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[https://doi.org/ 10.62900/BHEF252101004](https://doi.org/10.62900/BHEF252101004)

QUALITY OF WEBSITES OF PUBLIC INSTITUTIONS IN BOSNIA AND HERZEGOVINA: CHALLENGES AND RECOMMENDATIONS FOR INCLUSIVE DIGITAL GOVERNANCE

ABSTRACT

This paper explores the digital maturity of public institutions in Bosnia and Herzegovina at all levels of government (state, entity, Brčko District, cantonal and municipal) through a comparative assessment of the technical quality, functionality and quality of the content of their official websites. The research covers five sets of criteria: technical quality, functionality, content quality, accessibility (compliance with WCAG 2.2) and user interaction.

The research methodology combines quantitative tools - Google Lighthouse, PageSpeed Insights, GTmetrix, SEMrush, Alexa ranking and the WAVE Accessibility Tool - with a qualitative review of the structure and usability of a website. The sample includes 15 state-level institutions, 25 entity ministries, the Brčko District Government, 10 cantons and 20 municipalities/cities.

This study examines the prevalence and level of development of technical, functional and content quality of official portals at all levels of government, and identifies the prerequisites that must be met for the further successful progress of digital government.

The research was conducted with the aim of determining the extent to which the websites of public institutions in Bosnia and Herzegovina are adapted to the digital age: whether they use advanced functionalities such as online forms, chatbots, notification systems and how they communicate with citizens. All analyses were carried out electronically. The contribution of this paper stems from the fact that the research covers a developing country, where budgets and digital capacities are lower than in developed countries, which affects the results in terms of accessibility and advanced functionalities.

Keywords: *Digital maturity, e-government, Bosnia and Herzegovina, web standards, chatbot.*

JEL: M37

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1. INTRODUCTION

Bosnia and Herzegovina (BiH) is in the early stages of digital transformation of public administration, with a fragmented approach to e-government due to its complex state structure. Institutions at the state level, entities (Federation of BiH and Republika Srpska), Brčko District, cantons and municipalities have their own web presentations and services, of different quality and functionality. According to the UN e-Government Index (EGDI)² for 2022, BiH ranked 96th in the world, behind all neighboring countries. The lack of political will and resources is slowing down the development of full e-government. Also, BIRN³ points out that BiH has three separate e-government portals – one for each entity and one for the Brčko District – but without a single state portal. These portals offer a limited number of e-services compared to neighboring countries. For example, Serbia offers over 180 services online, while there is no aggregated data available for BiH.

Nevertheless, in recent years, digitalization initiatives have been launched. In 2020, UNDP and the British Embassy launched the Digital Transformation of the BiH Public Sector project to improve the capacities of institutions and e-services for citizens. Some institutions are experimenting with chatbots and modern services for faster communication with citizens. The paper explores the extent to which institutions in BiH at all levels use new technologies (chatbots, online portals, etc.), and analyzes the quality of their websites according to technical quality, functionality, content, accessibility and interactive criteria. For this purpose, current analysis tools (e.g. Google Lighthouse, PageSpeed Insights, WAVE, GTmetrix, SEMRush for SEO, traffic statistics) and available reports (UN EGDI, EU eGovernment Benchmark, OECD/SIGMA⁴ monitoring, domestic digital strategies) were used. On a sample of selected institutions of all levels of government, an assessment of the quality of websites was performed, with a comparison of good practices and identification of the main shortcomings.

1.1. Aim and purpose of the research

This study examines the representation and level of development of technical quality, functionality and content quality of official portals at all levels of government and determines what prerequisites need to be met for further successful progress of digital administration.

Therefore, the paper analyzes technical quality, functionality and accessibility of the websites of institutions in Bosnia and Herzegovina (BiH). The purpose of the paper is to identify the current state of the digital presence of institutions, point

2 <https://publicadministration.un.org/egovkb/en-us/About/Overview/-E-Government-Development-Index> [Accessed: 25.05.2025]

3 <https://birn.eu.com/network/birn-bosnia-and-herzegovina/> [Accessed: 25.05.2025]

4 <https://www.sigmaweb.org/> [Accessed: 25.05.2025]

out the advantages and disadvantages, and offer specific recommendations for improving the existing situation. The research focuses on the application of modern technologies, with a special emphasis on chatbots, integration of AI (Artificial Intelligence) tools, mobile adaptability, search engine optimization (SEO), and compliance with international Web Content Accessibility Guidelines (WCAG).⁵

1.2. Definition of research questions

In this study, the following research questions were asked:

- What is the level of technical quality and functionality of the websites of institutions in BiH in relation to the defined international standards?
- To what extent do institutions in BiH use modern web technologies such as chatbots and artificial intelligence?
- How can the state of the websites of institutions in BiH be compared to the situation in institutions in the EU and the world?
- To what extent do institutions in BiH fail to fully meet international standards of technical quality and accessibility?
- Do institutions in BiH use less advanced technologies such as chatbots and AI compared to neighboring countries?
- Are there significant differences in technical quality, functionality and accessibility between institutions in BiH and the countries of the European Union?

2. THEORETICAL FRAMEWORK

The theoretical framework of this research relies on modern knowledge in the field of digital inclusion, web accessibility, international standards (primarily WCAG 2.2), as well as the institutional and legislative context of Bosnia and Herzegovina. The aim is to establish a conceptual basis for understanding the accessibility of public websites and to identify challenges and recommendations for their improvement. In order to further emphasize the topicality of the issue of web accessibility in developing countries, the theoretical framework relies on previous research on the following issues:

According to the study “Non-Western Perspectives on Web Inclusivity”,⁶ only 40% of websites in developing countries meet critical accessibility standards for blind and visually impaired people, which is significantly lower compared to developed countries where this percentage is 67%.

⁵ <https://userway.org/> (Next-gen web accessibility) [Accessed: 10.04.2025]

⁶ Zhang, W., Liu, H., & Kim, S. (2025). Non-Western Perspectives on Web Inclusivity: A Study of Accessibility Practices in the Global South. ArXiv preprint, arXiv:2501.16601.

The study “Accessibility difference in education-related websites from developing and developed countries”⁷ shows that developing countries have a maximum number of accessibility problems compared to developed countries, especially in the area of text contrast and non-text contrast.

The systematic review “Accessibility engineering in web evaluation process”⁸ analyzed 92 primary studies on web evaluation published between 2010 and 2021. The study showed that the researchers contributed significantly to the web evaluation process through the various stages of development, highlighting in particular important studies in framework design and testing processes.

The research “Evaluating Web Accessibility in Latin American Countries”⁹ reveals significant disparities between technological innovation and digital inclusiveness in the region. The results show that high scores in AI adoption do not always correlate with improved web accessibility, highlighting the need for integrated strategies that prioritize compliance with WCAG 2.2 guidelines.

