifiability (see also Bergmann, 2020). However, the existing literature on the topic shows that the influence of social media is multifaceted, and results on the subject are often inconclusive. This section will provide an overview of studies of social media's impact on voter turnout and voting mode preferences.

R. Lindner and G. Aicholzer note that 'the debate about the democratic or political effects of new Internet-based modes of communication has always been characterised by a polarisation between far-reaching positive and optimistic expectations on the one side, and pessimistic expectations of detrimental effects on democratic structures and processes on the other' (Lindner & Aicholzer, 2021: 26). This is also true for the discourse of social media. The optimistic expectation for social media is that it might have the potential to revive citizens' involvement in politics, e.g. by fostering horizontal communication, making it easier to connect individuals, supporting diversity and spaces for opinion independent from established institutions (Dahlgren, 2013; Imhof, 2015). The pessimistic expectation is that social media provides a platform for misinformation and conspiracy theories that seemingly raise the attractiveness of anti-liberal and anti-democratic tendencies (Margetts, 2019; Bergmann, 2020).

Although the factors that predict voter turnout and voting mode preferences have been studied extensively, there is a significant gap in knowledge of the influence of social media on the issue. Interestingly, I only found one study that included social media use as a predictor for i-voting. In this study, the authors used social media use as an independent variable in a LOGIT model to see if it is significant in predicting voter voting online, which proved to be true (Spada *et al*. 2016). However, the authors used data from a survey during a referendum on state-level spending priorities, which is essentially a non-electoral process (see Spada *et al*., 2016: 188). As for electoral processes, I found no empirical studies on the issue of social media's influence

on turnout and voting mode preferences. Nevertheless, there is a reason to expect social media to influence voting mode preferences in national elections.

1.3.1. Social media and political participation

Lindner and Aicholzer (2021) point out that social media can influence political communication by exposing users to the news they are not actively seeking out, which may have a mobilising effect. This effect can also be amplified by the fact that this news emerges from users' personal online community networks, e.g. friends (see also Bode, 2012; deSilver, 2014). Social media also provides a platform for politicians and parliamentarians to engage directly with citizens. Although studies have shown that politicians have preferred to use social media channels for information distribution rather than an opportunity to engage, the availability of this political information, in conjunction with random exposure to social media users, can affect voting behaviour. However, the authors note that the results are inconclusive. Nevertheless, there are also other reasons to expect influence on voting behaviour.

Not all exposure to political information on social media is random. In some cases, social media can limit exposure to diverse perspectives and favour forming groups of like-minded people with shared narratives (Cinelli et al., 2021). This phenomenon is called an echo chamber. M. Cinelli *et al.* (2021) found that echo chambers are incredibly dominant on Facebook and Twitter. Echo chambers can highly increase the volume of similar information for the users, and this has different areas of use. For example, users can be exposed to more educational information. However, Bergmann (2020) argues that the emergence of online media has proved to be exceptionally fertile for conspirational populists as they most often spread misinformation and fake news. The success comes from the ability to spread suspicion of established knowledge and gain support in the process. In the context of voting behaviour, this information can affect voters based on party preference (see subsection 1.3.3. below).

Social media can also have a mobilising effect. S. Boulianne (2015) conducted a meta-analysis of 36 studies assessing the relationship between social media use and participation in civic and political life. Overall, the findings show that social media use had a positive association with participation in civic and political life, as most of the coefficients between the variables proved to be significant. However, half of the coefficients studied were not statistically significant (Boulianne, 2015: 524). Therefore, the association is not certain. It is also not sure that these

two have a causal relationship. Another interesting finding by Boulianne is that the studies using panel data were less likely to report positive and statistically significant results compared to cross-sectional surveys. These findings also set expectations for this paper. There is a possibility that social media influence is prevalent in the statistical models of this paper.

There are also studies on how specific social media platforms can be used to influence political participation in general, including voting and voter turnout. I will now give an overview of two studies focusing on Facebook's social media platform. A research group at the University of Texas looked at the impact of Facebook use on college students' life satisfaction, trust and political participation (Valenzuela *et al.*, 2009). One of the findings is particularly connected to the aim of this study. The authors found that belonging to political groups on Facebook was strongly related to political participation (Valenzuela *et al.*, 2009: 891). The authors also suggested small associations between Facebook variables and social capital (including political participation). Another article indicates that sending even one message on Facebook can significantly influence people's political self-expression, information-seeking and real-world voting behaviour (Bond et al., 2012). The authors found that the message significantly increased voter turnout in the 2010 U.S. Congressional elections using a randomised controlled trial of political mobilisation messages delivered to 61 million Facebook users. The results show that political messages could indeed influence voters' behaviour.

1.3.2. Social media and age

The previous subsection established potential ways social media can affect voting behaviour. This and the following subsections will narrow down the effect that can be expected based on other characteristics. Research indicates that age influences how social media usage affects mood, with younger adults feeling more negativity on days when they spend more time on social platforms than older adults do (Lin & Lachman, 2020). This trend suggests that social media's impact on well-being is particularly significant among the younger population, which could potentially affect their participation in activities like voting due to changes in mood and outlook. Further reinforcing this, data from the Pew Research Center shows stark age differences in social media usage. A higher percentage of adults ages 18 to 29 report using social media sites (84%) compared to those in older age brackets, and this trend extends to specific platforms like Instagram, Snapchat, and TikTok, which have particularly strong followings among young adults. For instance, a majority of 18- to 29-year-olds say they use

Instagram (71%) or Snapchat (65%), and about half say the same for TikTok (*Pew Research Center*, 2021).

Moreover, the frequency of usage among young adults for platforms like Facebook, Snapchat, and Instagram is notable, with a significant portion of users in this age group visiting these platforms on a daily basis. For Snapchat and Instagram, over 70% of users aged 18 to 29 use these apps daily, including a substantial number who do so multiple times a day (*Pew Research Center*, 2021). While the specific influence of social media on behaviour varies across different studies and depends on a range of factors, the evidence strongly suggests that younger individuals are not only more frequent users of social media but also more likely to be affected by its usage, impacting aspects of their mental health and behaviour. The American Psychological Association (APA) provides insights into how the potential risks of social media may be especially acute during early adolescence, a period of significant psychological and social changes (*American Psychological Association*, 2023). This underscores the importance of understanding and mitigating the potential negative impacts of social media, especially among younger, more vulnerable populations.

1.3.3. Social media and party preference

Research and studies on social media's influence in political contexts suggest that its effects can vary depending on users' political party preferences. One study published in the International Journal of Public Opinion Research explored how social media use impacts political opinion leadership and engagement, highlighting the increasingly crucial role of the internet and social media in contemporary society. The study indicates that social media platforms can act as significant arenas for political discussion and opinion formation, potentially reinforcing existing political beliefs and biases based on users' party preferences (Weeks *et al*., 2017). The authors found that frequent social media users were more likely to participate in politics than non-consumers (Weeks *et al.*, 2017: 12), which establishes a basis for social media influence on voter turnout.

Another detailed investigation, reported in PLOS ONE, focuses on social media's contribution to political misperceptions during U.S. presidential elections. It found that the technological environment of social media, characterised by highly segregated communities and echo chambers, might exacerbate the effects of deceptive political messaging. This segregation often

aligns with users' political predispositions, suggesting that social media can indeed influence individuals differently based on their party preferences. The study also highlights that while social media's overall impact might be limited, small changes in belief accuracy due to social media exposure can have significant downstream effects on political behaviour, including voting decisions (Garrett, 2019). A significant influence on voters' belief accuracy and the evidence that social media can play a role in shaping political beliefs are vital for this study.

Additionally, a study featured in Nature examined the influence of Facebook algorithms on political polarisation, providing empirical evidence on how social media feed algorithms might affect attitudes and behaviour in an election campaign. The findings suggest that algorithms can lead to asymmetric ideological segregation in exposure to political news, thereby potentially reinforcing users' pre-existing political beliefs and biases (Garcia, 2023). Another interesting finding from the article is that social media can potentially affect affective polarisation, a phenomenon in which people become more positive towards supporters of their own political party but more negative towards supporters of opposing parties. Moreover, affective polarisation has been associated with higher levels of political participation (see also Phillips, 2024). Consequently, if social media use increases levels of affective polarisation, it can also indirectly affect voter turnout and voting mode preferences.

These studies collectively underscore the nuanced and complex relationship between social media use and political beliefs, indicating that the influence of social media can indeed depend on party preference, potentially amplifying political polarisation and affecting political engagement and opinions. Therefore, social media use can also affect election turnout and voting mode preferences if there are social media posts or campaigns on these issues. It is also relevant to the Estonian case. The following subsection will focus on party positions regarding participating in the elections and voting mode preferences based on what parties can influence voters.

1.3.4. Party positions on voter mobilisation and i-voting in Estonia

Two types of party positions are relevant in this study: party statements related to voter mobilisation and party positions related to i-voting as a voting mode. As discussed above, in some cases, parties and party candidates can discourage voters from turning out or spreading misinformation, potentially lowering turnout in voter groups that would otherwise vote for the

opposing party. However, such voter suppression campaigns have not been relevant to the Estonian context for any relevant party and serious candidates. All relevant social media posts have focused on mobilising potential voters and, thereof, increasing turnout. One common mobilisation strategy has been appealing to the closeness of election results. Therefore, there is no reason to expect people searching for information on parties or party candidates to be less likely to vote. On the contrary, all people exposed to political news from any party on social media are expected to be more likely to turn out.

The expected association is different for i-voting. The parties participating in Estonian national elections have different stances on i-voting. Generally, parties notable for having large shares of votes cast electronically are also likely to promote i-voting more. The standout party with an especially large turnout electronically is the Reform Party, which won the elections both in 2019 and 2023. They have also been the most active promoters of i-voting, urging citizens to vote over the Internet in their social media with posts encouraging breaking the i-voting records and using catchy phrases such as *i-vote now*. Other notable promoters of i-voting are the Estonia 200 and the Social Democratic Party. In 2023, Estonia 200 used i-voting to mobilise voters, implying that according to the polls, the i-votes could close the gap between their and the Reform Party's results, potentially deciding the winner of the elections. The Social Democratic Party used a different mobilisation strategy, reminding people to take computers with them on family trips and reminding them how to i-vote.

Another party that slightly promoted i-voting on their social media is the Fatherland Party. They changed their cover photo on an official Facebook page to a picture with the statement *give your i-vote to Fatherland*. The Centre Party remained relatively neutral on the topic, simply stating that there is a possibility to i-vote, not encouraging people to do so. The party has been known for their stances against i-voting in the past but has not expressed such positions in recent years. The only party explicitly against i-voting is the Conservative People's Party of Estonia, which has strongly questioned the reliability of i-voting systems and strongly encouraged people to vote only on-site. One of the main messages of the Conservative Party was that i-voting is not secure and needs an audit by an independent body. After the elections, they also officially turned to the national court to have the election results annulled, claiming that the results were falsified. All social media posts before the 2023 national elections are shown in Appendix 1.

Observations on the same issue before the 2019 national elections (Appendix 2) show that, in general, the emphasis on i-voting was a bit weaker. The Reform Party did not centre its programme around i-voting. Additionally, Estonia 200 and the Social Democratic did not promote i-voting to the same extent as in 2023. Arguably, the most notable promoter of i-voting was the Fatherland Party, using the catchy phrase *Fatherland i-votes* in their campaign. The post by the Centre's Party was similarly neutral to Reform, Estonia 200 and Social Democrats' posts, showing i-voting as a possibility. The only party discouraging i-voting was the Conservative Party, openly stating that they do not recommend voting over the Internet. The positions from 2019 and 2023 were used to set expectations for the hypotheses in the following subchapter.

1.4. Hypotheses

The preceding literature review focused on two voter turnout and voting mode as two dependent variables and social media use as an explanatory variable in this study. It was established that associations between voter turnout and different variables are complex and often depend on the country's context. In particular, the effect could be blurred due to voter suppression campaigns. However, these kinds of campaigns have not been relevant in Estonia. Conversely, there is a reason to believe that social media use increases the probability of election turnout. Social media posts by parties and politicians in Estonia are primarily aimed at mobilising voters. Additionally, posts are often compiled to share information, increase affective polarisation and appeal to the closeness of the elections. All of these factors are associated with higher turnout rates. Moreover, the literature established that social media users can be expected to be more likely to participate in politics. Based on these findings, this study posited the following hypothesis:

H1: people exposed to political information on social media are more likely to turn out in elections than those who are not.

The literature also suggests looking for non-linear effects and co-effects of variables. The literature on social media influence shows that one important variable contributing to the effect of social media use is an individual's age. Younger adults are expected to be more susceptible to influence from social media if they are exposed to the same amount of media as older adults. In addition, young adults spend significantly more time on social media. Taking these aspects

into account, together with the fact that young people generally have lower turnout rates, the second hypothesis goes as follows:

H2: the effect of exposure to political information on social media on voter turnout is stronger among younger age groups.

From the perspective of rational choice, i-voting is expected to make voting more accessible and convenient, which could increase voter turnout. However, these expectations have not materialised in Estonia, and results in other countries are either minor or inconclusive. This shows that convenience voting can have a limit to how much it can affect voter turnout. Convenience voters are expected to be those people who were going to vote regardless. However, the mode preference can also be based on the influence of social media. The literature established that even one message in social media can influence voters' decisions. In the Estonian context, this influence is expected to be two-fold: the campaigns or social media posts about i-voting can be negative or positive. Therefore, there can be two different effects. Hypotheses 3 and 4 are as follows:

H3: voters exposed to positive convenience voting campaigns or social media posts are more likely to use convenience mode.

H4: voters exposed to negative campaigns of convenience voting modes on social media are more likely to vote on-site.

Each hypothesis is grounded in empirical observations and theoretical propositions discussed earlier and will be examined through systematic statistical analysis. The literature review generally suggests that there is a gap in our understanding of social media's influence on voter turnout and voting mode preferences. Based on current knowledge, social media use is expected to have a multifaceted influence on both dependent variables. Understanding it will not only contribute to the broader academic narrative but also have practical applications in the realm of digital political engagement.

2. Methods and data

This chapter explains how the study was carried out. First, it describes the research design used to study social media's influence on voter turnout and voting mode preferences. It aims to connect theoretical expectations with a methodical approach. The subchapter also conceptualises the variables and explains the importance of a rigorous overview of previous voter turnout and voting mode preference studies above. Second, it justifies the Estonian case selection in assessing the issue and gives an overview of the dataset used for this study. This subchapter also outlines how variables are operationalised. Third, it provides insight into the statistical models used in this study. The subchapter explains how logistic and multinomial logistic regression are used and what they show. Fourth, it proceeds to explain the principles of data analysis using statistical software. It covers the technical aspects of analysis, ensuring that this study's results are replicable. Finally, it explains the limitations of the study. The subchapter covers theoretical, methodic and data-related aspects.

