

E-participation platforms in the West: usability analysis

Kirill Svavolia
kirill.svavolia@gmail.com
University of Twente
Enschede Overijssel, Netherlands

ABSTRACT

Citizen participation is a way for citizens to participate in the decision-making, planning, funding, and organisation of public governmental activities. However, it is not enough to only have a platform, its usability and accessibility also play an important role. The research focuses on the e-platforms for citizen participation and their usability in the capitals of the EU, USA and Canada. The research presents a literature review to identify the key elements for an inclusive accessible democratic participation e-platform. Then, it applies the criteria to the chosen platforms and investigates them to get a snapshot of the current state and identify weak areas. The research concludes how usability scores correlate with an e-participation index of the countries. The correlation with the E-participation index is found to be moderately positive, while with E-government Development Index is weak.

CCS CONCEPTS

• **Human-centered computing** → *Heuristic evaluations*; **User interface design**; **Participatory design**.

KEYWORDS

Voting, e-participation, e-platforms, Government As A Platform, usability, accessibility, EPI, EGDI, public participation, user design

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1 INTRODUCTION

In recent years, platforms for citizen e-participation have gained increased attention from policymakers, scholars, and citizens[26]. These platforms aim to enable citizens to participate more efficiently and effectively in democratic processes and decision-making by providing them with the functionality to express their opinions, propose ideas, and collaborate with other citizens or government.

However, with the spread of such platforms, questions arise about their effectiveness, accessibility, and inclusiveness. Are e-platforms equally accessible and appealing to all citizens? Are the platforms

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only functional or easy to use and navigate through?

Despite the potential of e-participation, it also presents challenges. In particular, the usability and accessibility of e-participation platforms can influence their effectiveness, shaping citizens' experiences and their willingness to engage[12, 13, 28]. A platform with poor usability can be frustrating and challenging to navigate, discouraging citizens from using it. Similarly, a lack of accessibility can negatively affect and exclude citizens with disabilities, ultimately undermining the premise of inclusive democratic participation[11].

There is already a large body of research about the usability and accessibility of e-government and e-participation to a lesser degree[9, 19, 25, 29]. However, with rapid technological development, research becomes quickly obsolete, and there is a need for updates. Moreover, new countries, cities and municipalities join the e-participation movement every year, creating a new research direction. This paper aims to analyse the usability and accessibility of different e-platforms for citizen participation and assess how citizen participation is affected by the usability and accessibility of e-participation websites.

The study uses various heuristics and automated methods to analyse usability and accessibility. Then it investigates the correlation between usability+accessibility, the E-participation index, and the E-government development index.

The research focuses on North American and European countries due to their higher democracy index. The platform selection is based on location, administrative level, and type of participation.

The outcome of this study will provide insights for decision-makers, platform developers, and citizens, presenting the current landscape of the usability of these platforms. By comparing different platforms, this research will contribute to understanding digital democracy and how technology can facilitate greater citizen participation.

2 PROBLEM STATEMENT AND RESEARCH QUESTION

2.1 Problem Statement

E-participation platforms can significantly improve citizens' lives and increase levels of democracy and promote more accessible, transparent, and inclusive democratic processes. However, the effectiveness of these platforms is dependent on their usability and accessibility for citizens to use them in the first place.

Despite the advances in development and research, there are still challenges for e-participation platforms. Many e-participation

platforms have poor usability, characterised by complex navigation systems and not adhering to design standards, preventing citizens' successful usage. Moreover, accessibility issues create barriers to e-participation for individuals with disabilities, undermining the principle of inclusive democratic engagement.

Despite the critical implications of these challenges, there is limited empirical evidence on the current state of usability and accessibility of the growing number of e-participation platforms. There is a need for a comprehensive evaluation of these platforms to identify the main areas of concern and propose practical solutions.

Rapid technological developments and frequent website updates make interface analysis studies obsolete quickly. This is why systematic research in the user interface domain is required to keep the research data up-to-date.

Thus, this research paper aims to analyse the functionality of a population of 14 e-participation platforms and investigate how the design scores are correlated with the participation scores. The analysed e-platforms are from the following countries: Austria, Belgium, Estonia, Finland, France, Germany, Greece, Latvia, Lithuania, Luxembourg, Netherlands, Slovakia, Spain, and Canada.