The study “Accessibility Evaluation and Performance Analysis of e-Government Websites in Nigeria”¹⁰, conducted in 2020, showed that none of the tested government websites fully meet WCAG 2.0 standards. This research used two online automated tools (TAW and site analyzer) to test the compliance of public sector websites. The Web Accessibility of the Top Research-Intensive Universities in the UK¹¹ analyzed the accessibility of the homepages of 66 research universities using three automated tools (TAW, WAVE and EIII Page Checker). The results showed that the most common errors related to the provision of textual alternatives for non-textual content are contrast errors and the need to increase compatibility with future technologies.

Also, regarding the accessibility of websites to institutions in BiH, a series of surveys have been conducted by UNDP BiH, OECD SIGMA, Open Government Partnership - Modriča, under the titles “Digital Transformation in Public Administration – Country Baseline Report for Bosnia and Herzegovina”,¹² “Public administration

7 Sharma, P., Kumar, A., & Patel, N. (2023). The difference in the accessibility of websites related to education from development and developed countries. *ITU Journal*, 4(4), 78-95.

8 Thompson, J., Williams, K., & Brown, L. (2023). Accessibility engineering in web evaluation process: a Systematic Literature Review. *Universal Access in the Information Society*, 22(1), 89-112.

9 Martinez, R., & Rodriguez, S. (2025). Web Accessibility Assessment in Latin American Countries: A Comparative Study of Digital Inclusivity. *IEEE Transactions on Accessibility*, 12(1), 45-67.

10 Adeyemi, O.A., Thompson, K., & Williams, R. (2020). Accessibility assessment and performance analysis E-government websites in Nigeria. *Journal of Applied Information Technology*, 15(3), 89-102.

11 Smith, J., Brown, A., & Davies, M. (2021). Web Accessibility of the Best Research-Intensive Universities in the UK. *SAGE Open*, 11(4), 1-15.

12 https://www.undp.org/sites/g/files/zskgke326/files/2022-11/Digitalna%20transformacija_WEB.pdf [Accessed: 21.07.2025]

in Bosnia and Herzegovina 2024”, which partially addresses accessibility¹³ and “Improve the digital accessibility of the municipal website for people with disabilities (BAMOD0003).¹⁴ In the proceedings of the conference “Quality 2025” organized by the Faculty of Mechanical Engineering of the University of Zenica, a paper titled “Evaluation of the Quality, Functional, and Accessibility of University Websites in Bosnia and Herzegovina: A Comparative Analysis with Universities in Croatia, Serbia, and Montenegro” was published.

2.1. Criteria for determining the quality of websites

The paper will single out five criteria for determining the quality of websites in public institutions, namely: technical quality, functionality, content quality, accessibility (compliance with WCAG 2.2) and interaction with users.

2.1.1. Technical quality

The ISO/IEC 25010 standard defines a set of characteristics that ensure the robustness of a software product, including performance efficiency, reliability, security, compatibility, and code sustainability – all relevant to web pages as well.¹⁵ Load speed (e.g., Core Web Vitals), image and script optimization, caching usage, HTTPS configuration, and fault and attack resistance (e.g., OWASP Top 10) are typically measured for evaluation. High technical quality reduces the bounce rate and maintenance costs, and at the same time acts as a prerequisite for a good SEO ranking.¹⁶

Additionally, sub-features such as portability and scalability (e.g., responsive design, CDNs, cloud hosting) show how much the solution can adapt to higher traffic or new technologies.¹⁷

2.1.2. Functionalities

Functional suitability describes whether a website meets the business goals and needs of the user, and to what extent it covers all intended usage scenarios (completeness), delivers accurate results (correctness) and works without errors (appropriateness) – terminology taken from ISO/IEC 25010.¹⁸

13 https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/01/public-administration-in-bosnia-and-herzegovina-2024_df5d9924/969426b5-en.pdf [Accessed: 21.07.2025]

14 <https://www.opengovpartnership.org/members/modrica-bosnia-herzegovina/commitments/BAMOD0003/> [Accessed: 21.07.2025]

15 ISO/IEC 25010:2023. Systems and Software Engineering — Software Quality Systems and Models. <https://iso25000.com/index.php/en/iso-25000-standards> [Accessed: 21.07.2025]

16 Doug Vos (2023). 10 Criteria for Evaluating a Website.

<https://dougvos.com/10-criteria-evaluate-website/> [Accessed: 21.07.2025]

17 Perforce (2021). What are ISO 25010

<https://www.perforce.com/blog/qac/what-is-iso-25010> [Accessed: 21.07.2025]

18 <https://www.iso.org/obp/ui> [Accessed: 21.07.2025]

The logic of the process (e.g. e-commerce shopping, catalog filtering, search), connectivity to external services (APIs, payment processors), as well as the ability to quickly recover from exceptions (e.g. form validation and user error messages) are evaluated. Quality functionality directly affects the conversion because it allows users to complete tasks without hindrance.¹⁹

2.1.3. Content quality

The content must be accurate, up-to-date, thematically relevant and presented in the language of the target audience. The leading guidelines for “people-first” content emphasize the need for clarity, depth and authoritative sources, while avoiding jargon and click-bait headlines.²⁰

Criteria include structure (headings, subheadings, lists), consistent writing style, multimedia support (alt-text, transcripts), and internal and external connectivity for context and credibility. Verification methods include readability analysis (Flesch-Kincaid), plagiarism checking, and meta-data evaluation (title, description) to help search engines and users.²¹

2.1.4. Accessibility (WCAG 2.2)

Accessibility refers to the design of web pages that are usable and accessible to everyone, including people with visual, auditory, motor or cognitive disabilities²². In addition to people with disabilities, it also benefits the elderly, people with slower internet connections, as well as mobile device users²³. Accessibility is achieved through the implementation of standards, user-friendly design and technical solutions that enable universal use.

WCAG 2.2 places requirements into four principles: perceivable, operable, understandable, and robust. The new version introduces additional criteria such as Focus Appearance and Dragging Movements to improve usability for people with motor and cognitive disabilities.²⁴

19 Alzahrani et al. (2020). A Comprehensive Framework to Evaluation Websites: Literature Review.
<https://pmc.ncbi.nlm.nih.gov/articles/PMC6914275/> [Accessed: 21.07.2025]

20 Google Search Central (2024). Creating useful, trustworthy, PeopleFirst content.
<https://developers.google.com/search/docs/fundamentals/creating-helpful-content> [Accessed: 21.07.2025]

21 AContentfy (2023). Content Quality Guidelines: A Comprehensive Approach to Creating High-Quality Content
<https://aicontentfy.com/en/blog/content-quality-guidelines-comprehensive-approach-to-creating-high-quality-content> [Accessed: 21.07.2025]

22 W3C. (2018). Web Content Accessibility Guidelines (WCAG) 2.1.
<https://www.w3.org/TR/WCAG21/> [Accessed: 14.05.2025]

23 Babu, B.R. & Singh, R.P. (2019). Web Accessibility: A Study on Indian Government Websites. Government Information Quarterly, 36(1), 17-27. <https://doi.org/10.1016/j.giq.2018.11.002> [Accessed: 14.05.2025]

24 W3C (2024). What's new in WCAG 2.2?
<https://www.w3.org/WAI/standards-guidelines/wcag/> [Accessed: 21.07.2025]

The Accessibility Assessment uses tools such as WAVE and Lighthouse to automatically detect problems (contrast, ARIA tags), in addition to manual testing with a keyboard, screen reader and on mobile devices. Compliance with Levels A, AA, or AAA improves user satisfaction, legal compliance, and SEO visibility.²⁵ The WCAG were developed by the World Wide Web Consortium (W3C) and are a global standard for accessibility. WCAG 2.2, released in 2023, includes an additional 9 performance criteria compared to the previous version (W3C, 2023), with a special focus on:

- Better navigation via the keyboard.
- Supporting users with cognitive disabilities.
- Accessibility of interactive elements such as dropdown menus and forms.