2.1. Research design

This is a large-N quantitative explanatory study that uses statistical methods to understand and quantify how social media use impacts voter turnout and voting mode preferences. The quantitative approach allows for the objective measurement of variables. Since this study involves assessing the influence of social media on voter turnout and voting mode preferences, these variables can be quantitatively measured and analysed using statistical techniques. Additionally, a quantitative approach involves a large sample size that enhances the generalisability of the findings to the broader population, which is essential for understanding the widespread phenomenon of social media use. Quantitative research is also pertinent for hypothesis testing as it uses statistical methods to ascertain the likelihood that a given hypothesis is valid for the population. The approach is consistent with previous studies and provides replicable results.

To conceptualise the variables and test the hypotheses, it was important to understand what was already known about the topics and how they have been studied. In the context of this study, voter turnout shall considered an act of casting a vote in the elections, similar to the authors discussed above. Consequently, voting mode is a way of balloting in the elections. The literature review outlined important aspects that affect both dependent variables. Although both

voter turnout and voting mode preferences have been studied extensively, these studies have yet to focus on the influence of social media. Social media is the means of interaction among people in which they create, share, and/or exchange information and ideas in virtual communities and networks. Given that the literature on social media's influence on electoral processes was limited, the expectations were formed based on social media's influence on behaviour in behavioural studies. Other studies' findings imply that the associations between the variables are causal and relevant. Previous sections established four hypotheses that will be tested in this study. The research seeks to refute or confirm these.

Other studies' findings imply that the associations between the variables are significant and causal. Social media has proven to affect individual opinions and behaviour, which should also apply to political behaviour. The empirical analysis with statistical models was conducted step by step. This means that associations were first assessed only between the dependent and independent variables. Then, the interaction variables were added to the statistical models to evaluate the differences between different age groups and party voters for turnout and voting mode, respectively. Finally, all factors potentially influential to the dependent variables were added to statistical models to contextualise results. This is also why reviewing factors affecting voter turnout and voting mode preferences was important.

2.2. Case and data

A case needs to meet several criteria to assess the associations. The most influential electoral processes with large masses' public engagement occur in the countries' national elections. The country under observation needs to be a stable democracy with a degree of political freedom that allows for genuine political competition and the free exchange of political ideas on social media. Regular free elections were also a prerequisite. The country also needed to have a voting system that enables to cast votes using different voting modes. Other requirements include high social media penetration and its relevance in politics. Estonian case meets all of these criteria. It is an established democracy with high levels of political and media freedom. The elections are competitive. During the national elections in 2019 and 2023, six parties shared 101 places in the Parliament. The party with the most seats is the Reform Party, with 34 seats in 2019 and 37 seats in the 2023 parliament's composition. Most importantly, the Estonian voting system enables casting votes in two main ways, including i-voting.

Another crucial factor is the availability of data to answer the research question. The hypotheses were tested with cross-sectional post-election survey data from Estonian national elections in 2019 and 2023 (Johan, 2023). The data comes from post-election surveys conducted over 30 days after the election date. Surveys used a stratified random sampling method, and data is representative of the Estonian eligible voters in terms of age, gender, ethnicity, settlement type and region. Although survey data is available for the period since the 2005 local elections when i-voting was introduced, the question used to measure social media influence was first inserted into the questionnaire in 2019. Therefore, the data is available for 2019 and 2023 national, 2019 European Parliament, and 2021 local government elections. Datasets were analysed separately because of the differences in party positions before the 2019 and 2023 elections (see subchapter 1.3.4. above and Appendices 1 & 2).

This study only focuses on the two national elections for the comparability of results. This is because electoral law differs for local government elections from national elections, enabling non-citizen permanent residents and people aged 16 or 17 to vote. This means that the populations are significantly different. In addition, the type of election is also an important factor. Local government elections generally have lower intensity than national elections. This is even more true for the European Parliament elections, which have been labelled *second-order* because of lower stakes for all relevant actors, including voters (Reif & Schmitt, 1980). The second-order status has also generally been confirmed in more recent studies (see Ehin & Talving, 2021). Therefore, the decision was made to leave other elections out and focus on the national elections.

The survey questionnaire operationalises the variables. The first dependent variable is voter turnout. In the questionnaires, people were asked if they had voted in the national elections. Additionally, if survey participants had cast a vote, they were asked to specify their voting mode. In this study, three types of profiles are distinguished: non-voters, i-voters, and on-site voters. The analysis distinguishes between these three profiles in the empirical part of this study. The independent variable is operationalised by the question *How often did you do the following in the four weeks before the elections? How often did you look at the parties' and candidates' materials and posts on social media?* Respondents could choose between options *often*, *sometimes*, and *never*. The analysis of this study did not distinguish between the first two options, as the assumption was that any interaction with social media should be causal.

2.3. Logistic regression and multinomial logistic regression

This study uses logistic and multinomial regression models to answer the research question. Logistic regression is appropriate for modelling binary dependent variables. Binary variables are variables where outcomes are typically coded as 0 if something did not happen and 1 if it did. In the case of voter turnout, the outcome is either not voting or voting. Multinomial regression is a generalisation of logistic regression that enables classifying cases with more than two possible outcomes. Both models predict probabilities of the different possible outcomes of a categorically distributed dependent variable. These models allow users to calculate the odds ratios, which can be interpreted as the change in odds of voting (or voting mode) for each unit increase in the predictor variable (social media exposure). This way, it was possible to classify and compare non-voters, i-voters and on-site voters.

Logistic and multinomial logistic regression are both statistical methods used for predictive analysis, particularly suited for classification problems, but they address different types of issues. Logistic regression is used when the dependent variable is binary, meaning it has only two possible outcomes (e.g., "yes" or "no", "success" or "failure"). The logistic regression model uses a logistic function to model a binary outcome variable based on one or more predictor variables. The logistic function can be represented as $\boldsymbol{\sigma(z) = \frac{1}{1+e^{-z}}}$, where z is the input to the function. The reciprocal of $\boldsymbol{1 + e - z}$ maps large positive values of z to values near 1, and large negative values of z to values near 0. Thus, any real-valued number will be mapped into an interval between 0 and 1, representing the probability of the dependent variable belonging to a particular class.

Multinomial logistic regression is an extension of logistic regression that is used when the dependent variable is categorical with more than two levels. This is suitable for scenarios where the outcomes are mutually exclusive categories such as “non-voter“, “on-site voter“, or “i-voter“. In multinomial logistic regression, the probabilities of each category are modelled using a softmax function over the linear combinations of the input features. The softmax function, given by $\boldsymbol{P(Y = j|X = x) = \frac{e^{x \cdot \beta_j}}{\sum_k e^{x \cdot \beta_k}}}$, where $\boldsymbol{x \cdot \beta_j}$ is a linear combination of the input features weighted by the model parameters specific to class j. This term corresponds to z in the logistic regression but is specific to each class. $\boldsymbol{e^{x \cdot \beta_j}}$ is the exponential of the product so that all outputs are non-negative. $\boldsymbol{\sum_k e^{x \cdot \beta_k}}$ is the sum of exponentials of the products across classes k. It ensures

that the probabilities across all possible classes sum to 1. The softmax function assigns a probability distribution over a discrete set of outcomes, making it suitable for modelling scenarios where predictions must be classified into multiple categories. In general, multinomial logistic regression makes logistic regression more versatile for handling a broader range of practical problems where the target variable is not limited to two categories.

At the core, both models had the social media variable, which showed exposure to political information on social media. The independent variable was used as a dummy, showing whether or not a respondent was exposed to political information on social media. There were two reasons for using it as a binary rather than a categorical variable with three categories. Firstly, there was an expectation that any exposure to political information on social media should have an effect. Secondly, it would significantly reduce the number of cases under observation, resulting in less meaningful results. This would have been a further issue with the use of interaction variables, especially with the party preference variable. The first models assessing the associations only included the dependent and the social media variables. This way, it was possible to show the association's and model fit's significance.

Following the first iteration, the interaction variables were added to the model. For the voter turnout model, I added the interaction between respondents' age and social media use. Age was used as a continuous variable. This showed how social media exposure influenced turnout based on respondents' age. For the voting mode preferences model, I added the interaction between respondents' party preferences and social media use. Party preference was used as a categorical variable, and six parties that had been elected to the parliament each had their own category. Although Estonia 200 did not achieve the vote threshold for the Parliament in 2019, they were still assigned a category to increase the comparability of 2019 and 2023 data. This model showed how the effect of social media use depends on party preference. However, for this model, it was assumed that the respondent voted for a party to which information he/she was exposed. Finally, all variables that were identified as influential to turnout and voting mode preferences were added to the models to show social media influence in context and determine the significance of observed associations.

The multinomial regression model tested hypotheses 1 and 2. Hypothesis 1 expected a positive association between exposure to political information on social media and election turnout. The hypothesis was based on the fact that every party sought to mobilise voters, and there had been

no relevant voter suppression campaigns. Therefore, the positive effect was expected regardless of party preferences. Hypothesis 1 was confirmed if exposure to social media increased the likelihood of turning out in the elections. Hypothesis 2 focused on the strength of the association in different age groups. The expectation is that younger age groups are more likely to be influenced by social media exposure. Hypotheses 3 and 4 focus on voting mode preferences and assume that the effect of social media exposure depends on the type of information voters were exposed to. If respondents voted for a party supporting i-voting, they were expected to be exposed to this party's social media and expected to be more likely to i-vote. In case respondents voted for a party against i-voting, they were expected to be exposed to posts discouraging i-voting and expected to be more likely to vote on-site.

2.4. Principles of data analysis

This study used RStudio statistical analysis software for data preparation, descriptive statistics, model building, diagnostics, and association visualisation. Data preparation steps included loading the data, handling missing data, removing outliers, and recoding variables. I used *foreign* (Bivand *et* al., 2023) and *readr* (Wickham *et* al., 2024a) packages to load the data from *.sav* and *.csv* files. Data was prepared using R base and additional functions from the *dplyr* (Wickham *et* al., 2023a) package. Data preparation is essential to perform statistical analysis. Logistic regression requires a binary dependent variable as an input. Multinomial regression uses a categorical variable as a dependent variable, which needs to be used as a factor in the model. Independent variables need to be coded as continuous, binary, or specified as factors. In addition to the dependent and independent variables, the model included other influential variables that were also prepared for the analyses.

Descriptive statistics were also identified with R base functions and used in conjunction with the data-cleaning and model-building processes. Logistic regression capability is included in the R base package, but the multinomial regression model was used from the *nnet* (Ripley & Venables, 2023) package. Assumption checks, including collinearity and outlier checks, as well as visual inspection of logarithmic odds, were used in preparation for the model analysis. The analysis of associations was accompanied by models' goodness fit and diagnostics. Goodness fit and diagnostics involved using p-values as a predictor of significance and pseudo R-squared along with sensitivity and specificity as a means of gauging the models' explanatory power. This study used Nagelkerke's R-squared values, as these are analogous to R-squared from the

ordinary least squares linear regression. Nagelkerke's R-squared values were calculated using the *pscl* (Jackman et *al*., 2024) package. The statistical results were summarised, and the most important ones were visualised. Summary tables were generated with the *stargazer* (Hlavac, 2022) package. Visualisations were made with *ggplot2* (Wickham *et* al., 2024b) and *sjPlot* (Lüdecke *et* al., 2023) packages and modified with *scales* (Wickham *et* al., 2023b) and *ggeffects* (Lüdecke et *al*., 2024).

The sample included a total of 2001 respondents: 1000 in 2019 and 1001 in 2023. The models were identical for both datasets, but the models were run with one dataset at a time. This allowed for comparing social media influence across two elections to identify change over the years. Additionally, running statistical models with these two datasets together made little sense due to a lack of theoretical and empirical basis to do so. This would somewhat have dimmed the results without having any positive effects. Finally, the ethical considerations, such as privacy and confidentiality, did not prove to be an issue in this study, as it only used anonymised datasets without any specific identifiers.

2.5. Limitations

This subchapter explains the limitations related to research design, methods, and data. Firstly, proving the causal inference of social media use on voter turnout and voting mode preferences is always limited. Although the theoretical and empirical evidence suggests that social media use is significantly associated with changes in people's behaviour, there is no complete certainty of the causality. However, there was a high likelihood to argue for the causality of the relationship. Overwhelming evidence suggests that social media use can influence political participation by mobilising people, increasing levels of affective polarisation and shaping or reinforcing people's beliefs. Evidence also suggests that age can be a significant factor in moderating the influence. If it is established that being exposed to information on social media is indeed influential, it is only logical that the effect depends on the exact type of information the person was exposed to.

There are also limitations related to data and survey questionnaires. Firstly, the question of exposure to political information does not necessarily indicate if a person was exposed to political information about a particular party or candidate randomly or if they looked for it intentionally. The question left the respondent room for interpretation. However, the survey

questionnaire also included a question: *did you search for information on parties and party candidates on the Internet?* Both questions can imply that a person was exposed to a specific social media post because of their interest in politics. However, the question I used in my statistical analysis suggests that a person was exposed to political information randomly. Given the fact that two questions were asked one after another, there is an expectation that the person saw one option as intentional and the other as random. Nevertheless, this limits the study's inference as it is impossible to differentiate between the intentionality of social media use.

Additionally, the inference is limited by the fact that survey respondents were not asked what party or party candidates' information they were exposed to. For example, it is possible that a Reform Party voter cast their vote over the Internet because they were exposed to a social media post by the Conservative Party's candidate questioning i-voting procedures. However, because of the mechanisms behind the social media algorithms, it is more likely that a person was exposed to posts by the party they prefer. People were also likely exposed to multiple social media posts of different party candidates. Suppose they still voted for a specific party after being exposed to various posts by different parties or candidates. In that case, it is likely that they are more influenced by social media posts of their party of preference. Nevertheless, this is an assumption this study could not alleviate.

Finally, the number of responses in the datasets of this study limited statistical significance and generalisibility in this study. Using interaction variables can significantly limit the number of cases for each profile (i-voters, on-site voters and non-voters) assessed in this study. Assessing influence across different party voters proved to be challenging for the model due to the number of cases. Using data from both the 2019 and 2023 datasets together also did not make much sense because different effects can be expected with varying years of campaign, which would have blurred the model results. However, models still provide meaningful results and insights into the topic that had not been studied before.