2.2 Research Question

The research questions, which come from the aforementioned problem, are:

- (1) How do selected e-participation platforms perform regarding usability and accessibility?
- (2) What are the common usability and accessibility issues prevalent in current e-participation platforms?
- (3) How do the quality of e-participation platforms correlate with the EGDI and EPI scores of the respective countries?

Research questions 1 and 2 are answered in the subsection of the Data Analysis section - Websites Overview, Usability, and Accessibility. Research question 3 is answered in the subsection Usability and e-participation index.

3 RELATED WORK

Multiple studies have been conducted on the role of technology in citizen participation, focusing on various platforms and contexts.

3.1 E-Platforms and Citizen Participation

3.2 E-participation

The digital revolution brought innovation into the governmental sector and in citizen-government relations. E-participation is the use of Information Communication Technologies (ICTs) to facilitate citizens' participation and engagement in governmental processes[20]. These processes involve consultations, collaborative decision-making and budgeting, idea proposals, voting, and reporting through digital platforms. This can include information provision, consultation, decision-making, and service provision, all enabled through digital platforms [21].

Research on e-participation indicates the potential of such a form of citizen-government interaction to make the decision-making process more democratic and create a more inclusive democracy[32]. E-participation can increase transparency, accountability, and accessibility of government.

3.3 Usability and Accessibility

Despite the significant advantages offered by e-participation, the effectiveness of these platforms depends on their usability and accessibility. Usability is the ease of use and user satisfaction with a system [22]. This involves, for example, the platform's design, navigation, and readability, which play an important role in ensuring that users successfully interact with the platform.

Accessibility is the inclusive design of products or services to ensure that they can be accessed and used by people with disabilities [18]. This is another crucial aspect of e-participation platforms, as these platforms should be in a democratic way inclusive and accessible to all. Hence, high accessibility is essential to ensuring that e-participation platforms do not perpetuate existing offline social inequalities.

3.4 Evaluation of E-participation Platforms

There is a large body of research on the usability and accessibility evaluation of e-participation platforms.

A common method for usability testing employed in the literature is heuristic evaluation. Originating from the Human-Computer Interaction field, heuristic evaluation involves inspecting a user interface for compliance with recognised usability principles [13, 31]. However, while it provides insights into design and navigation issues, heuristic evaluation might not capture all potential usability problems. Hence, some other studies implemented expert reviews, user surveys and interviews to collect other information [16, 24]

According to the research, accessibility is tested via WCAG 2.0 guidelines to analyse the compliance of e-participation websites with recognised accessibility standards [10, 23, 31]. However, these studies highlight that multiple e-participation platforms fail to comply with these guidelines, creating barriers for individuals with disabilities.

3.5 Correlation with EGDI and EPI

E-Government Development Index (EGDI) and E-participation Index (EPI) are key metrics in understanding a country's performance in implementing e-government services and promoting e-participation. However, the research shows that there is not always a direct correlation between these indices and the usability or accessibility of the associated platforms [14?]. A high EGDI or EPI ranking can mask underlying usability or accessibility issues. Therefore, it becomes crucial to investigate the relationship between these indices and the usability and accessibility metrics of the e-participation platforms.

4 METHODOLOGY

4.1 WEBSITE SELECTION

A set of defined criteria guided the selection of e-platforms for the analysis. Given the large number of available platforms for citizen participation, it was crucial to implement a systematic approach to ensure a representative and manageable sample for analysis.

The scope of the platforms was defined based on geographical location and the level of government. This study focused on platforms used within the European Union at the municipal level, given the EU's forward role in promoting e-participation and the diversity among its member states [26]. Next, the United States and Canada were added following the same reasoning. The scope was then narrowed to the platforms operating in capital cities and operating for more than two years. The keywords to find websites via Google search engine are "[city] e-participation", "[city] digital participation", "[country] e-participation", "[city] submit an idea to government", "[country] digital participation". The data collection happened between 15.05.2023 and 02.07.2023. The e-participation platforms for the capitals of Bulgaria, Denmark, Cyprus, Hungary, Ireland, Italy, Malta, Czech Republic, Poland, Portugal, Romania, Croatia, Slovenia, USA, and Sweden were not identified on the Internet. In the case of multiple e-participation websites in one city - Google Trends was used to compare them and identify the most used.