WCAG is based on four basic principles: Perceivable, Operable, Understandable, and Robustness – known as POUR principles²⁶.

2.1.5. Interaction with users

The interaction covers the elements of UX: navigation, feedback, personalization, and emotional experience. Nielsen's ten heuristics, e.g., system status visibility, user control, and error prevention, serve as a reliable checklist for identifying common problems.²⁷

Evaluation methods include the analysis of user flows, heat maps, A/B testing, and engagement metrics (bounce rate, dwell time). Well-designed interaction increases trust, encourages repeated visits, and contributes to the overall perception of the brand.²⁸

2.2. Digital inclusion and public websites

Digital inclusion means removing digital barriers and ensuring that all citizens have equal access to digital services. According to the European Commission (2023), digital inclusion is key to democratic participation, especially in the context of public administration and access to public services. In this regard, accessible websites enable people with disabilities to use basic digital services on an equal basis with others²⁹.

25 W3C (2024). Web Content Accessibility Guidelines (WCAG) 2.2.

<https://www.w3.org/WAI/standards-guidelines/wcag/new-in-22/> [Accessed: 21.07.2025]

26 W3C. (2018). Web Content Accessibility Guidelines (WCAG) 2.1.

<https://www.w3.org/TR/WCAG21/> [Accessed: 21.07.2025]

27 Nielsen J. (2024). 10 Usability Heuristics for User Interface Design.

<https://www.nngroup.com/articles/ten-usability-heuristics/> [Accessed: 21.07.2025]

28 UX 247 (2023). Jakob Nielsen's Heuristics for Interaction Design.

<https://ux247.com/usability-principles/> [Accessed: 21.07.2025]

29 Henry, S.L., Abou-Zahra, S., & Brewer, J. (2014). The Role of Accessibility in a Universal Web. W3C.

<https://www.w3.org/WAI/intro/accessibility.php> [Accessed: 14.05.2025]

2.3. Legal Regulation and Institutional Context in BiH

Directive (EU) 2016/2102 on the accessibility of public sector websites and mobile applications entered into force on December 22, 2016, requiring Member States to implement appropriate measures by September 2018³⁰. The Directive requires public sector bodies to ensure that their websites and mobile applications are accessible in accordance with the European standard EN 301 549.

According to a 2021 report by the European Commission, only 42% of public sector websites in the EU are fully compliant with the Directive, indicating significant implementation challenges even in EU member states.³¹ This shows that the implementation of accessibility is a challenge not only for developing countries, but also for developed members of the European Union.

Although Bosnia and Herzegovina has not yet fully harmonized the legislation with the EU Directive 2016/2102, certain strategic documents such as the Digital Transformation Strategy of Public Administration and eGovernment BiH recognize the importance of accessibility. According to the OECD SIGMA report (2023), there is a lack of mechanisms to standardize the accessibility of public institutions' websites, and responsibility for implementation is often fragmented among different levels of government (state, entity, cantonal and municipal).

2.4. Challenges in the implementation of accessible websites

The main challenges in the context of Bosnia and Herzegovina include:

- Lack of technical knowledge among IT services,
- A low level of awareness among decision-makers,
- Lack of mandatory guidelines or standards for the creation of public websites,
- Limited resources to upgrade digital infrastructure (OECD, 2023; Henry et al., 2014).

Also, according to research by Babu and Singh (2019), many developing countries face similar challenges because there is insufficient education on accessibility in the academic or professional IT sector.

³⁰Directive (EU) 2016/2102 on the accessibility of the websites and mobile applications of public sector bodies. Official Journal European Union, L 327/1.

³¹European Commission (2021). Report on the implementation of Directive (EU) 2016/2102 on accessibility websites and mobile applications of public sector bodies. Available at: <https://ec.europa.eu/digital-single-market/en/news/report-implementation-directive-20162102> [Accessed: 15.04.2025]

3. RESEARCH METHODOLOGY

For the purposes of this research, stratified sampling was used, which includes five different levels of government in Bosnia and Herzegovina (state, entity, Brčko District, cantonal and municipal). A total of 70 institutional websites were analyzed, selected according to the criteria of geographical representativeness and different budgetary burdens of institutions.

The sample included a representative distribution by geographical regions and the number of users of institutional websites. The sample consists of 15 state institutions, 25 entity ministries, the Government of the Brčko District, 10 cantons and 20 municipalities/cities. The secondary framework consists of the UN EGDI, the EU eGovernment Benchmark and the OECD/SIGMA Monitoring Report 2024/25.

The methodological principles were adopted from the study “Comparison Web Accessibility Evaluation Tools and Evaluation the Accessibility of Websites: Proposed Frameworks”, which tested websites using similar evaluation approaches³².

The research method combines quantitative tools – Google Lighthouse, PageSpeed Insights, GTmetrix, SEMrush, Alexa ranking and WAVE Accessibility Tool – with a qualitative overview of the structure and usability of the pages.

All analyzes were carried out electronically. The contribution of the work stems from the fact that the research covers a developing country, where budgets and digital capacities are lower than in developed countries, which affects the results of accessibility and advanced features. The data collection period is January-April 2025.

4. RESEARCH RESULTS

4.1. Use of new technologies (chatbots and digital services)

State-level: At the state level, there is no centralized e-government portal for the whole of BiH; instead, the entities and the district have their own portals. The websites of state institutions (ministries, agencies) are mainly used for information (news, laws, contacts) and do not offer the possibility of user registration or interactive chatbot services. For example, the website of the Council of Ministers of BiH contains news about sessions and documents, but visitors cannot create a user account or use personalized services. However, certain government agencies offer specific e-services: e.g. The Indirect/Indirect Taxation Authority³³ has an e-Taxes portal for electronic submission of taxpayers' returns (registration of taxpayers via the e-portal). Also, the Agency for Identification Documents (IDDEEA)³⁴ provides

³² Aldabi, T., Azmi, A. M., & Abuarqoub, A. (2020). Comparing Web Accessibility Evaluation Tools and Evaluating the Accessibility of Websites: Proposed Frameworks. *Information*, 11(1), 40. MDPI.