3. Results

This chapter focuses on the analysis results. First, it presents an overview of descriptive statistics. The overview involves describing Estonian national election results in 2019 and 2023 relevant to this study's context and variables used in its statistical models. Second, the analysis proceeds to the voter turnout model. The voter turnout model is a multinomial logistic regression model distinguishing between non-voters, i-voters, and on-site voters. This model was used to test hypotheses 1 and 2. Third, the analysis uses the logistic regression model to distinguish between i-voters and on-site voters. This model tested hypotheses 3 and 4. Both models used a step-by-step approach, gradually adding independent variables to increase the models' predictive power and analyse results in context. Finally, the findings were discussed regarding generalisability, impact and future research.

3.1. Descriptive statistics

This study looked at Estonian national elections in 2019 and 2023. The relevant descriptive statistics are associated with voter turnout, voting mode preferences, and social media use. Official voter turnout numbers show that turnout in Estonian national elections has generally been stable over the years of the possibility of i-voting. Figure 3 shows that the turnout levels ranged from about 62% to 64% of eligible voters over the years. However, there was a sudden increase in the number of voters from 2019 to 2023 that is not reflected in the share of voters. This is due to a change in the methodology for counting voter turnout. The turnout share decreased as citizens permanently resident abroad were counted as part of the electorate. Previously, only those voters living abroad who actually voted were counted in the calculations. Therefore, there was a significant increase in turnout from 2019 to 2023, and 2023 voter turnout is actually the all-time highest in the national elections, considering the number of voters. It is possible that social media use has played a role in it.

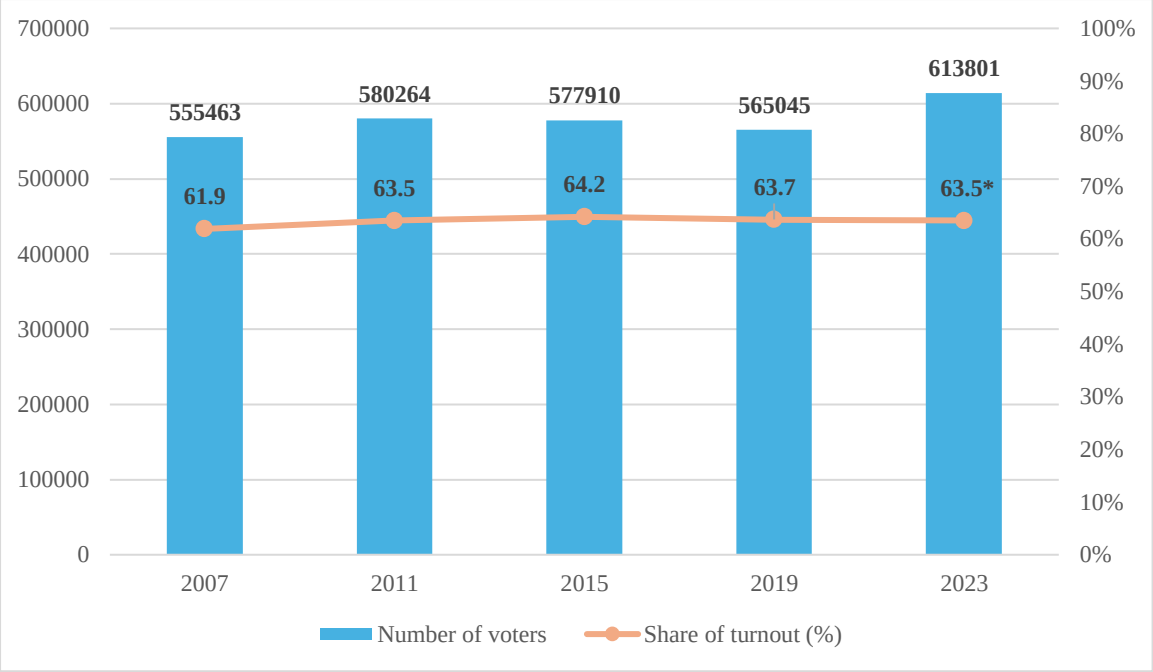

Figure 3. Voter turnout in Estonian national elections 2007–2023 (*Vabariigi Valimiskomisjon*, 2024)

* vote shares for 2023 were calculated with different methods

One reason to assume that social media played a role in the increase in turnout is that it is associated with turnout levels in different age groups. The increase in turnout was mainly influenced by higher turnout rates among younger age groups. Although I was unable to get official data upon request, the data indirectly shows the difference. This is reflected in survey data that is representative of the Estonian population. If, in 2019, the 18–34-year-old respondents constituted 18% of the people that voted in elections, in 2023, it constituted 22%. Proportions in all other age groups either remained the same or lowered, indirectly indicating that young people caused the overall rise in turnout. Additionally, I was able to use another dataset representative of the Estonian population from 2023 (*Norstat*, 2023) on the topic of affective polarisation. The dataset showed that out of all voters, more than 25% belonged to the 18–34 age group and among non-voters, the results were similar to the 35–54 age group. Although these results do not directly show a higher turnout in younger age groups than usual, it seems highly likely.

Official i-voter numbers show that i-voting has steadily been on the rise, indicated both by the number and share of i-voters. Figure 4 clearly shows that voters have become more accustomed to the i-voting system, which is also consistent with the literature review above (e.g., Solvak & Vassil, 2017). At the same time, voter turnout has not shown the same consistently rising trend,

indicating that new i-voters are mainly either new voters who have gained the right to vote (e.g. turned 18) or those who would vote anyway but choose to do it more conveniently. This finding is also consistent with the literature above. Descriptive statistics also indicate that positive i-voting campaigns over the years, including social media posts, might have played a role in increasing i-voter turnout because of the normalising effect as well as trust in the party or party candidate as an authority.

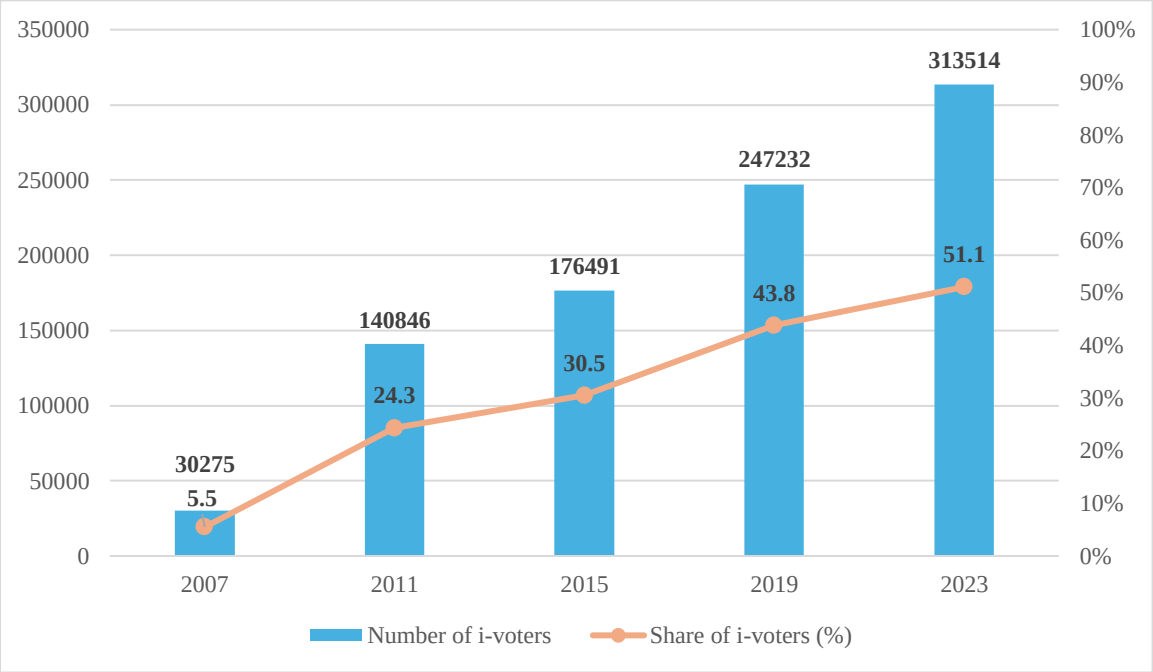

Figure 4. I-voter turnout in Estonian national elections 2007–2023 (*Vabariigi Valimiskomisjon*, 2024)

As established above, most parties in Estonia have encouraged i-voting in 2023 or remained neutral in the case in 2019. However, this is not the case for all of them. While most parties have encouraged voting over the Internet, others have discouraged doing so. Figure 3 shows that most parties have had an increase in their share of i-votes over the last national election campaigns. However, the only party without a consistent rise is the Conservative Party, which has discouraged i-voting both in 2019 and 2023. Considering that this information has been shared on social media and that social media has arguably become the most important source for sharing information and mobilising voters, it is reasonable to assume that social media has influenced people's voting mode preferences. At least the descriptive statistics show that social media campaigns have coincided with changes in voting patterns. Therefore, it was reasonable to test these associations.

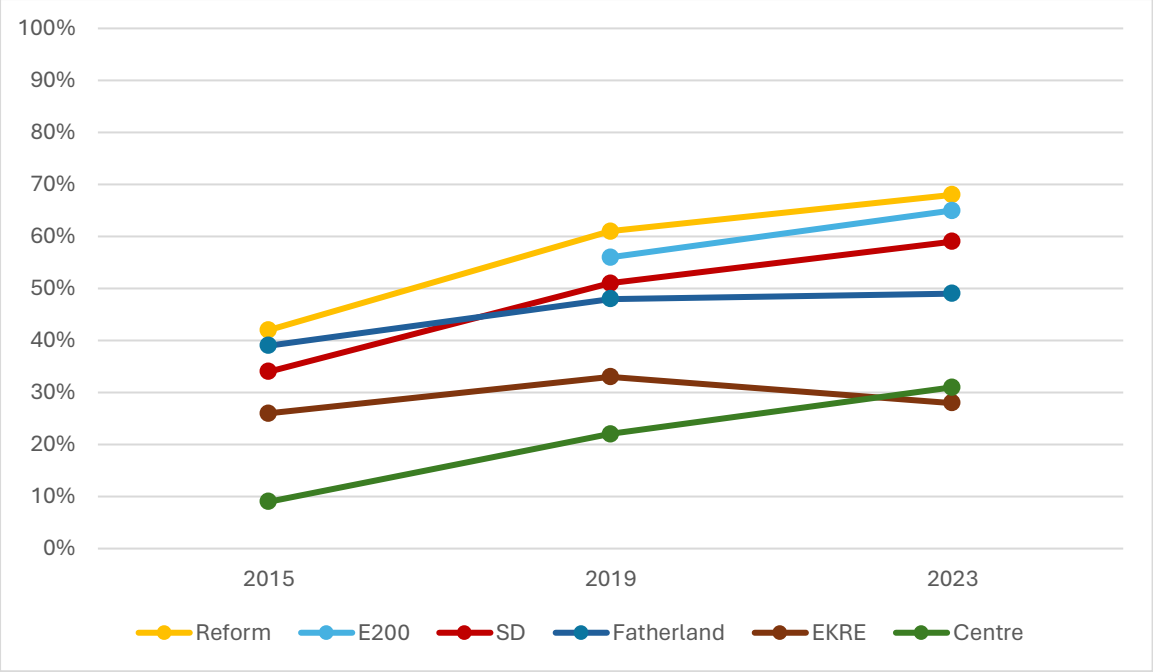

Figure 5. Shares of i-votes out of all party votes in national elections 2015–2023 (%) (*Vabariigi Valimiskomisjon*, 2024)

Finally, this subchapter outlines the descriptive statistics of variables from the dataset that were used in the statistical models. These are presented in Table 1. Most variables were used as factors, so the statistical information is absent. Education factors were primary or basic education (reference category), secondary or special secondary education (including vocational education), higher education, and vocational education without a secondary degree. Both datasets included more male than female respondents. About two-thirds of respondents in both datasets were interested in politics. The Reform Party was the most popular in both datasets according to party preference, corresponding to the actual voting results where the Reform Party gained the most votes. However, the 2019 dataset included a lot fewer people who were exposed to social media (only 25%), whereas the 2023 dataset included 48% of respondents exposed to political information on social media. The share of non-voters in the 2019 dataset is 19%, and 17% in the 2023 dataset. More people voted on-site in 2019 and, conversely, over the Internet in 2023. Based on descriptive statistics, the datasets are representative of the Estonian population.

Table 1. Descriptive statistics

Variable	Min	Max	Mean	Mode	SD
2019					
Age	18	93	51,21	66	17,75
Computer literacy	1	5	3,49	4	-
Distance from polling station	1	7	3,88	5	-
Education level (factor)	-	-	-	Secondary	-
Gender (factor)	-	-	-	Female	-
Income	1	7	3,52	1	-
Interest in politics (factor)	-	-	-	Interested	-
Party preference (factor)	-	-	-	Reform	-
Social media use (factor)	-	-	-	No	-
Trust in i-voting	0	10	6,72	10	-
Turnout (factor)	-	-	-	On-site voter	-
Voting mode (factor)	-	-	-	On-site	-
2023					
Age	18	92	50,46	49	18,20
Computer literacy	1	5	3,76	5	-
Distance from polling station	1	7	4,32	5	-
Education level (factor)	-	-	-	Secondary	-
Gender (factor)	-	-	-	Female	-
Income	1	7	3,98	7	-
Interest in politics (factor)	-	-	-	Interested	-
Party preference (factor)	-	-	-	Reform	-
Social media use (factor)	-	-	-	No	-
Trust in i-voting	1	10	5,96	10	-
Turnout (factor)	-	-	-	I-voter	-
Voting mode (factor)	-	-	-	Internet	-

3.2. Voter turnout model

The voter turnout model is a multinomial logistic regression model that distinguishes how social media use affects three types of individuals: non-voters, on-site (paper) voters, and i-voters. The model was used in three steps. First, it only included the dependent and social media exposure variables to see how much social media exposure alone can predict turnout and belonging to a specific voter group. Secondly, the age variable was added to see if there were any differences in social media use influence if age is taken into account. Finally, the associations were contextualised with a complete model that included previously identified variables influencing voter turnout. This step-by-step approach helped catch the nuanced nature of the association and interpret the results in context. For all models, I show the regression table and visualise the results. The results are presented in regression tables that provide the coefficients, offering initial information on the direction of an association. I then elaborate on this influence by analysing how the odds of belonging to a category change with exposure to political information on social media. I comment on the main results and essential model diagnostics, most importantly Nagelkerke's pseudo-R-squared, sensitivity and specificity of the model.