The full list of the identified e-participation platforms is as follows: Digital Agenda Vienna, Brussels smart city, Tallinn, City of Helsinki, Paris Decide, meinBerlin, DIGITAL SERVICES OF THE MUNICIPALITY OF ATHENS, Manabalss, My government, Ze-summe Vereinfachen, Wij Amsterdam, Bratislava The Capital City of Slovakia, Decide Madrid, Ottawa.

4.2 Analysis methodology

Susha and Gronlund [25] state in their analysis of the e-participation that fragmentation of the field and its lack of consistent terminology presents one of the e-participation research constraints. The authors propose a solution using shared methods, data and tools. The approach is aimed to help with the repeatability of the observations and help to build a broader overview based on multiple papers. This paper aims to assist in the solution by using the methods from the previous studies with some exceptions. The main methods are taken from a study of e-government in Alabama state by King and Youngblood [19].

The usability evaluation methodology adopted in this study utilizes heuristic evaluation and automated usability testing. The heuristic evaluation is particularly suited for this study due to its wide use and proven effectiveness in e-government usability studies. It offers in-depth usability inspections, especially when evaluating multiple platforms [13, 31]. While heuristic evaluation is an expert-based method, previous studies show that it can also be effectively used by novice researchers [15, 17]. The list of heuristics is taken from the study of King and Youngblood [19]. The heuristics represent dichotomous variables, and the paper checks whether they are present on a website. The heuristics are separated into six sections: overall

design standards; hypertext; navigational standards; readability; language option; and findability. Some adjustments were made to the list of heuristics. In particular, the usability measure "A splash page is NOT used (on the opening screen)" is omitted because none of the websites used them. Next, "Page has a non-English version or a translation option" is changed to "Page has an English version or a translation option", because most of the websites were from the capitals of non-English speaking countries, while the original research was in the USA. Lastly, "County website is on the first page of results from Google" and its section "findability" is also omitted because it is impossible to judge it objectively due to Google search results being based on my location and language usage[?]. Hence, 14 out of 16 usability measurements are considered in the research.

Next to the usability measurements, WCAG 2.0 guidelines are implemented to analyse the accessibility of the e-participation platforms. WCAG 2.0 guidelines are developed by the World Wide Web Consortium (W3C) and are designed to be applied to websites for manual or automated testing. The guidelines follow four principles - the web must be perceivable, operable, understandable, and robust (POUR) to all users. WCAG 2.0 represents globally recognised guidelines and is adopted internationally, making it proper guidelines for the current research. The research by King and Youngblood uses AChecker to check compliance with WCAG 2.0, but AChecker, with the price of 200 Euros, is out of the budget for this paper. Hence, Taw was used to inspect websites' compliance with WCAG 2.0 automatically. Furthermore, some of the guidelines were not detected by Taw, so a manual inspection was performed. It was not possible to identify three guidelines from the original research of King and Youngblood - WCAG 2.2.1, 2.4.1, and 3.3.2. It must also be noted that Taw could not analyse the Lithuanian website My Government.

By adhering to these established standards and guidelines, this paper aims to provide a holistic assessment of the accessibility of e-platforms for citizen participation. It also allows the research findings to be more applicable and beneficial to a broader range of users, including those with disabilities, promoting inclusive digital citizen engagement.

4.3 Indices

After the usability and accessibility evaluation, the E-Government Development Index (EGDI) and E-participation Index (EPI) of each country will be addressed. The EGDI is the index developed by the United Nations Department of Economic and Social Affairs (UNDESA), that measures the capacity and willingness of countries to adopt e-government [29]. Similarly, the EPI measures countries' exploitation of online services to provide information about policy and level of trust, engage citizens in the decision-making process, and create an environment for citizen participation.

The final part will involve statistical analysis to investigate the potential correlation between the quality of the e-participation platforms and the EGDI and EPI scores.