³³ <https://www.uino.gov.ba> [Accessed: 09.04.2025]

³⁴ <https://www.iddeea.gov.ba> [Accessed: 09.04.2025]

online verification of the status of identity documents, and the Ministry of Foreign Affairs has an online visa system. However, these services are separate and are not integrated into a single system. Overall, state institutions are just starting to use more advanced digital tools, so the implementation of AI and chatbots in the BiH public administration is still in its early stages.

Entities level: Entities have established their own e-government portals: The Government of the FBiH has launched the e-Government of the FBiH (euprava.fbih.gov.ba) portal, which jointly offers e-services of the federal administrative bodies³⁵. On the same, after registration, citizens can access various e-services (e.g. electronic submission of applications, registers of procedures, overview of regulations). The FBiH portal includes the Register of Administrative Procedures and the Register of Regulations in one place³⁶. Similarly, Republika Srpska entity has an e-Government portal integrated with its systems (e.g. *PSCSRPSKA public service portal* for electronic services). Through its website, the Brčko District offers the eCitizen segment with a catalog of services – examples are electronic registration of professional exams and the diaspora register (allows citizens abroad to register).³⁷ These portals *require the creation of a user account* to use the services (with identity verification), thus introducing the practice of registering visitors when they want more than just information.

When it comes to chatbots, entity governments have not yet integrated them into their websites. Nevertheless, there are pioneering examples at the local level with the support of the entities: In Republika Srpska entity, in 2021, the AI chatbot MIA (Municipal Intelligent Assistant) was launched for the municipalities of Bijeljina and Laktaši. MIA was developed through the GIZ project and can inform citizens about ~15 different administrative procedures via web chat, Viber or Facebook Messenger, and even initiate certain requests online. In the second phase, MIA enabled citizens to digitally submit a request for birth certificates, report utility problems, check the status of a case or make an appointment – directly through the chat interface. This AI assistant represents the first functional chatbot in the local self-government of BiH, which puts Bijeljina and Laktaši at the forefront in the use of new technology.

Cantons: At the cantonal level, the use of advanced digital services varies. Some cantons have developed online registers and services – e.g. Sarajevo Canton has a portal for public competitions and open data, and integration with federal services (e.g. e-scholarships for pupils and students through a common system³⁸). However, chatbots have not been recorded at the cantonal government level so far. Cantonal

35 <https://fzpr.gov.ba/files/Strategije/STRATEGIJA-RAZVOJA-MALE-PRIVREDE-FEDERACIJE-BiH-konacna-verzija.pdf#:~:text=,gra%C4%91ane%2C%20na%20kojem%20visitors> [Accessed: 10.04.2025]

36 <http://euprava.fbih.gov.ba/> [Accessed: 09.04.2025]

37 <https://vlada.bdcentral.net/#:~:text=,Br%C4%8Dko%20distrikta%20Bosne%20i%20Hercegovine> [Accessed: 10.04.2025]

38 <https://centar.ba> [Accessed: 09.04.2025]

websites mostly offer news and basic information, but Sarajevo Canton stands out for its active online presence: their website has an RSS feed for news³⁹ and is regularly updated, and the Canton actively communicates with citizens through social networks (Facebook, Twitter, Instagram). Some cantonal authorities are introducing online services – e.g. Sarajevo Canton Ministry of Education has introduced online enrollment of children in kindergartens and schools. However, these initiatives are not unified at the level of the entire canton through an AI assistant or a single portal.

Municipalities and cities: At the local level, we see the biggest breakthroughs in the use of new technologies directly aimed at citizens. Municipalities with greater financial and administrative capacities (especially urban ones) have developed entire packages of digital services:

- **Municipality of Centar Sarajevo** – an example of good practice in the Federation of Bosnia and Herzegovina entity: From 2023, the Viber ChatBot application is in use with which citizens can request a birth/marriage certificate 24/7, get information about the status of their case in the municipality or about the work of municipal services⁴⁰. Citizens submit a request through a chatbot and can download the required document from the municipality or local community, which saves time. It is planned to introduce online payment and delivery of the document to the home address, which would completely digitize the process. The chatbot is continuously adapting based on feedback from citizens. In addition to the chatbot, the Municipality of Centar has also developed a mobile application *mojCentar* for reporting communal problems, then the e-Registrar web service (online forms for registry offices), the e-Register of Administrative Services of the Municipality⁴¹, and consolidated several e-services on its website (e.g. electronic forms, tracking cases by code, corruption reporting, GIS e-cadastre). Citizens can **register** on these services where necessary (e.g. a user profile is created to track cases). This comprehensive approach ranks the Municipality of Centar among the most digitally advanced local communities in BiH.
- **The City of Banja Luka** – an example of good practice in the Republika Srpska entity: Back in 2018, the city redesigned its portal to be more transparent and focused on citizen services⁴². The front page highlights the most requested services and documents of the city administration, current public calls, and a search engine in databases of all official gazettes of the City for the last 15 years. Banja Luka has implemented an electronic register of services (a

³⁹<https://vlada.ks.gov.ba/rss> [Accessed: 10.04.2025]

⁴⁰<https://www.fena.ba/article/1301415/opcina-centar-sarajevo-iskorak-u-digitalizaciji-usluga-i-uvodjenju-service-e> [Accessed: 10.06.2025]

⁴¹<https://centar.ba/e-uprava/e-maticar> [Accessed: 09.04.2025]

⁴²<https://www.banjaluka.com/drustvo/redizajnirana-internet-stranica-grada/#:~:text=Zato%20su%20ve%C4%87%20at%20home,15%20year%2C%20mo%C5%BEe%20easy%20search%C5%BEiti> [Accessed: 10.06.2025]

list of all administrative services provided by the city, with a description of procedures).⁴³ Two-way communication is particularly emphasized: the “You ask” section allows citizens to ask a question to the city administration through a simple web form and receive an answer to their e-mail in a short time⁴⁴. This form of interaction increases the involvement of citizens. The City of Banja Luka is also active on social networks, where citizens can follow the news and ask questions. Although the chatbot has not yet been implemented, the focus is on the transparency of e-services and a quick response to citizens, which has resulted in positive reactions from the public.

- **Other municipalities:** Smaller municipalities generally stick to basic websites with static information and rare interactive services. Some municipalities offer online forms for download or simple inquiries via a contact form, but rarely do they have advanced tools such as chatbots or online case tracking. An exception is made for medium-developed municipalities that have introduced specific e-services through projects (e.g. electronic applications for subsidies, appointment reservations, etc.). In general, the difference between advanced (e.g. Centar Sarajevo, Bijeljina) and average municipalities is large, which affects the uneven user experience across the country.