3.2.1. First iteration: social media use

The first iteration of the model (Table 2) shows that social media was significant in predicting voter turnout for both on-site and i-voters, with the exception of on-site voters in 2019. The coefficients displayed in the table show the direction of an association. Positive coefficients indicate that the effect of social media exposure was significantly different for voter groups compared to the non-voter reference groups. Positive coefficients can mean two things. Firstly, it can mean that the effect of social media exposure itself is significant and a strong predictor of turnout. However, it can also mean that the effect of social exposure for voters and non-voters is fundamentally different, which is likely to be true. People exposed to political information on social media were likely only exposed to positive campaigns encouraging them to vote because there were no relevant voter suppression campaigns in 2019 and 2023. Additionally, people who are exposed to political information on social media can be exposed to it because of their interest in politics. Therefore, the general expectation should be that people are less likely to belong to the non-voters group if they are exposed to political information on social media. Taking this possibility into account, there is yet no basis to say that social media exposure increases the probability of turnout.

Table 2. Results of the first iteration of the voter turnout model

	Dependent variable:			
	Paper 19	Internet 19	Paper 23	Internet 23
	(1)	(2)	(3)	(4)
Social Media: Exposed	0.182	0.578***	0.796***	0.597***
	(0.210)	(0.215)	(0.191)	(0.191)
Constant	0.855***	0.412***	0.518***	0.638***
	(0.097)	(0.105)	(0.119)	(0.117)
Number of cases	988		977	
Nagelkerke R-squared	0.011		0.021	
Sensitivity	0.471	0	0.456	0.414
Specificity	0	0.663	0.633	0.578
Akaike Inf. Crit.	2,050.178	2,050.178	2,009.979	2,009.979
Note:				**p<0.05; ***p<0.01

Although coefficients show the direction of an association, these results are difficult to interpret because influence is shown to the logarithms of odds ratios. The odds ratios, in turn, describe how the likelihood of being an on-site voter or an i-voter changes based on exposure to social media relative to being a non-voter (the reference category). The odds ratios can be divided into the baseline odds and the social media exposure effect odds. The baseline odds for the 2019 model show that the base likelihood of being an on-site voter, compared to a non-voter, was 2,35 times greater when social media exposure and other factors are not considered. For i-voters, the odds of being an i-voter are about 1,51 times greater than being a non-voter. The baseline odds in 2023 for on-site voters and i-voters were 1,67 and 1,89, respectively. These odds ratios essentially show the distribution of the dataset, showing that in comparison to actual turnout results, the non-voters are underrepresented in the dataset. However, the proportions of on-site and i-voters out of all voters in the sample align well with the actual turnout results.

More importantly, the odds ratios for the effects of social media exposure for on-site voters were 1,20 and 2,22, and 1,78 and 1,89 for i-voters. These results mean that the effects in 2019 are 1,20 and 2,22 times more positive for on-site voters and i-voters, respectively, compared to those for non-voters. In 2023, the effects were 1,78 and 1,89 times more positive. The closer the odds ratio values are to 1, the more similar the effect is for either voting group compared to the non-voters. The results are visualised in Figure 6. As shown in the figures, the effects of

social media exposure for different voter categories are indeed significantly different. As expected, the probability of being a non-voter is lower if people are exposed to social media. The effect was more substantial in 2023, which indicates that social media might have played a slight role in mobilising people to vote. On the other hand, the effects for both on-site and i-voter categories over two elections show interesting results. The direction for on-site voters in 2019 was similar to non-voters in 2019 and completely different in 2023. Respondents were slightly less likely to be on-site voters if exposed to social media in 2019 but more likely to fall under this category in 2023. Therefore, in comparison of two years, social media might have played a role in mobilising people to vote on-site. For i-voters, we see a higher probability of belonging to the category in 2019 but no effect in 2023, with social media exposure. This shows that social media exposure did not influence people to vote over the Internet in 2023 at all and it is not likely that the association is causal for i-voters in 2019 as there is no proof of extensive i-voting mobilisation campaigns.

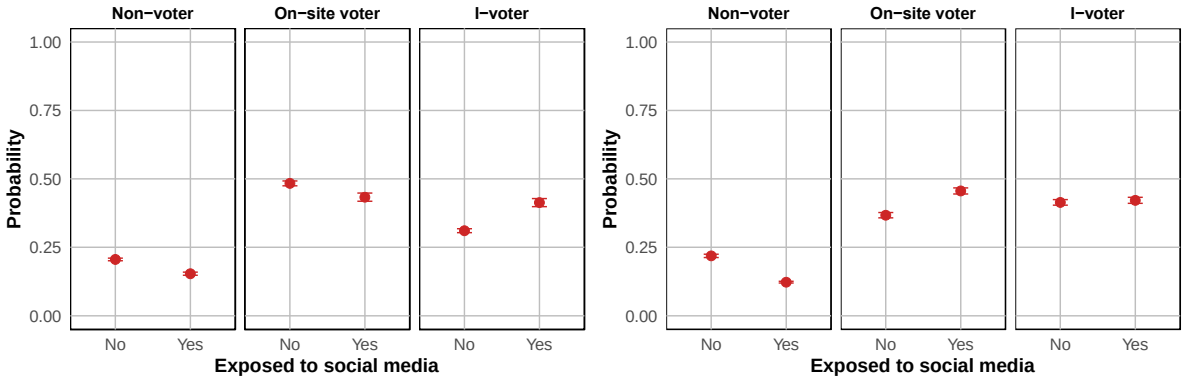

Figure 6. Probability of belonging to a class based on social media use (2019 and 2023)

Although the results of the first iteration of the model showed a significant positive association between exposure to political information on social media and voter turnout, the model's explanatory power is relatively insignificant. Firstly, the variation in social media exposure only explains about 1%–2% of the variation among voter profiles, as indicated by the pseudo-R-squared value. The overall accuracy of the models regarding predicting both true positive and true negative results are 0,470 and 0,431, so the predictions made by the model were accurate less than half of the time. The sensitivity and specificity scores show that the model predicted less than 50% of true positive (0% for the reference category in both 2019 and 2023) and also 0% to 83% of the true negative results. Generally, the model indicates that exposure to political information on social media can be associated with a slightly higher likelihood of

turning out in the elections. However, this effect is not consistent for both voter profiles. The effect changes over time, as shown by the comparison of probabilities based on social media exposure. These changes were expected, but not in the direction they actually turned out to be.

Overall, the first iteration of the first model shows that social media use can influence voter turnout. People exposed to political information on social media are less likely to be non-voters, and this association was consistent over two election periods. This partially confirms Hypothesis 1. However, there is a significant limitation because of which the association was highly expected in the first model. As mentioned in the methods chapter, the survey respondents were only asked if they were exposed to political social media posts, regardless of their intent. This means that people could be exposed to social media posts randomly, but they could also just generally be interested in politics and follow political news anyway. This would mean they can be more influenced by their interest in politics than social media posts in their decision to vote. Taking this into account, the effect would be expected to be stronger. Nevertheless, the interesting finding is that social media use only explains a small part of the variation in turnout.

Additionally, the first iteration of the model showed that the overall effect of social media exposure on voting mode preferences was not exactly in line with the expectations. The effects of social media exposure on different profiles indicate that despite the stronger and more numerous social media campaigns for i-voting in 2023, the effect was statistically more significant in 2019. Therefore, the causality of the association is even more questionable. However, for on-site voters, the effect of social media exposure was the opposite in 2019 to what it was in 2023. Interestingly, the results show that social media exposure might have influenced people to vote on-site rather than over the Internet. Although there is little basis to establish the causal association of these results yet, the results indicate that the effect of social media exposure can depend on other factors.

3.2.2. Second iteration: social media use and age

The second iteration showed that social media alone does not predict voter turnout for on-site or i-voters. The results are shown in Table 3. The addition of the age variable entirely made the social media exposure variable insignificant. Age is a significant predictor of turnout, especially for the on-site voters. Positive and significant coefficients (0,037 and 0,031,

respectively) indicate that older individuals are more likely to vote on-site, with a higher likelihood of voting with each additional year of age. Insignificant positive coefficients for i-voting for both years suggest that age does not mediate the decision to i-vote, at least not in a linear rise in probability. This result is also consistent with the earlier studies. Negative coefficients (-0.541 and -0.757, respectively) for the social media exposure variable suggest that exposure to social media decreases the likelihood of voting via these methods compared to the reference category, which is an entirely different result in comparison to the first iteration of the model. However, the lack of asterisks indicates these effects are not statistically significant. This shows that overall, social media exposure alone is a weak predictor of turnout and voting mode preferences, as the initial significance fades once more relevant explanatory variables are added to the model.

Table 3. Results of the second iteration of the voter turnout model

	Dependent variable:			
	Paper 19	Internet 19	Paper 23	Internet 23
	(1)	(2)	(3)	(4)
Social Media: Exposed	-0.541	-0.757	0.906	0.452
	(0.684)	(0.659)	(0.559)	(0.534)
Age	0.037***	0.005	0.031***	0.012
	(0.006)	(0.006)	(0.007)	(0.007)
Social Media*Age	0.032	0.038**	-0.001	0.004
	(0.017)	(0.017)	(0.011)	(0.011)
Constant	-1.148***	0.175	-1.036***	0.086
	(0.326)	(0.320)	(0.368)	(0.338)
Number of cases	988		977	
Nagelkerke R-squared	0.106		0.064	
Sensitivity	0.541	0.398	0.502	0.457
Specificity	0.668	0.694	0.669	0.629
Akaike Inf. Crit.	1,971.231	1,971.231	1,980.048	1,980.048
Note:				**p<0.05; ***p<0.01

Positive interaction term coefficients (0,038) for i-voters indicate that the combined effect of age and exposure to social media increases the likelihood of voting online (over not voting) in 2019 as age increases. In other words, older individuals exposed to social media were slightly more likely to vote online in 2019. These results might be influenced by higher turnout in

younger age groups in the 2023 elections. However, while the turnout was higher for younger age groups, the exposure to social media is insufficient to explain the higher turnout rates. In essence, the interaction term shows significance only for the likelihood of voting online in 2019, where the impact of social media exposure increases with age. For other voting methods and years, age and social media exposure do not interact significantly to alter voting behaviour relative to non-voters. Given these results, Hypothesis 2 is not supported by the data. The analysis suggests that the influence of social media on voter turnout does not decrease with age; in fact, for online voting in 2019, it slightly increases with age. Thus, younger age groups do not show a stronger response to political information on social media in terms of their turnout behaviour, at least not in a statistically significant way, according to the model's results.

If we translate the results of the second iteration into odds ratios, it is more feasible to understand the different effects by explaining the interaction terms' influence across all categories of voters and years separately. For on-site voters in 2019, the odds ratios of 0,582 show that while the association was insignificant, those exposed to social media were less likely to vote on-site compared to those not exposed. The odds ratios of 1,032 for interaction terms show that the negative effect of social media on voting on-site slightly decreases with age. For i-voters in 2019, the odds ratios of 0,469 also show that those exposed to social media are less likely to vote online compared to those not exposed. The 1,039 odds ratios of interaction terms show that, similar to on-site voters, the negative effect of social media decreases with age.

For on-site voters in 2023, the social media exposure odds ratio of 2,475 shows a significant positive effect. This suggests that those exposed to social media were much more likely to vote on-site compared to those not exposed. The odds ratios of 0,999 for interaction terms show that there was nearly no change in the effect of social media on age. For i-voters, the odds ratios of 1,572 for social media exposure show a positive effect, indicating that exposure to social media increases the likelihood of voting online. As for the interaction terms, the odds ratios of 1,004 show a slight increase in the effect of social media with age. While all indicators for the influence of social media exposure are insignificant, even the interaction terms show a slight positive effect with age in both years, contradicting the hypothesis that younger age groups would be more influenced. The effect of social media on voter behaviour does not seem to depend on age strongly and, in fact, shows a slight increase with age in some cases.

The interaction terms are visualised in Figure 7. They show the probability of different voter types as a function of age, comparing groups exposed to social media versus those not exposed. Each plot represents a different voting category, and the trends are shown for both 2019 and 2023. The 2019 set of plots shows that for non-voters, both lines are relatively flat, suggesting little change in the likelihood of not voting as age increases, regardless of social media exposure. The plot shows a slight separation, with non-exposed individuals slightly more likely not to vote. For on-site voters, both lines show a clear upward trend, indicating that the probability of voting on-site increases with age, regardless of social media exposure. For the i-voters category, the online voting probability shows a downward trend for those not exposed to social media, decreasing with age. For those exposed, the trend is also downward but less pronounced. This indicates that younger individuals exposed to social media were more likely to vote online, which diminishes with age.

The second set of plots shows that the probability of not voting is lower among those exposed to social media and decreases slightly with age for both exposed and non-exposed groups, with a slightly sharper decline for the non-exposed group. For on-site voters, similar to 2019, the trend for both exposed and non-exposed is upward, suggesting an increase in the probability of on-site voting with age for those exposed. The effect is more pronounced for people not exposed to social media. Finally, for i-voters, both lines go slightly down as the probability of being an i-voter decreases with age completely, regardless of social media exposure. It needs to be noted that the only significant result that appeared for i-voters in 2019 was that the effect of social media use was significantly different from that of non-voters. Larger representations of both plots in Figure 7 are shown in Appendix 3.