5 DATA ANALYSIS

5.1 Websites overview

Out of 29 chosen countries, only 15 or 51% had an e-participation functionality on their website or a separate website for e-participation. There was also a large variety in the way these e-participation platforms operate. For example, the Tallinn platform from Estonia was solely devoted to citizen participation with a focus on a participatory budget, where citizens propose their ideas and vote on the ideas of others in budget cycles. Meanwhile, Smart City Brussels allows citizens to propose ideas, vote and interact with the projects proposed by Brussels municipality. For example, citizen participation is difficult to find on the Ottawa website because it is mixed with other information about the government making e-government and e-participation one platform. Another form is the Amsterdam website - WijAmsterdam, which allows citizens to place their initiatives at any time independent of budget cycles of governmental projects.

5.2 Usability

Good usability is pivotal in enabling citizens to use e-participation platforms effectively. Usability analysis of 14 e-participation platforms was performed and is presented in Table 1.

From the data, none of the websites had auto-play audio or video. All websites also avoided horizontal scrolling. Six websites or 42% did not use colour properly to differentiate the links from the text. Also, 15% of the websites do not change a link’s colour after it is clicked, which could pose problems for navigation. Half of the platforms do not underline the links, which poses an issue for colourblind users.

Navigation standards had the following distribution - almost all (78%) of the websites had their navigation on the top or left side of the page with home text links on internal pages. All websites had a country/city logo or other header graphics as a "home" link on internal pages. The menu was limited to less than 10 items per grouping during the navigation, which helps navigate the website. This grouping is a noticeable difference between the one that King and Youngblood identified in their research in Alabama state, where 67% of websites had more than 10 navigational items per grouping. This difference can be explained by technological development and increased user experience awareness since 2016. Also, they compared the platforms in the cities from one state, while in the current paper, the websites are from capital cities, which increases the investment and usage of these websites.

In the readability section, there is an issue with underlined text, for which 65% of the websites have other text beside a link. However, it performs well regarding text left alignment and all-cap text.

The number of English-only speakers in the observed countries varies drastically. From 46% in Latvia to 95% in the Netherlands [27]. Such numbers of English speakers in countries and the number of migrants in open borders of Europe make it essential to have an English language option on a website at least in the capital. Gladly 80% of the websites do have an English language option on their website.

| Standard violated | Websites failing |
|--|------------------|
| Overall Design Standards | - |
| Audio and video do NOT auto-play when the page loads. | 0%(0) |
| Horizontal scrolling is NOT required with the browser window set to 1024 pixels across; i.e., “No” means that horizontal scrolling is required | 0%(0) |
| All text links are blue (some shade of blue, not necessarily the default shade, counts as “blue”). | 42.86% (6) |
| Conventions for hyperlinked text in main text | - |
| All text links are a different colour than the main text. | 28.57% (4) |
| All text links colour changes after a link is clicked. | 85.71%(12) |
| All text links are underlined. | 42.86%(6) |
| Navigational Standards | - |
| A “home” or “return” text link (HTML text or text appearing in a graphic) appears on internal pages. | 28.57% (4) |
| A country logo or other header graphic serves as a “home” link on internal pages. | 0%(0) |
| The main navigation is on the top and/or left side of the page. | 21.43%(3) |
| There are 10 or fewer visible items per navigational grouping. | 0% (0) |
| Readability | - |
| The main body text is left aligned. | 7.14% (1) |
| No more than one contiguous line of all-cap text. | 0% (0) |
| Any text that is underlined is a link. | 64.29% (9) |
| Language option | - |
| The page has an English version or a translation option. | 21.43% (3) |

Table 1: How many websites violate the standards?

5.3 Accessibility

Eighty-seven million people in Europe have some kind of disability [2], which makes it harder for them to navigate the Internet. This is why compliance with the WCAG 2.0 guidelines [3] is important. Table 2 showcases how many analysed websites comply with WCAG 2.0 accessibility regulations.

All of the analysed websites had substantial accessibility problems. The only regulation where all the websites performed well was "Keyboard". This means that all of the websites are operable from the keyboard alone.

The most common WCAG 2.0 guideline problems were 1.1.1 [4] with 84% websites failing and 1.3.1 [5] with also 84% fail rate. The first one relates to the fact that all non-text context which includes images, videos, and audio, should have a text alternative. This ensures that people who cannot perceive audio or visual information can still access it. While 1.3.1 relates to the fact that information,

structure, and relationships conveyed through presentation can be automatically determined or are available in text [5]. On both of those guidelines, 11 of the analysed websites failed.