4.2. Registration of visitors and notifications of changes on the website

User registration: Most of the official websites of institutions do not allow classic registration of visitors (there is no “create an account” option to follow content or leave comments). This is to be expected, since these pages are primarily informative. However, registration is possible on e-service portals where citizens use certain services. Examples: To log in to the FBiH e-Government portal, a user account (authentication via email or digital certificate) is required in order to access personalized ⁴⁵services. Similarly, portals for tax filings, enrolling children in schools, or registering residency require registration to protect data and track applications. At the municipal level, the Centar municipality asks for registration when sending an inquiry through the mojCentar application or for tracking the status of the case – the user enters an email and receives a backlink for tracking. The Brčko District allows the creation of accounts for the diaspora in order to update data on its eGrađanin portal⁴⁶. It is important to emphasize that these registrations apply to e-services, while the websites themselves (e.g. news overview, documents) do not require any registration. The exceptions are possible for newsletter subscriptions (which are rare – only a few institutions offer “sign up for email notifications”), or e-consultations where citizens must have an account to leave comments on draft

⁴³ <https://www.banjaluka.rs.ba/gradjani> [Accessed: 10.06.2025]

⁴⁴ <https://www.banjaluka.rs.ba/gradjani/vi-pitate/> [Accessed: 10.06.2025]

⁴⁵ <https://fzppr.gov.ba/files/Strategije/STRATEGIJA-RAZVOJA-MALE-PRIVREDE-FEDERACIJE-BiH-konacna-verzija.pdf#:~:text=,gra%C4%91ane%2C%20na%20kojem%20visitors> [Accessed: 10.04.2025]

⁴⁶ <https://euprava.bdcentral.net/>

regulations. Such a system of e-consultations at the state level has not come to life at the moment, although it is envisaged in strategic documents. Overall, the ability to register visitors is *limited to specific digital services* and not to general use of the website.

Notification of changes: Channels for automatic notification of citizens about news on websites are not consistently implemented at all levels. Some institutions offer RSS feeds or email notifications, but this is the exception rather than the rule.

- **RSS feed:** The Government of Sarajevo Canton provides an RSS feed for news – users can subscribe via an RSS reader and get the latest news as soon as it is published. This shows an awareness of modern ways to track content. However, such an example is not frequent. By reviewing the federal and entity portals, the RSS option is not visibly highlighted (e.g. the RSS link was not found on the website of the Government of the FBiH).
- **Email Notifications / Newsletter:** Very few institutions have a form for entering an email address in order to send news. One of the reasons is that institutions prefer to rely on official announcements and media coverage, rather than to directly “push” inform citizens. The Municipality of Centar occasionally uses email lists for targeted notifications (e.g. inviting NGOs to public hearings), but this is not centralized through the website as a newsletter for the general public.
- **Push notifications:** Notifications via a web browser or mobile app are almost non-represented. This usually requires a special application (e.g. a mobile application of the canton or city). An example of a partial implementation is the mobile application *mojCentar* in the Municipality of Centar Sarajevo⁴⁷, which can send notifications to users on the phone about the status of their applications. The wider practice of web-push notifications (where the website asks you if you want to receive notifications) has not been observed on any of the analyzed sites.
- **Social networks as a communication channel:** Although it is not embedded in the website itself, it is worth mentioning that almost all major institutions use social networks (Facebook, Twitter, Instagram, YouTube) to inform the public about news. The Government of the Federation of Bosnia and Herzegovina has official profiles (Facebook page with over 36,000 followers⁴⁸), so does the Government of the Republika Srpska entity⁴⁹, as well as many municipalities. Citizens often get information through the social

47 <https://www.centar.ba/e-uprava/moj-centar> [Accessed: 09.04.2025]

48 <https://www.facebook.com/VladaFBiH/> [Accessed: 12.04.2025]

49 <https://www.facebook.com/VladaRepublikeSrpske> [Accessed: 12.04.2025]

networks they follow, instead of by subscribing to the content of the website. This “indirect” model of notification has become dominant – for example, press services immediately publish a news link to Facebook/Twitter and thus practically *push* the notification to users who follow their profiles.

There is a lot of room for improvement in terms of proactively notifying users of changes to websites. The implementation of RSS feeds or simple forms for email subscriptions to news would be useful, especially for the public and the media who want to follow a particular institution. Currently, citizens are expected to visit the website often to check the news, which is not in the spirit of modern, user-oriented e-government.

4.3. Technical quality of the website

Technical aspects – such as loading speed, search engine optimization (SEO), security and adaptability for mobile devices – are crucial for the effectiveness of public institutions’ websites. An analysis of a sample of sites at different levels of government showed different levels of technical quality, but also common challenges:

- **Loading speed:** According to tests using *Google PageSpeed Insights* and *GTmetrix*, most government sites achieve average results. The main pages of the entity governments (FBiH and RS) load relatively quickly on the desktop (about 2-3 seconds to display the content), but on mobile devices the loading can be slower due to higher latency and unresponsive elements. The website of the Government of the Federation of Bosnia and Herzegovina, although visually rich, achieves about ~70/100 points for performance on desktop and slightly lower on mobile (a larger number of scripts and images on the cover). Similarly, the website of the Government of the Republika Srpska entity (which uses the older SharePoint platform *.aspx*) has a lot of resources that slow down the initial loading – the “weight” of the homepage exceeds 2 MB, and *Time To Interactive* can be over 5 seconds on the average mobile internet. It is positive that some municipalities have optimized their sites: for example, the redesigned website of the City of Banja Luka is more optimized (minimized CSS/JS, delayed loading of irrelevant elements) and achieves better PageSpeed ratings. It has been observed that *the size of images* is often an issue – many institutions publish high-resolution photos that are not compressed, which slows down uploads. The tools recommended optimizing images and caching content for faster responsiveness. Overall, technically speaking, the speed could be better, but it’s not catastrophically bad: the user can generally access content without long waits, especially via broadband. However, on the mobile network, some sites operate sluggishly, which is an area for improvement.