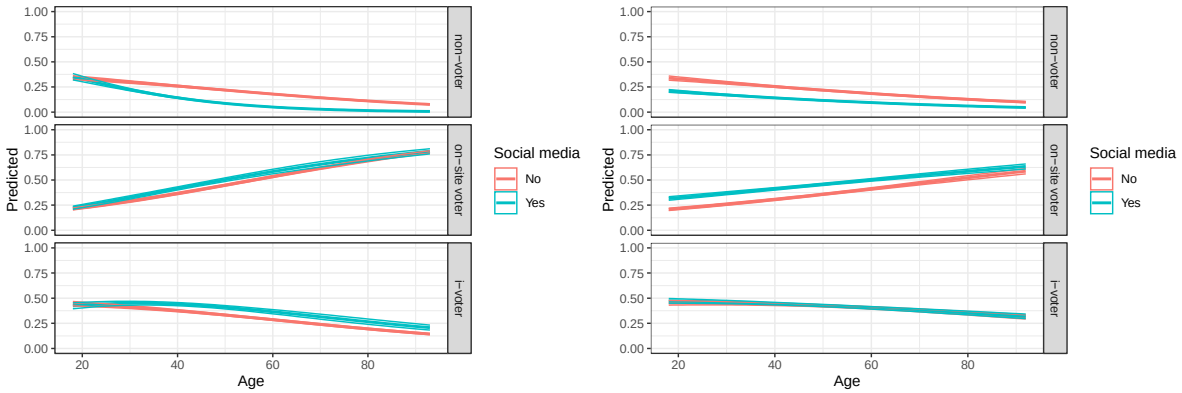

Figure 7. Probability of belonging to a class based on social media use and age (2019 and 2023)

Overall, the second iteration shows that social media exposure has minimal effect on voter turnout, and when this variable is in a model with strong predictors, it is completely irrelevant. While the influence can differ across age groups and time, there is no basis for assuming a causal association. In general, the results show that the the direction and strength of influence of social media exposure varies very little based on age, as shown by the direction of the lines in Figure 7. Hypothesis 2, that younger age groups are more influenced by social media in their turnout behaviour, is only marginally supported for online voting in 2019, as indicated by the stronger initial rates of online voting among the younger individuals exposed to social media. However, the expectation was that influence would be stronger for the 2023 model. Hence, there is no reason to assume that the association is causal and Hypothesis 2 is disproved.

3.2.3. Third iteration: complete model

The third iteration of the model included a complete set of variables that have been identified to influence voter turnout in Estonia over time. The results are shown in Table 4. The model further confirmed that social media alone does not predict turnout once all relevant predictors are present. The only variables consistently relevant in predicting both on-site and Internet turnout are political interest and age. Additionally, trust in e-voting and computer literacy are important predictors of i-voter turnout. All of the social media exposure coefficients are negative and insignificant. This result is affected by model complexity, new inter-correlations and a lower number of cases. Additional variables likely account for variability in voting behaviour that was otherwise previously attributed to social media influence in simpler models. Additionally, new variables can correlate with both social media exposure and voter turnout, thus modifying the effects of social media exposure. The models also include fewer cases because, with the addition of new variables, there is an increased number of missing values.

Table 4. Results of the third iteration of the voter turnout model

	Dependent variable:			
	Paper 19	Internet 19	Paper 23	Internet 23
	(1)	(2)	(3)	(4)
Income	-0.074	-0.058	0.141**	0.111
	(0.065)	(0.067)	(0.060)	(0.062)
Political Interest	2.219***	1.652***	1.530***	1.138***
	(0.273)	(0.282)	(0.247)	(0.258)

Education: Secondary	0.900*	0.570	-0.191	0.048
	(0.467)	(0.538)	(0.366)	(0.422)
Education: Higher	0.991	1.157**	0.396	0.490
	(0.540)	(0.589)	(0.446)	(0.490)
Education: Vocational	1.639	1.285	-0.505	-0.088
	(1.001)	(1.222)	(0.596)	(0.680)
Computer Skills	0.234	0.655***	-0.046	0.478***
	(0.166)	(0.179)	(0.138)	(0.151)
Trust in E-voting	-0.037	0.348***	-0.060**	0.271***
	(0.038)	(0.051)	(0.031)	(0.035)
Gender: Female	-0.129	0.110	0.306	-0.173
	(0.261)	(0.272)	(0.240)	(0.249)
Social Media: Exposed	-0.888	-0.737	0.512	-0.151
	(0.931)	(0.952)	(0.671)	(0.673)
Age	0.032***	0.038***	0.026**	0.024**
	(0.012)	(0.013)	(0.011)	(0.011)
Social Media*Age	0.035	0.029	-0.0003	0.010
	(0.024)	(0.024)	(0.013)	(0.014)
Constant	-3.007***	-7.474***	-1.681	-5.074***
	(1.075)	(1.200)	(0.879)	(0.972)
Number of cases	702		808	
Nagelkerke R-squared	0.468		0.420	
Sensitivity	0.685	0.619	0.672	0.674
Specificity	0.719	0.798	0.752	0.847
Akaike Inf. Crit.	1,124.999	1,124.999	1,339.185	1,339.185
Note:				**p<0.05; ***p<0.01

Overall, the model has significant predictive power, as indicated by values of Nagelkerke's R-squared of 0,468 and 0,420 for 2019 and 2023, respectively. This means that the model explains about 42% to 46,8% of the variation in the dependent variable. The model is also more accurate, with sensitivity scores ranging from 0,619 to 0,685 and specificity scores from 0,718 to 0,847. Figure 8 displays the change in the interaction variable's effect on voter profiles. The plots show that the lines for on-site voters and i-voters are either almost wholly overlapping or flat, confirming that social media exposure had little to no effect on different voter profiles. The association is most visible for non-voters. However, there are minor differences in the direction of the influence based on social media exposure, and these only partly support the hypotheses established in this study. Hypothesis 1 is supported by respondents being less likely to be non-

voters if exposed to political information on social media. Hypothesis 2 is not supported as age did not mediate the association in a significant manner.

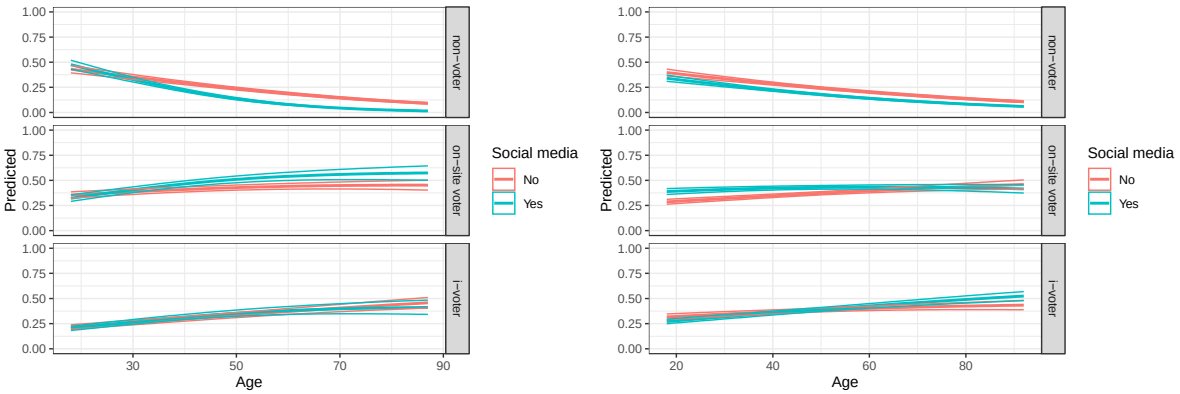

Figure 8. Probability of belonging to a class based on social media use and age (2019 and 2023)

3.3. Voting mode preferences model

The voting mode preferences model is a logistic regression model that distinguishes how social media use affects two types of voters: on-site (paper) voters and i-voters. Although the voter turnout model also explains some aspects of voting mode preferences, there was a need for an additional model as party preference was only asked from people who cast their votes. Additionally, factors that influence voter turnout differ from those that influence voting mode preferences among the voting population. Similar to the voter turnout model, the preferences model was used in three steps. First, it only included the dependent and social media use variables to see how much social media use explains being part of a specific voter group. Secondly, the party variable was added to see if there were any differences in social media use influence if party preference is taken into account. Finally, the associations were contextualised with a complete model that included previously identified variables influencing voting mode preferences. This step-by-step approach helped catch the nuanced nature of the association between social media use, party preference, and voting mode preferences.

3.3.1. First iteration: social media use

Although social media use alone is not a central variable in the voting mode preferences model, it still helps establish baseline expectations for social media exposure influence and adds information to the output from the voter turnout model. The results for the second model are shown in Table 5. Negative baseline odds for 2019 indicate that there were significantly more

on-site voters than i-voters, so the base probability of being an on-site voter is higher. The proportions of i-voters and on-site voters are almost equal for the 2023 dataset. These also correspond to the real turnout results. The positive coefficient for social media exposure in 2019 indicates that respondents were more likely to i-vote if exposed to political information on social media. In 2023, this association is negative and insignificant. The negative coefficient indicates that people exposed to social media were less likely to vote over the Internet. However, this association is not statistically significant. Initial results show that social media alone does not explain a significant part of the decision behind voting mode preferences.

Even though exposure to social media alone does not explain voting mode preferences, it does not necessarily mean that the effect is not present. As established in the theoretical part of this study, the effect can vary depending on other variables. If the effect of social media exposure does indeed vary depending on party preference, then insignificant coefficients can be expected. However, a positive and significant coefficient in 2019 compared to 2023 is not expected, as i-voting campaigns by parties were arguably more prevalent in 2023. Additionally, parties that promoted i-voting were significantly more successful than parties questioning i-voting, so exposure to social media was expected to result in an overall positive effect. Therefore, the causality of the association under the observation is already questionable.

Table 5. Results of the first iteration of the voting mode preferences model

	Dependent variable:	
	Internet 19	Internet 23
	(1)	(2)
Social Media: Exposed	0.396**	-0.199
	(0.161)	(0.141)
Constant	-0.443***	0.120
	(0.085)	(0.100)
Number of cases	798	808
Nagelkerke R-squared	0.010	0.003
Sensitivity	0	0.520
Specificity	1	0.530
Log Likelihood	-539.129	-559.029
Akaike Inf. Crit.	1,082.258	1,122.057
Note:		0.05<**p***p<0.01

The odds ratios describe how the likelihood of being an i-voter change based on exposure to social media relative to being an on-site voter (the reference category). The value of odds ratios for social media in 2019 is 1,49, which means that exposure to social media increases the odds of online voting by about 48,6% compared to on-site voting. For 2023, the odds ratio is 0,820, indicating a decrease in the odds of voting online by about 18% for those exposed to social media compared to those who are not. The odds ratios show the differences in effect on the two profiles. From the voter turnout model, it is already known that the effect was slightly negative for on-site voters and slightly positive for i-voters in 2019, and positive for both on-site and i-voters in 2023. Therefore, the odds ratios do not contradict the earlier results. The results of social media influence on i-voters are visualised in Figure 9, and we see that in comparison to the voter turnout model, the effect of social media in 2019 is milder and in 2023, it is negative, though statistically insignificant.

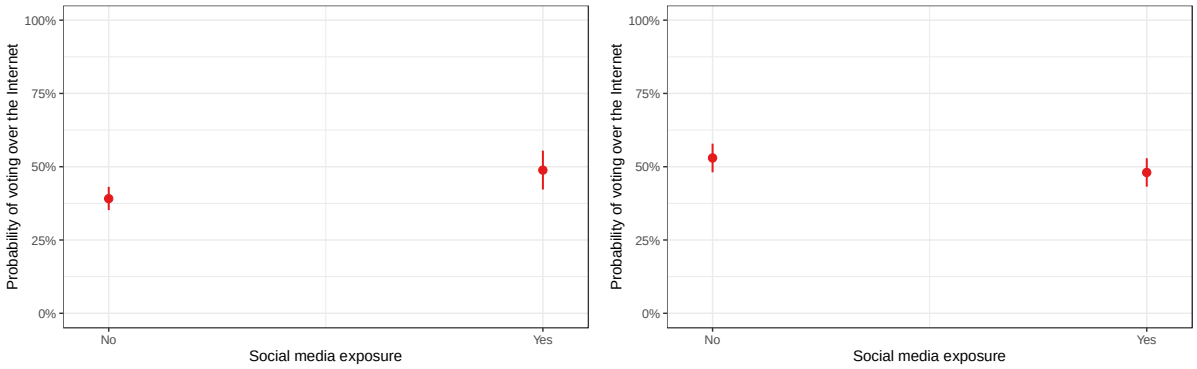

Figure 9. Probability of voting over the Internet based on social media use (2019 and 2023)

Overall, the predictive power of the model is weak. Nagelkerke's R-squared values indicate that social media exposure explains a tiny fraction of the variance in voting mode preferences. The models also lack in terms of classification accuracy. For the 2019 model, while the model perfectly predicts negative cases, it fails to correctly predict any positive cases (the specificity value is 1 and the sensitivity value is 0). For 2023, sensitivity and specificity are around 0,52 and 0,53, respectively, indicating moderate accuracy in predicting positive and negative cases but still not very high. These results suggest that other unaccounted factors influence voting mode preference and that the effect of social media is minimal. Further analysis with additional variables and is necessary to gain a clearer understanding of these dynamics.

3.3.2. Second iteration: social media use and party preference

The second iteration of the voting mode preferences model confirms that social media alone does not predict voting mode preferences. The general trend for both years is that social media exposure alone reduces the likelihood of choosing internet voting, although these effects are not statistically significant. Party preference, in turn, adds significant value to the model. Several parties (Fatherland, Reform, and Social Democrats) have significant positive coefficients, particularly in 2019, indicating that preference for these parties increases the likelihood of voting via the Internet. However, it needs to be noted that these effects are relative to the voting mode preferences of the Centre Party, a reference group, which has historically had high rates of on-site voters. The significant interaction terms show that the effect of social media exposure on internet voting preferences is significantly different for those who vote for a specific party compared to the Centre Party voters. So, once again, the interaction terms measure the strength of the effect. The model shows two such significant interaction effects. Both were in 2019, for Estonia 200 and the Reform Party.

Table 6. Results of the second iteration of the voting mode preferences model

	Dependent variable:	
	Internet 19	Internet 23
	(1)	(2)
Social Media: Exposed	-0.582	-0.455
	(0.528)	(0.410)
E200	0.326	1.449***
	(0.529)	(0.439)
EKRE	0.319	-0.622
	(0.307)	(0.426)
Fatherland	1.301***	0.051
	(0.324)	(0.438)
Reform	1.445***	0.942***
	(0.270)	(0.345)
SDE	1.243***	0.595
	(0.339)	(0.438)
Social Media*E200	3.108**	0.341
	(1.308)	(0.603)
Social Media*EKRE	0.536	-0.243
	(0.672)	(0.605)

Social Media*Fatherland	0.706	0.602
	(0.721)	(0.635)
Social Media*Reform	1.386**	0.780
	(0.630)	(0.504)
Social Media*SDE	1.275	0.252
	(0.705)	(0.645)
Constant	-1.243***	-0.323
	(0.215)	(0.287)
Number of cases	713	692
Nagelkerke R-squared	0.172	0.202
Sensitivity	0.644	0.738
Specificity	0.668	0.612
Log Likelihood	-437.308	-421.976
Akaike Inf. Crit.	898.616	867.952
Note:		**p<0.05; ***p<0.01

When the coefficients are translated to odds ratios, we see that multiple party voters are significantly affiliated with specific voting modes. For example, the Reform party odds ratios in 2019 and 2023, respectively, are 4,24 and 2,56. Both were statistically significant and indicate that the Reform Party voters are more likely to vote over the Internet than Centre Party voters. Interestingly, the only case affiliated with lower odds of i-voting compared to the Centre Party across both years is the Conservative Party in 2023, although not significant. This gives a general idea of party voter profiles. The Centre Party and Conservative Party voters generally prefer on-site, and Reform and Estonia 200 Party voters generally vote over the Internet. For Fatherland and the Social Democrats, the results are mixed, so the voter base is also more diverse regarding voting mode preferences.