The second most common violation was that the purpose of each link could not be determined from the link text alone or the link text with its automatically determined link context [6]. This guideline was violated by nine websites or 69.23%.

Eight websites struggled with providing labels and instructions in cases where user input was necessary. It is also important to notice that seven of the websites or 53.85% violated the guidelines related to the colour contrast on all A, AA, and AAA levels. It means that on some web pages, the contrast between the text and background was too low, which made the text barely visible to people with eyesight disabilities.

Six websites failed in making the default language can be automatically determined [7]. It means that for those websites, the assistive technologies will not be able to perform well when reading the text. The same number of web pages failed to add the functionality of resizable text.

Most of the websites(70%) have descriptive headings and labels, which accurately convey the topic or purpose [8].

The fact that most of the websites performed poorly in at least three usability criteria indicates that there is much room for improvement regarding the accessibility of the E-government platform for users with disabilities.

| WCAG Standard violated | Websites failing |
|----------------------------------|------------------|
| 1.1.1 Non-text content | 84.61%(11) |
| 1.3.1 Info and relationships | 84.61%(11) |
| 1.4.1 Use of color | 15.38% (2) |
| 2.1.1 Keyboard | 0% (0) |
| 2.4.2 Page titled | 15.38%(2) |
| 2.4.4 Link purpose (In context) | 69.23%(9) |
| 3.1.1 Language of page | 46.15% (6) |
| 3.3.2 Labels or instructions | 61.53%(8) |
| 4.1.1 Parsing | 84.61%(11) |
| 1.4.4 Resize text | 46.15% (6) |
| 2.4.6 Headings and Labels | 30.77% (4) |
| 1.4.6 Contrast (Enhanced) | - |
| Any level A | 53.85% (7) |
| Any level AA | 53.85% (7) |
| Any level AAA | 53.85% (7) |

Table 2: How many websites violate WCAG 2.0?

5.4 Usability and e-participation index

Multiple studies assume an association between e-government development and usability due to the importance usability has [12, 28, 30]. This paper tests the assumption via the E-participation

index (EPI) and E-government development index (EGDI). The usability measures and WCAG scores are combined and correlated with EPI and EGDI. The scores for usability + WCAG and EPI with EGDI are presented in Table 3. The average score is 16.7, the highest collected score is 22 by the platform from Helsinki, and the highest possible score was 28.

| Country | Usability+WCAG score | EGDI | EPI |
|-------------|----------------------|--------|--------|
| Austria | 14 | 0.8801 | 0.7727 |
| Belgium | 15 | 0.8269 | 0.4545 |
| Estonia | 21 | 0.9393 | 0.9773 |
| Finland | 22 | 0.9533 | 0.9545 |
| France | 17 | 0.8832 | 0.7159 |
| Germany | 18 | 0.877 | 0.7273 |
| Greece | 16 | 0.8455 | 0.6136 |
| Latvia | 15 | 0.8599 | 0.7386 |
| Lithuania | 12 | 0.8745 | 0.5455 |
| Luxemburg | 20 | 0.8675 | 0.75 |
| Netherlands | 13 | 0.9384 | 0.9659 |
| Slovakia | 15 | 0.8008 | 0.4659 |
| Spain | 18 | 0.8842 | 0.75 |
| Canada | 19 | 0.8511 | 0.8295 |

Table 3: Scores, EGDI, EPI

The observed correlation between the EPI and the usability + WCAG scores is 0.52. This is a moderate positive correlation. This moderate positive correlation supports the existing assumption about the correlation between usability and EPI [12, 13, 28]. The association between usability and WCAG scores and EPI is presented in Figure 1.