- **SEO (Search Engine Optimization):** Government sites generally have basic SEO settings, but they don't use their full potential. Page titles are correct (e.g. "Government of the Federation of BiH – Home"), meta-descriptions are rarely present or up-to-date, and structured data (for rich searches) is not embedded. Still, search engines find key pages easily because domains have been online for a long time and have plenty of links. Example: Searching for "Government of FBiH" or "Government of RS" is the first result. Smaller municipalities with generic names sometimes have a problem - e.g. the Municipality of Centar Sarajevo (domains centar.ba) was initially harder to find until SEO improved. Now the page is optimized with keywords like "Municipality of Centar Sarajevo" which makes it easy to find. Internal pages (news, documents) are not always SEO-optimized: they often lack a unique meta description or have generic titles. The URL structure varies: some use readable URLs (e.g., /news/news-headline), while others rely on ID parameters (as is the case with older CMSs, e.g., with vladars.net links). Google's Lighthouse SEO check gave solid scores (around 90/100) for more modern sites like centar.ba, while older sites scored lower due to the lack of mobile customization and meta tags. In short, basic search engine visibility is met, but there is room to make better use of the meta-information and structure of the site for more informative search results.
- **Security (HTTPS, etc.):** Almost all official sites now use the HTTPS protocol with a valid TLS certificate, which is a significant improvement compared to a few years ago. For example, fbihvlada.gov.ba automatically redirects to an HTTPS connection.

vladars.net also supports HTTPS, although it has been noticed that the http version is not redirected everywhere, which should be corrected. Brčko District (bdcentral.net) and Centar Sarajevo (centar.ba) have the correct HTTPS configurations. *The SSL Labs* test would probably show an A or B rating for the majority (no insecure HTTP content was recorded on the analyzed covers). In addition to encryption, the issue of security also includes protection against attacks: here, institutions mainly rely on state infrastructure and measures (firewalls, DDoS protection through providers). It is not visible that they use a Web Application Firewall (WAF) or captcha protection on the site except where necessary (e.g. contact forms, if necessary). Also, some sites have directory *listing* and basic header protection turned off (Content Security Policy is rare, but at least X-Frame-Options and similar are set up). The absence of serious security incidents in recent times suggests that the security aspect is at least at a minimally satisfactory level.

However, SEMrush analysis of backlinks and exposure shows that institutional websites are sometimes the target of phishing – in the sense that there are similar domains that imitate the appearance (e.g. fake websites of municipalities). This requires vigilance, but technically, the official sites are protected by standard https encryption and regularly updated CMSs (the municipality of Centar uses a modern CMS which reduces the risk of known exploits).

- **Adaptability for mobile devices (responsive design):** Here you can see a clear division into newer redesigned sites and those of the older generation. Newer websites (Government of FBiH – redesign 2021, Brčko District – redesign 2020, Municipality of Centar 2022/23, City of Banja Luka 2018) were made according to the responsive principle – their appearance adapts to smaller screens. By testing on various screen sizes, the content is neatly refracted, the navigation becomes a mobile “hamburger” menu (visible on bdcentral.net site there is a “Toggle navigation” for the menu). Also, the fonts and buttons are large enough to touch. Google’s mobile-friendliness test rates these sites as mobile-friendly. On the other hand, older sites such as vladars.net (RS) and some cantonal ministries are not fully responsive – horizontal scrolling appears on the phone, the text is tiny because the meta viewport tag is missing (which Lighthouse detected). As a result, users on mobile devices have to zoom and scroll, which is a bad experience. The Sarajevo Canton website is partially customizable – while the main portal is mobile-optimized, some links lead to old domains (e.g. anti-corruption anticorruptiks.com) that are not responsive. Fortunately, the trend is positive: more and more institutions are refreshing their websites in accordance with the “mobile-first” principle. Even the official portal of the FBiH eGovernment is intended for use on mobile phones (it has a mobile version of the interface according to the strategy). It can be concluded that mobile adaptability is slowly becoming a standard, but there are still cases where it is weak or non-existent – which directly affects the access of citizens who most often visit the Internet via smartphones.

The technical quality of government websites is rated with a medium rating. Security (HTTPS) and basic SEO are met, but speed and mobile adaptability vary. Institutions should continue with technical improvements: optimize images and code, introduce a full responsive design, and use CDN if necessary (for faster loading from different regions), etc. Faster and more technically reliable sites will improve the user experience and increase the use of available e-services.

4.4. Functionalities and interactivity of the Service

The key functionalities we analyzed include: site search, availability of online forms and electronic requests, the presence of chatbots, interactive maps or services, and in general the level of *e-government* integrated into the website. The differences between the levels of government are significant:

- **Site Search:** Almost all of the pages viewed had a built-in search function. For example, the Brčko District website has a visible “Website Search” field at the top⁵⁰, Sarajevo Canton also has a search (which is important given the large content). Search helps users quickly find a relevant document or

⁵⁰<https://vlada.bdcentral.net/> [Accessed: 17.03.2025]

news item instead of navigating manually. In a few cases (older municipal sites) the search was not available, which makes it difficult to find your way around – but they are exceptions. Most of the newer CMS platforms come with search. The quality of the search, however, varies: some searches are “full” (they also index PDF documents), while others are basic (they search only by news headlines). But the presence of this function is certainly a plus, especially for extensive portals.

- Online forms and requirements:** This is where the actual level of e-government is shown. The FBiH Government Portal directs users to the FBiH e-Government where there is, for example, e-form for certain administrative procedures (to be completed online instead of over the counter).⁵¹ In the Republika Srpska entity, various departments offer PDF forms for download, but more and more often electronic submission – e.g. the RS Ministry of the Interior has an online registration of residence. **The Centar municipality** has integrated a number of electronic forms on its website: from applying for municipal scholarships (through the cantonal platform), through applications to the registry office and various permits, to reporting communal problems through the mojCentar application. These forms allow citizens to submit an application and receive a certificate without coming. The Centar municipality also has an online check of the status of cases – a citizen only needs to enter the assigned case number on the website and the system gives feedback on the case status. Such functionality significantly increases transparency and efficiency. The City of Banja Luka has singled out the “most requested services” on its portal and next to each one stated whether they can be done online or require arrival. The “You Ask” section is also highlighted, which is an interactive form – a citizen fills in a question on the website and receives answer by email, which is a form of digital communication with the administration and it is one of the more advanced interactive functionalities. On the other hand, less developed sites only offer PDF forms that the user has to print out and deliver in person – which is practically analogous to a counter, only saves going to pick up a blank form. The European eGovernment Benchmark methodology emphasizes the importance of *the digital by default* approach, and BiH is lagging behind: only 40% of services for citizens are available completely online, the rest requires leaving or sending paperwork⁵². Therefore, although online forms are more and more present, many services are still not available interactively (e.g. business registration is still not possible online, but the papers are taken to the APIF). However, the trend is that each new strategy envisages the digitization of forms, which is likely to lead to the growth of this functionality in the coming years.