Most importantly, this study needs to assess the odds ratios and the effect of interaction variables on voting mode preferences. The results show that the effect of social media exposure in 2019 differs for all other party voters compared to the Centre Party. The most similar effect is seen for the Conservative party voters. This means that for all other parties, the effect of social media exposure either went entirely in a different direction or was just significantly different. In 2023, the effects across different parties did not differ as drastically; the most significant interaction odds ratios appeared with the Reform Party voters, where the interaction terms odds ratios were 2,18, which, in comparison to 22,37 with Estonia 200 in 2019, is a lot

more moderate difference. In general, this indicates that the effect of social media on different party voters was also likely more moderate. However, these effects are easier to understand when visualised in the plot.

Figure 11 shows the results of the second iteration of the voting mode preferences model. The plot shows that in 2019, the Centre Party and the Conservative Party were the only two party voters for whom the i-vote probability decreased with social media exposure. In 2023, Estonia 200 and Social Democrat voters can also be added to the same list. However, it needs to be noted that these effects are not statistically significant because of the overlap of the confidence intervals. The effect coefficients are also significantly influenced by the reference group Centre Party voters who were a lot less likely to vote on-site in 2023 in comparison to 2019. However, the effect on Centre Party voters did not change a lot. Most importantly, we see from this plot that in 2023, while there are some differences in how social media exposure influenced different party voters, the effects are statistically insignificant and not as strong as expected. The most interesting change seems to involve the Conservative Party voters and the Social Democrats, for whom the effect of social media use changed direction over the years, but because of a moderate and statistically insignificant effect, it can be said that social media exposure had a minor influence on voting mode preferences.

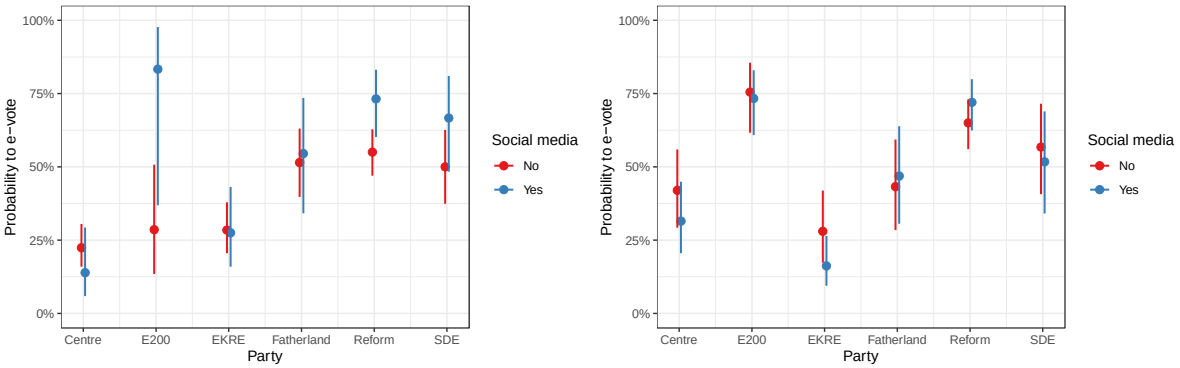

Figure 10. Probability of voting over the Internet based on social media use and party preference (2019 and 2023)

Overall, the model improved significantly by adding the party preference variable. Nagelkerke's R-squared values indicate that the model explains 17,2% of the variability of the dependent variable in 2019 and 20,2% in 2023. The model also significantly improved in terms of classification accuracy, now correctly classifying 64,4% of true positive and 66,8% of true negative values in 2019. For the 2023 dataset, it correctly classified 73,8% of true positives

and 61,2% of true negative results. While the model's predictive power improved, it mainly did so because of the addition of the party preference variable, which is a strong predictor of voting mode preferences. The effect of social media exposure only varied a little, with no statistically significant results at all. The effect seems to be even smaller for 2023 than 2019, which defied expectations. Additionally, the effect is not significant for parties with negative campaigns on i-voting, nor for those with positive campaigns. Therefore, Hypotheses 3 and 4 can most likely be disproved.

3.3.3. Third iteration: complete model

The third iteration of the model included a complete set of variables that are expected to influence voting mode preferences identified in the earlier studies. Additionally, after the first iteration, all statistically irrelevant predictors (such as income, political interest and level of education) were taken out of the model to keep the tables more compact. The results are shown in Table 5. The results show that once all relevant predictors of voting mode preferences are entered into the model, the model predicted different results than before. While social media interaction variables in 2023 remain unchanged in terms of statistical significance, the interaction variable in 2019 for the Conservative Party now shows significant results. However, the coefficient indicates that social media exposure had a significantly positive effect on the i-voter turnout of the Conservative Party voters in comparison to the reference group, the Centre's Party voters. Additionally, social media exposure had a negative statistically significant effect compared to the on-site voters' reference group. Multiple factors, such as fewer observations and new inter-correlations, can cause these changes.

Table 7. Results of the third iteration of the voting mode preferences model

	Dependent variable:	
	Internet 19	Internet 23
	(1)	(2)
Gender: Female	0.087	-0.459**
	(0.220)	(0.200)
Computer Skills	0.593***	0.490***
	(0.119)	(0.097)
Trust in E-voting	0.361***	0.291***
	(0.049)	(0.042)

Social Media: Exposed	-1.418**	-0.115
	(0.624)	(0.509)
E200	-1.410**	0.040
	(0.640)	(0.545)
EKRE	-0.453	-0.362
	(0.416)	(0.562)
Fatherland	0.290	-0.635
	(0.467)	(0.549)
Reform	0.233	-0.528
	(0.387)	(0.458)
SDE	0.123	-0.747
	(0.462)	(0.571)
Time to polling station	0.145**	0.254***
	(0.062)	(0.060)
Social Media*E200	3.236**	-0.095
	(1.403)	(0.715)
Social Media*EKRE	2.224***	-0.400
	(0.808)	(0.753)
Social Media*Fatherland	1.040	-0.026
	(0.846)	(0.777)
Social Media*Reform	1.512**	0.329
	(0.734)	(0.602)
Social Media*SDE	1.497*	0.148
	(0.850)	(0.776)
Constant	-5.676***	-4.188***
	(0.661)	(0.648)
Number of cases	570	631
Nagelkerke R-squared	0.44	0.394
Sensitivity	0.766	0.834
Specificity	0.721	0.689
Log Likelihood	-279.855	-326.641
Akaike Inf. Crit.	591.711	685.282
Note:		**p<0.05; ***p<0.01

Overall, in terms of hypotheses, this study is more interested in social media exposure and party preference interaction variables. These results are visualised in Figure 12. The plots show that once all relevant predictors of voting mode preferences are included in the model, the effect of

social media use almost entirely disappears. Although the confidence intervals of party preference variables are significantly widened by the reduction of cases in these models, there is a minimal effect, even more so for the 2023 dataset, which was expected to have more significant differences than in 2019. Additionally, for example, the association between social media use and voting for the Conservative Party is completely opposite to what one would expect from party statements. Therefore, there is further support to disprove Hypotheses 3 and 4.

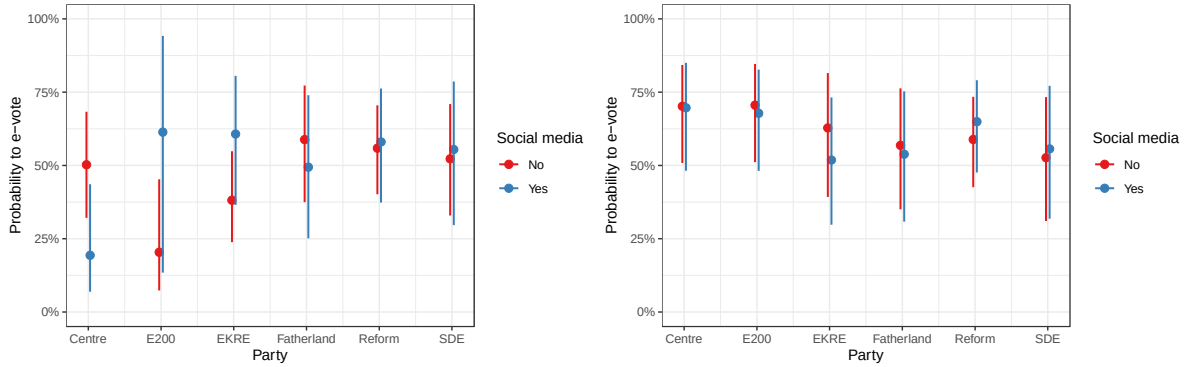

Figure 11. Probability of voting over the Internet based on social media use and party preference (2019 and 2023)

3.4. Discussion

The main results of this study show that social media exposure generally has little influence on voter turnout and voting mode preferences. The voter turnout model showed that while social media exposure seems to be highly associated with higher turnout at first, the effect is actually moderate once models become more complex and improve in terms of predictive power. However, exposure to political information on social media decreases the probability of being a non-voter. The expected association between age and social media influence proved to be untrue. While age is an important predictor of turnout, especially for on-site voting, the effect of age on voter turnout varies very little for people exposed to social media compared to those who are not. This proves that overall, that while social media exposure plays a part in mobilising voters, this part is marginal in comparison to other important predictors. Additionally, in the field of voting behaviour, there is no proof that younger people are more affected by social media exposure in comparison to people from older age groups.

Voting mode preference models were expected to show that social media exposure differs based on voters' party preferences. More specifically, it aimed to show that negative campaigns

affect voters differently from positive campaigns. The analysis showed that while party preference is a strong predictor of voting mode preferences, exposure to social media does not mediate this effect. This indicates that established political parties in Estonia have strong voter bases that align with party positions on i-voting regardless of their exposure to parties' social media posts. The effect on different party voters was expected to be stronger in 2023 than in 2019, but this proved to be untrue. Therefore, little evidence proves the influence of social media or negative and positive campaigns on voting mode preferences. The hypotheses of this study were thereby refuted.

The abovementioned results supplement our knowledge of voting behaviour. The findings from the literature on social media's mobilising role (Lindner & Aicholzer, 2021) can be partially confirmed. However, this analysis does not show the effect of social media use separately, as exposure also includes an element of political interest. Analysis of the previous literature showed that the idea of social media exposure mediating the effect of ageing on voter turnout is novel for studies on political behaviour. Therefore, the support for the hypothesis related to age was drawn from studies in the field of psychology (Lin & Lachman, 2020). However, the expectations were not confirmed, so at least in the Estonian case in the two last national elections, it can be said that social media did not influence the younger population more than the older age groups. As for voting mode preferences, the idea of negative and positive campaigns influencing differently (Weeks *et* al., 2017; Boulianne, 2015) proved untrue in Estonia's case of voting mode preferences. These findings might be unique to Estonia, but a similar study needs to be conducted in another country with multiple voting modes to confirm the generalisability of the results.

In terms of theoretical and practical implications, this study adds value to how different theoretical expectations work in the narrow fields of social sciences and country-specific contextual backgrounds. The mobilising effect of social media can be confirmed. However, other theoretical perspectives remain challenged: younger people are not likely to be more affected by social media exposure, and different campaigns for voting mode preferences may not be influential to voters. More generally, this study implies that the role of social media in democratic processes can often be overestimated (Lindner & Aicholzer, 2021). At least, this proved to be the case for Estonia's voter turnout and voting mode preferences. From a practical standpoint, social media is likely to be a fruitful tool for new parties, as indicated by high social media influence for Estonia 200 in 2019, which was a new party at the time. New parties can

build their strategies around social media to increase their chances of success. As for policymakers, this information can provide valuable knowledge for the necessity of awareness-raising initiatives. The general implication here is that social media influence is relatively insignificant, so social media use awareness campaigns are likely unnecessary.

While this study is comprehensive, it also has its limitations. The most acute issues are methodological. Firstly, the survey question used in this study to identify social media exposure does not differentiate between knowledgeable and random exposure to political news. This means that the influence of social media is likely to be affected by interest in politics. Additionally, survey questions did not enable us to pinpoint what party social media posts a person was exposed to. However, because of social media algorithms, specifically the echo chamber effect (Cinelli *et* al., 2021), it was assumed that people were most likely exposed to information of their preferred party. However, for future research, I would recommend finding a more concrete way around these limitations to identify a way to measure the influence of social media exposure independent from political preferences. Additionally, conducting similar studies for other countries would provide more generalisability and enrich the literature on voter turnout and voting mode preferences.

Conclusion

Social media has been argued to be increasingly significant in shaping individuals' worldviews over the years. Being the primary source of information, social media is expected to influence many, if not all, political participation domains. The discourse of social media participation expected it to have two potential effects. While it could be a mobilising tool boosting political engagement, it could be used to spread misinformation and negative political campaigns and feed anti-democratic views. The effect was also expected to depend on the sentiment of social media campaigns, where positive and negative campaigns were expected to have different effects. This thesis aimed to assess how social media use influences voter turnout and voting mode preferences. This study answered the following research question:

RQ: How does social media use impact voter turnout and voting mode preferences?

The main findings show that while exposure to political information on social media can be associated with a higher likelihood of turning out in the elections, the effect is relatively modest. Even though this study could not completely separate the effect of social media exposure from an interest in politics, the results indicate that people exposed to social media were less likely to be non-voters. Thereby, exposure to political information on social media increased the likelihood of voting, and Hypothesis 1 was confirmed. The other three expectations found no substantial evidence to be valid. Namely, the effect of social media exposure was expected to depend on people's age, with younger people being more affected. However, age was not an important factor based on which the effect of social media exposure varied in the population.

The study also showed little evidence of different effects from social media campaigns of varying sentiments. At least in the case of voting mode preferences, being exposed to negative or positive campaigns is not likely to influence voters' voting mode preferences. While party affiliation does explain a significant part of voting mode preferences, exposure to social media has little effect on different party voters. This means that party affiliation establishes a strong link between voters' and parties' positions regardless of pre-election social media posts by parties or their politicians. While these findings are limited to national elections in Estonia, the potential effects of social media use on voter turnout and voting mode preferences can be

studied all around the world to contribute to the larger picture of social media influence, voter turnout and voting mode preferences studies.