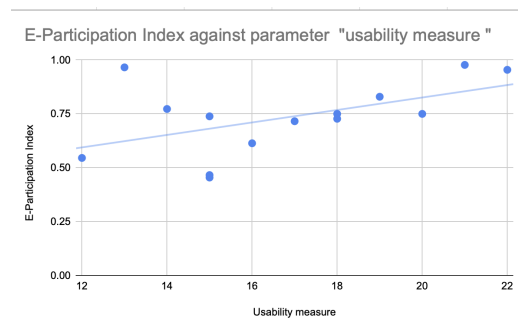


Figure 1: E-Participation Index against usability+WCAG scores

The observed correlation between the EGDI and the usability + WCAG scores is 0.38. This score indicates a low to moderate positive correlation. However, it is not as strong as with EPI. The result makes sense since the selected websites focus on e-participation rather than on the e-government as a whole. The association between usability and WCAG scores and EPI is presented in Figure 2.

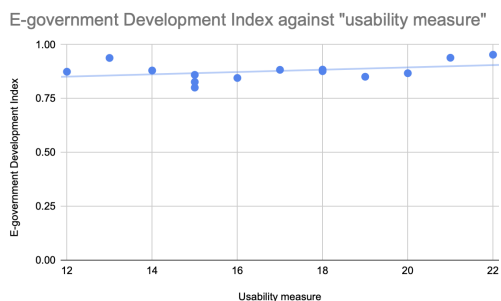


Figure 2: E-government Development Index against usability+WCAG scores

6 LIMITATIONS

The paper has several limitations, which are essential to acknowledge.

First, the selection of e-platforms for analysis in this paper was based on availability and their position at the time of the paper's completion. In particular, only 14 platforms were selected. Furthermore, there are other platforms which are not included in this paper and their exclusion limits the breadth of the overview.

Second, technological development is another limitation. The functionalities of e-platforms evolve rapidly and updates might appear after the publication of the paper. Thus, the paper reflects a particular point in time and does not include recent advancements in the e-participation.

Third, due to methodological constraints, this study does not involve direct user interaction or user surveys. The understanding of the usability effect on e-participation is concluded from the correlation analysis and does not include user perceptions, experiences, or feedback. This lack of user input is a limitation.

Lastly, geographical and cultural variations are limited and do not represent the overall worldwide trend. The chosen E-platforms are primarily from European countries except for Canada and USA, which capital does not have an e-participation platform or is not searchable. E-platforms operate differently in various socio-cultural and political contexts. This paper does not capture these regional and cultural differences.

7 CONCLUSION

The proposed study makes several significant contributions to the understanding and practice of E-participation. Firstly, by focusing on the usability of 14 European and North American platforms for citizen e-participation, the study addresses a gap in the current body of research. This comparative analysis will allow for identifying common patterns and unique features and how they influence user engagement, thereby contributing to the academic understanding of effective e-participation.

The moderate positive correlation between the EPI and the usability + WCAG scores supports the existing assumption about the correlation between usability and EPI. However, the correlation between the EGDI and the usability + WCAG scores is only low to moderate, suggesting that factors beyond usability and accessibility may influence e-government development.

This research also has practical implications for a range of stakeholders. For policymakers and government agencies, the findings could inform the design and implementation of e-platforms for citizen participation, making them more effective and user-friendly. For developers and IT professionals working on the design and development of these platforms, the study's findings can provide valuable insights into what usability measures usually lack in e-participation platforms.

8 FUTURE WORK

The current paper analysed the usability and accessibility of the e-participation platforms with their potential impact on participation. However, the research also had some limitations. The existing limitations and raised questions call for more research on this topic.

This paper focused on the analysis of various e-participation platforms. Future studies could focus deeper into specific functional elements, examining in greater detail how each feature contributes to overall user experience and participation levels. A use case of designing an "ideal" e-participation platform can be considered in the future. Additionally, with new technologies such as artificial intelligence, blockchain, and augmented reality becoming more widespread, studies could explore how these might be integrated into e-platforms and what impact they could have on citizen engagement.

Future studies could also focus on how e-platforms' usability and accessibility impact different demographic groups. Age, socioeconomic status, digital literacy, and cultural background can all influence how individuals interact with e-platforms. Understanding these demographic nuances can help design more inclusive and effective e-participation tools.

Finally, this research provided a snapshot of e-platform usability and accessibility state and its correlation with citizen participation at a particular time. Longitudinal studies that monitor these factors would offer insights into how e-participation evolves. It would be beneficial to see a longitudinal analysis of the same regions or compare them using the same methodology.

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