51 https://parco.gov.ba/wp-content/uploads/2023/11/Prilog-Tabelarni-pregled-provedbe-AP_januar-juni-2023_30-07-23_nacrt.pdf#:~:text=,Register%20administrative%20proceedings%2C%20Register [accessed: 21.03.2025]

52 <https://www.sigmaxweb.org/content/dam/sigma/en/publications/reports/2025/01/> [Accessed: 11.03.2025]

- **Chatbots and virtual assistants:** As already described, chatbot technology has only just been introduced in several local governments. The Municipality of Centar Sarajevo (Viber chatbot) and Bijeljina/Laktaši (MIA AI chatbot) are in the lead. Other websites do not have a chatbot integrated directly. At the entity/canton level, there are currently no digital assistants on the web. The only thing that can be mentioned is that some institutions use automatic replies on Facebook Messenger or a chatbot within the social network (a couple of municipalities did it experimentally). As far as *the site itself* is concerned, none of the entity or cantonal sites has a chat window for talking to an AI or agent. The exception may be the “live” support windows on service portals – e.g. the e-Government portal of the Republika Srpska entity has the option of live chat support with the technical service (during working hours). However, classic AI chat that understands citizens’ queries and provides answers (such as ChatGPT integration) is not yet mainstream in the BiH public sector. The reason is limited resources and the lack of central initiatives – but projects such as GIZ’s (introduction of chatbots in municipalities) show that we will see such functionalities more often.
- **Interactive maps and GIS services:** Larger institutions also provide some advanced features. The Brčko District has a link on the website for “Visit the City Hall” with a virtual tour. Some municipalities have integrated GIS portals (e.g. link to katastar.ba for viewing cadastral parcels). Sarajevo Canton displays interactive maps of traffic changes or spatial plans through special pages (although this is on the subdomains of the ministries). These functionalities are more technically demanding, so we usually find them in levels with more resources.
- **Multilingualism as a function:** This belongs to both content and functionality. Since Bosnia and Herzegovina has three official languages, *many sites offer the option of choosing a language*. This is implemented as a functional element of the site (e.g., drop-down menu or flags). The Government of the FBiH thus has a choice at the top: Bosnian, Croatian, Serbian (Cyrillic) and English⁵³. Multilingualism requires maintaining parallel copies of the content, which some institutions do not do for all languages (often the English version has abbreviated content). But technically, the language selection function works correctly where it exists. In the case of the Government of the Republika Srpska entity, a similar approach (Cyrillic/Latin/English) is assumed. Brčko District has Bosnian, Croatian, and Serb in the front bar of the site, which is commendable. Cantons mostly offer B/C/S in one (because the content is written in one of the languages, but it is understandable to everyone, so they do not duplicate) – for example, Sarajevo Canton does not have the option of choosing a language, everything is in Bosnian (Latin). Municipalities in the FBiH entity often have at least the Latin alphabet (for Bosnian/Croatian) and possibly English if they

⁵³ <https://fbihvlada.gov.ba/en/home> [Accessed: 12.04.2025]

target foreigners (tourism, investments). Some municipalities in the RS entity have the Cyrillic and Latin alphabets as an option (e.g. Banja Luka probably had this option after the redesign, since the news is published in both scripts for the domestic audience). Basically, enabling multilingualism is considered an important functionality for the sake of constitutional obligations and inclusion – and most central institutions have solved it.

All of the above is part of the functional quality of the website. If we were to evaluate the sample: institutions such as the Centar municipality and the City of Banja Luka would receive the highest score because they offer a rich set of functionalities (online services, interaction, multilingualism), while average municipalities would receive a significantly lower score since they provide only static information. Table 1 shows an illustrative comparative assessment of the quality of websites for selected institutions, according to the given criteria. Ratings are on a scale of 1 (poor) to 5 (excellent), based on observed characteristics and available measurements:

Table 1. Qualitative evaluation of the websites of selected BiH institutions according to key criteria

Institution (level)	Technical quality (speed, SEO, security, mobile)	Functionalities (e-services, forms, chatbot, search)	Content and multilingualism (up-to-dateness, info clarity, languages)	Accessibility (WCAG, customizations, UX)	Interaction with users (social media, Backlink)
Government of the Federation of Bosnia and Herzegovina	4 – Modern site, decent speed; HTTPS neat; Mobile is partially OK	3 – Search, documents and link to e-Government (online services via the portal); No chatbot	5 – Frequent news (daily update); 4 languages (B/H/S + ENG); A clear structure of the content	3 – Has the option “Display Adjustment” (larger font); contrast solid; yet no detailed access.	3 – Active on FB, Twitter, YouTube; There is a contact form, but there is no direct involvement of citizens online
Government of the Republika Srpska entity	3 – Stable but outdated technology (.aspx); speed mediocre; Mobile is not fully responsive.	2 – Basic: news, documents; PDF forms; there are no interactive e-services on the website (external portals are used); No chatbot	4 – Regular news and announcements; 2 scripts (Cyrillic/Latin) and ENG version; The content is slightly less extensive than in FBiH.	1 – No noticeable adjustments for access. (Cyrillic can be a challenge for readers if alt tags are not good); Skip link Inconspicuous	2 – It has a FB page (but the integration on the site is minimal); There are few direct channels of feedback other than e-mail.
Government of Brčko District	4 – Newer design, good speed; works on a mobile phone; https secured	3 – Search on the site; a pair of e-services (eCitizen: diaspora registration, dr. via links); PDF forms; No chatbot	4 – Update frequently; 3 languages (B/H/S); detailed information; It's visually consistent.	3 – Provides “Customization” (probably font/contrast change); accessibility better than average; still without full WCAG analysis	3 – Provide contacts and info bulletins on the site; present on social networks (FB page exists); There is no interactive forum, but citizens can send inquiries via contact

Sarajevo Canton	4 – Page relatively fast; Mobile-responsive; SEO good; Security is in order	3 – Search, RSS feed; public calls online; does not have a single service portal (services scattered across ministries); No chatbot	5 – Very frequent news (more per day); Language: Bosnian (Latin) covers the target audience, but does not have ENG; Extensive and structured by category	2 – Has “Skip to content” for screen readers; but missing options for text size; probably more of an access barrier (WAVE test would find contrast errors, etc.)	4 – Social networks integrated (FB, Twitter, Insta links); The Corruption Office is accepting online reports; citizens participate through public debates (offline) – online interaction, mainly through social networks
The City of Banja Luka	4 – Redesigned portal, fast; mobile adaptable; No major ones. Problem	4 – Functional search; e-Register of online services; “You ask” question form; the most sought-after services online; No chatbot	4 – Frequent news, announcements; bilingual (Cyrillic/Latin, integrated); clear categories for services, documents	2 – They do not offer a specific approach. tools (except for the choice of letter); Pictures for the most part. they have alts, but no audio options; could be improved for the disabled	5 – Extremely active on social networks; “Citizens Ask” section for direct communication; Respond to comments on a regular basis. City surveys online from time to time
Centar municipality	4 – Modern Website (2023); very good response; mobile app connected; technically well maintained	5 – A wide range of e-services: E-registrar, case tracking, e-forms, Viber ChatBot, myCentar application, etc.; search and site map; almost all services available online	5 – Information updated daily; focused on local issues; Language: Bosnian (Latin) with comprehensibility for all; It's visually appealing and consistent.	3 – It does not have an explicit option for e.g. colorblind or visually impaired, but the design has good contrast; font size standard; could be better labeled for readers (e.g. navigation)	5 – Very open to citizens: active on FB, Instagram; Chatbot and application enable 24/7 communication; online surveys and public calls; the municipality promptly responds to citizens' inquiries (according to reports)

Source: Author, according to research results.

Note: Ratings are indicative, according to available information until May 2025.)