This study contributed to the academic field of political science and digital media studies by filling a gap in the literature on factors affecting voter turnout and voting mode preferences. The influence of social media exposure in these fields was previously unknown. Therefore, this study offers new insights into the effects of social media on political participation. More importantly, the findings in this study have theoretical and practical implications. The study confirmed the mobilising effect of social media. However, it challenged other theoretical perspectives. Young people are not likely to be more affected by social media exposure in their voting behaviour. Furthermore, negative and positive campaigns may not always affect voters significantly or significantly differently. More generally, this study implies that the role of social media in democratic processes can often be overestimated and might not be accurate for voting behaviour.

While social media is a powerful tool and affects and has broad implications in numerous fields of everyday life, it may not be equally effective or effective at all in all of the fields. From this study, it seems that specific contextual prerequisites need to be met for social media to be effective. It might be a mix of factors, such as polarisation and perceived significance of the topic or the exact way the information is provided. In the case of Estonian national elections, this influence was only slightly present in terms of voter turnout, with social media exposure having a mobilising effect. As for engaging younger people, the effectiveness of the approach has been questionable, whereas young people have the most room for improvement in terms of turnout numbers. Finally, while social media poses a risk in terms of the spread of misinformation, this risk is not likely to be relevant to voting behaviour in Estonia. However, understanding social media's role in modern democracies is particularly important in the context of rapidly evolving digital landscapes to promote informed public decision-making.

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Appendix 1. Party statements before and after 2023 elections

Figure 12. The Reform Party's i-voting Facebook post focusing on i-voting record. *(The Estonian Reform Party*, 2023a)

Figure 13. The Reform Party's Facebook post focusing on mobilisation. (*The Estonian Reform Party*, *2023b*)

Figure 14. Estonia 200's Facebook post focusing on i-voting. (*Estonia 200*, 2023)

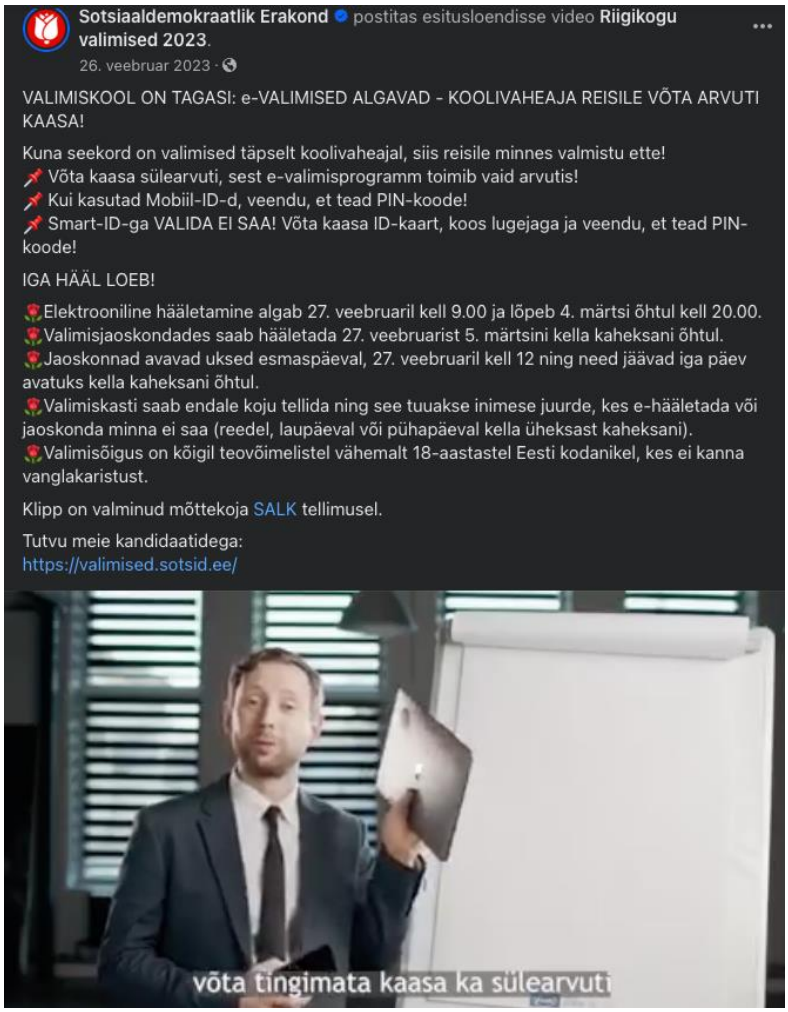

Figure 15. Social Democratic Party's Facebook post on i-voting. (*The Social Democratic Party*, 2023)

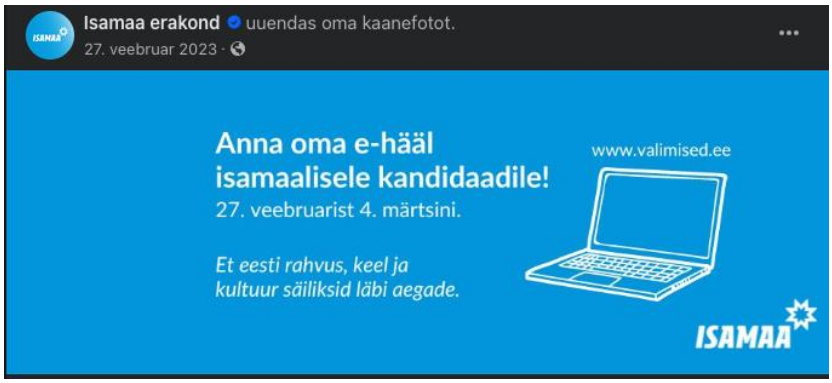

Figure 16. Fatherland's Facebook post on i-voting. (*Fatherland Party*, 2023)

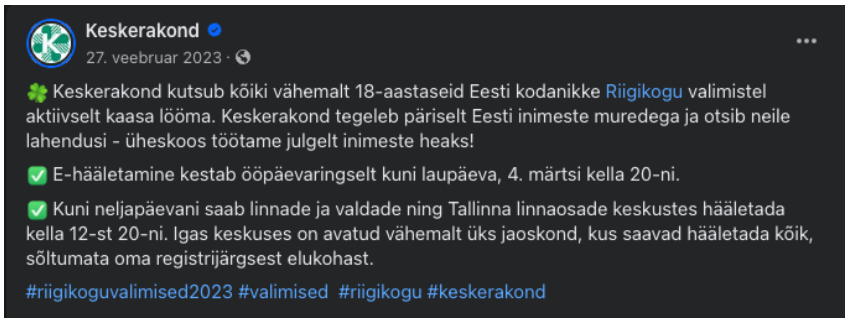

Figure 17. Centre Party's Facebook post on voting and i-voting. (*Estonian Centre Party*, 2023)

Figure 18. Martin Helme's (EKRE) Facebook post on voting and i-voting. (Helme, 2023a)

Figure 19. Martin Helme's Facebook post attachment. (Helme, 2023b)

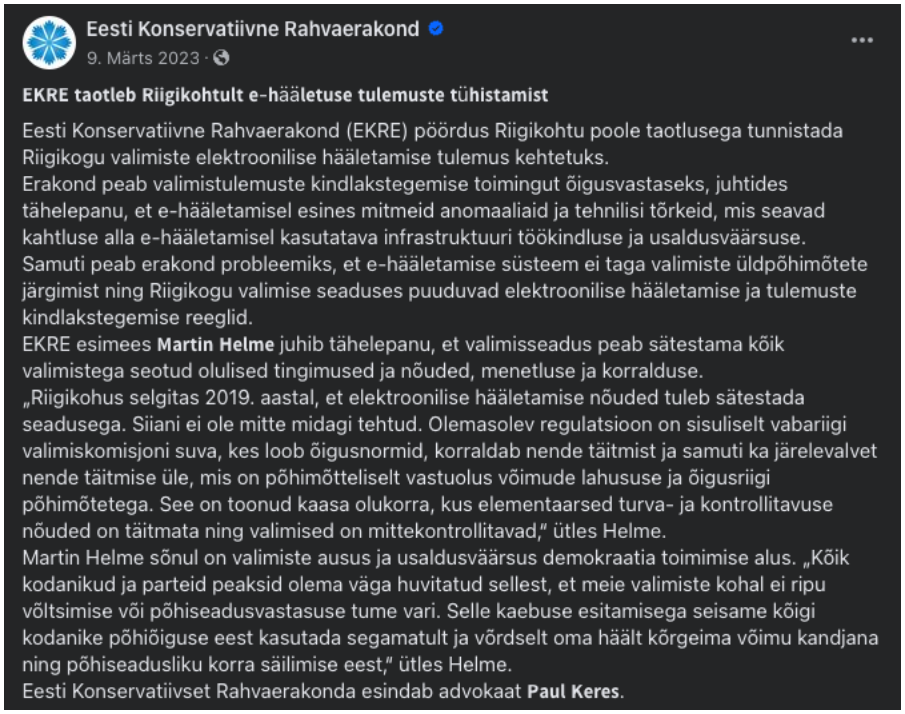

Figure 20. EKRE's social media post on falsification of i-voting results (EKRE, 2023)

Appendix 2. Party statements before 2019 elections

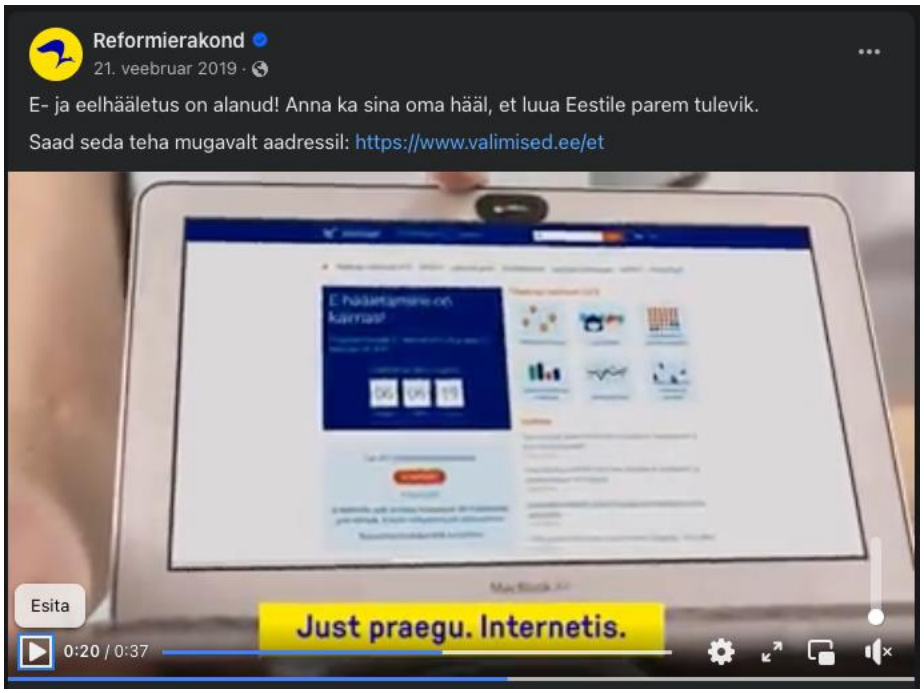

Figure 21. The Reform Party's campaign for 2019 national elections. (The Estonian Reform Party, 2019)

Figure 22. Estonia 200's Facebook campaign for 2019 national elections. (*Estonia 200*, 2019)

Figure 23. Social Democratic Party's Facebook post on i-voting. (*The Social Democratic Party*, 2019)

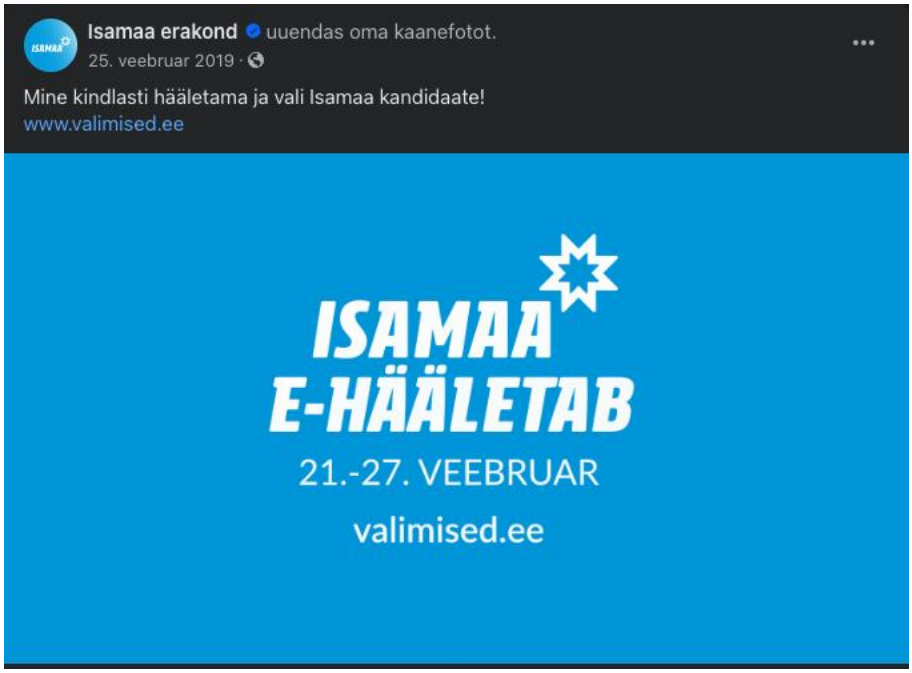

Figure 24. Fatherland's Facebook post on i-voting for 2019 national elections. (*Fatherland Party*, 2019)

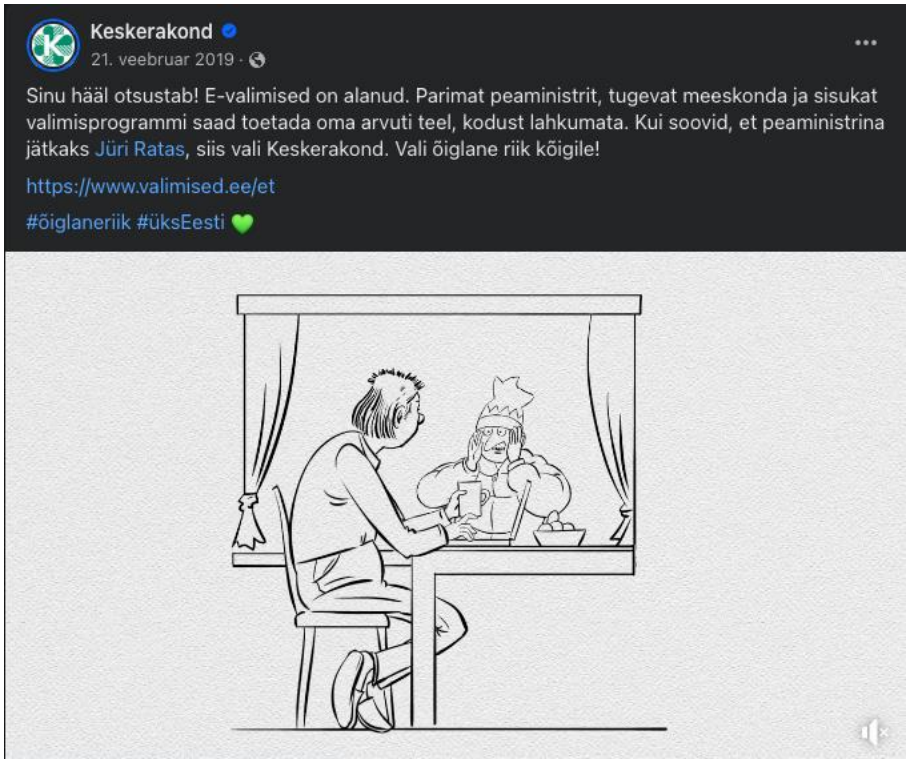

Figure 25. Centre Party's Facebook post on voting and i-voting. (*Estonian Centre Party*, 2019)

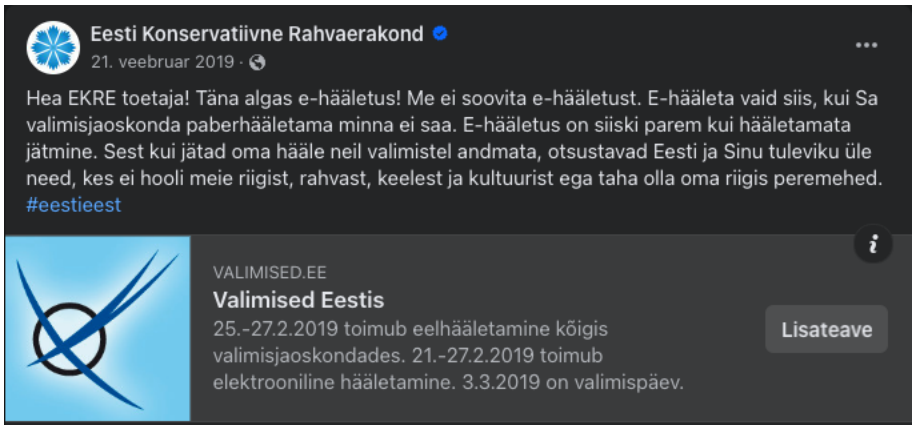

Figure 26. EKRE's social media post discouraging i-voting (*EKRE*, 2019)

Appendix 3. Results of voter turnout model

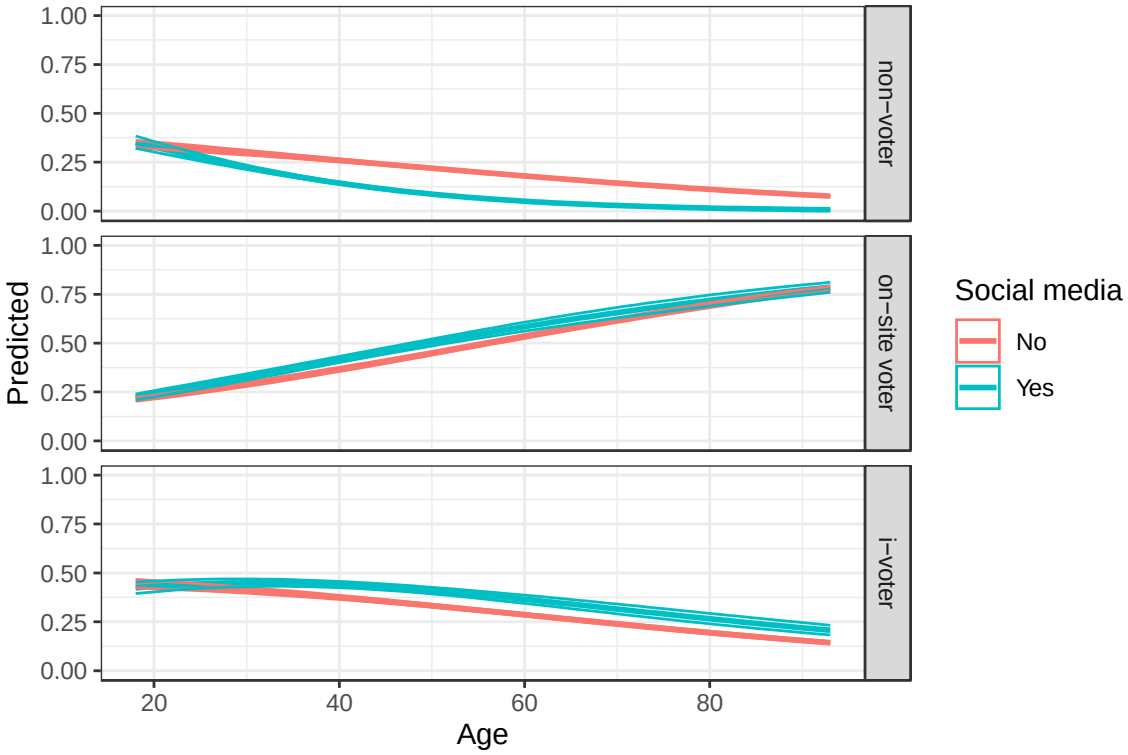

Figure 27. Probability of belonging to a class based on social media use and age: second iteration 2019

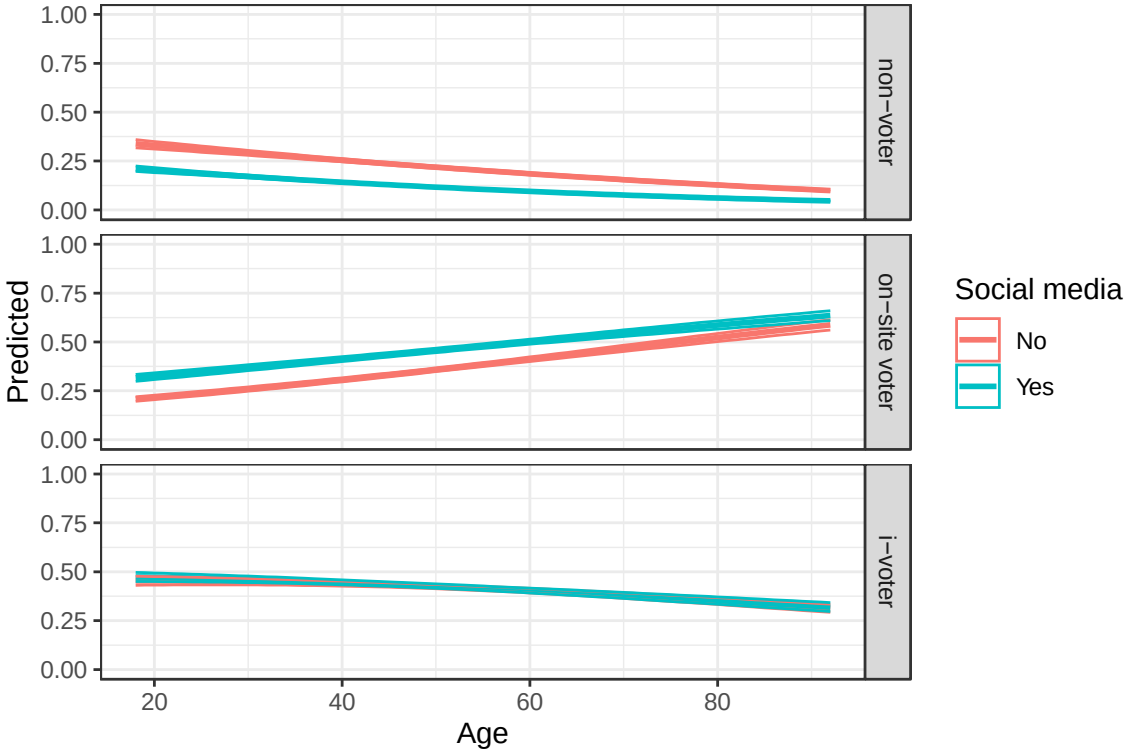

Figure 28. Probability of belonging to a class based on social media use and age: second iteration 2023

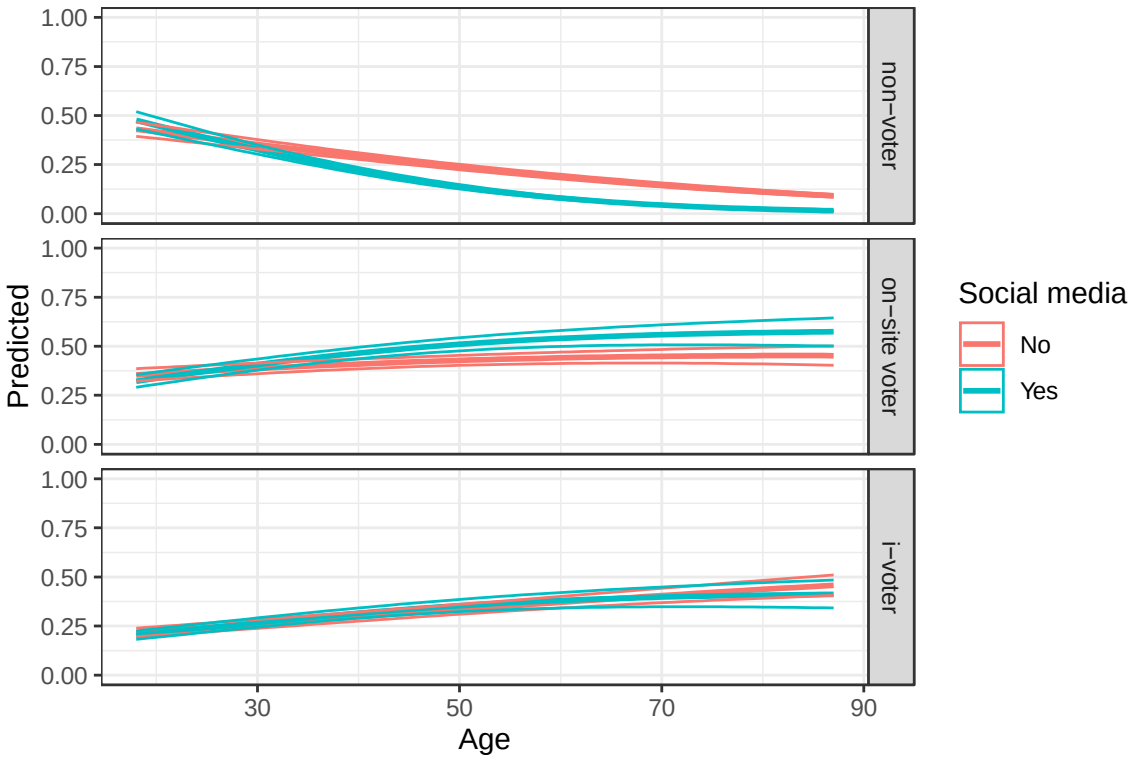

Figure 29. Probability of belonging to a class based on social media use and age: third iteration 2019

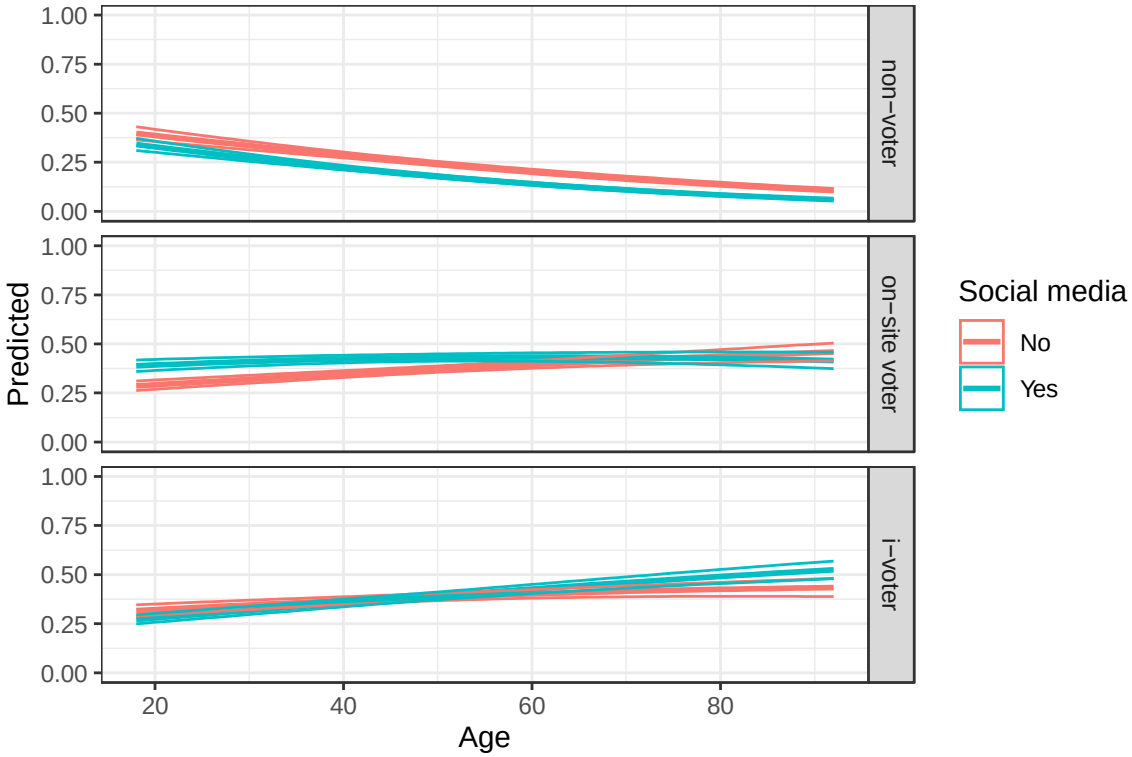

Figure 30. Probability of belonging to a class based on social media use and age: third iteration 2023'

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