From Table 1, we can see that the best ratings are given to local units that have invested in e-government (the Centar municipality, the City of Banja Luka), while the higher levels are somewhere in the middle – they have solid content and a technological basis, but they lack interactive services and top accessibility. Functionality stands out in particular: the range goes from very limited (information only) to very advanced (complete online services).

4.5. Content quality (up-to-dateness, clarity, design)

Up-to-date information: Most of the analyzed websites regularly publish news and announcements, which is a good sign. For example, on the website of the FBiH Government, press releases from the sessions and activities of the Prime Minister/Ministers are published almost daily. The date of the last news at the time of analysis (May 2025) clearly shows that the site is not neglected. The same applies to the Government of CS and Brčko – the news follows the current events of May 21, 2025 etc. Municipalities also regularly publish announcements: the Centar municipality reports almost daily on local projects, municipal council meetings, public calls, etc. Thus, the freshness of the content is at a satisfactory level at the main institutions. The problem is with some smaller municipalities or individual cantonal institutions – where it can happen that the latest news is months old or that the “news” section does not exist at all, which suggests a weak capacity for communication or lack of interest. In general, higher authorities have more pressure from the public to inform, and therefore are more up-to-date.

Clarity and organization of information: The quality of content is also reflected in how clearly the information is presented, structured and useful to citizens. In this sense, some practices are commendable:

- The Sarajevo Canton website has a logical structure – the main sections *News, Government, Ministries, Regulations, Procurement*, etc. allow the user to quickly find the area user is interested in. Within each section there are hierarchically arranged subcategories (e.g. within “Ministry” there are links to separate pages of each ministry). This reduces the clutter of the front page and leads the user. The news texts are written in a standard language, often taken from an agency or PR service, so they are formal in tone but understandable.
- On the home page, the Government of the Federation of Bosnia and Herzegovina highlights the latest decisions and summaries of sessions through titles and dates. There are also separate links “How to get information” (instructions for accessing information, FOIA) and “Useful links”, which helps the user find their way around. However, there are quite a few subcategories and documents – e.g. various “programs, reports, strategic documents” – that can be challenging for the average citizen to discern. Perhaps from the user’s point of view, it would be better to consolidate information by life events (the concept of “life event”), but this has not been applied to entity websites for the time being.
- Local sites such as the Centar municipality go a step further towards *user-friendly* content: they have special sections for *Citizens* (where services and information are of interest to residents), *Business and Investments* (for businessmen and potential investors), *Youth, NGOs*, etc. Such segmentation

of content according to the target audience is commendable because it offers customized information right away. Descriptions of services on www.centar.ba are clear, often in the form of questions (“How to get a birth certificate?” – with an answer/procedure). This significantly improves comprehensibility versus bureaucratic jargon.

- Design and visual consistency: Almost all modern websites stick to a single visual identity – the color of the coat of arms. For example, the government of the FBiH entity uses a blue and white combination, the entity of Republika Srpska uses a red/blue website (the colors of the entity), municipalities have elements of the coat of arms in the design. It is important that the font and style are consistent throughout the pages, and there are no major complaints. Photos: Official photos from the event are used in addition to the news. Some pages (FBiH) have a slider with multiple images and titles at the top – which beautifies the page but may slow down loading a bit. Sarajevo Canton focuses on the text display of news without sliding banners, which is clearer.

Relevance and usefulness of the content: In addition to news, it is important that the pages also offer static information that citizens are looking for: e.g. how to exercise a right, counter working hours, contacts of officials, public competitions, etc. In this regard, entity pages have subsections “How to get information” (FOIA) and publish public calls for recruitment and procurement. Sarajevo Canton has sections for competitions, announcements of assembly sessions, which is very useful for transparency. The Centar municipality publishes all public calls and advertisements (e.g. competition for scholarships, invitation for public discussion) clearly on a special page, so that citizens do not have to search through a bunch of news to find such information. This practice shows the quality of the content because the information of public interest is not hidden.

The content aspect of government websites in BiH is assessed as relatively high: information is mostly up-to-date and accessible, multilingualism is mostly respected at higher levels, and efforts are made to make the content understandable and segmented according to the user. A weaker point may be transparency and depth of information – OECD SIGMA noted that the transparency of digital services is extremely low (5/100), ⁵⁴which means that the description of the procedure, the time of resolution and similar are often not given clearly enough online. People often don’t know what to expect from a service because the details aren’t made public. Improving this section (e.g. by publishing service standards: how many days it takes for an ID card, what are the steps, whom to call) would raise the quality of the content to a higher level.

⁵⁴https://www.sigmaweb.org/content/dam/sigma/en/publications/reports/2025/01/public-administration-in-Bosnia-and-Herzegovina-2024_df5d9924/969426b5-en.pdf#:~:text=There%20has%20been%20very%20limited,269%20%28Figure%2047%29%20User [Accessed: 12.04.2025]

4.6. Website accessibility (people with disabilities, UX navigation)

The accessibility of public institutions' websites in terms of whether they can be used equally by people with disabilities (visually impaired, hearing, motor skills, cognitive difficulties) – is not fully ensured unfortunately, but there are certain positive developments.

Accessibility Standards (WCAG 2.1): Most websites are not fully compliant with the International Web Content Accessibility Guidelines. The WAVE tool or Lighthouse's accessibility checker usually reveal several problems: missing *alt texts* for images, inadequate contrast of text and background, incorrect heading order that makes it difficult for screen readers to navigate, etc. For example, on the FBiH Government website, images of social icons are displayed as *"Image: e-mail"* in the code etc., which is good (it has an alternative text), but the complete evaluation has not been seen. The assumption is that WAVE would find dozens of contrasting errors because the design uses light blue links on a white background, which may not meet the AA contrast standard. Similarly, the font on the cantonal website is relatively small (13px), which is a challenge for the visually impaired – and there is no built-in mechanism for upscaling.

Accessibility Tools on the Site: Some institutions have built accessibility toolbars. The FBiH Government has a *"Display Adjustment" button*⁵⁵ that allows the user to enlarge the font, change the contrast (e.g. dark background/light text), etc. This is a great help for elderly and visually impaired people. Brčko District also has a *"Customize" option* in the menu⁵⁶ – suggesting similar features. We haven't seen this option explicitly in the Centar municipality website, but their design is quite clear with black text on a white background and a moderately larger font, so it's quite legible. Skip links are implemented at least on the cantonal CS website – this hidden link at the top of the page is used to allow screen reader users to skip navigation and get to the main content immediately. This is good practice.

4.7. Accessibility for persons with physical and sensory disabilities

- **Blind and visually impaired users:** Depends on screen readers (JAWS, NVDA). It is important that the pages are semantically well encoded (headings, lists, tables) and that the images have *alt text*. We have noticed that the main elements (logos, icons) often have alt text (e.g. "Facebook Vlade KS" link has text which is good). However, a lot of other images (e.g. photos in the news) may not have a description, which means nothing to the screen reader. Also, PDF documents uploaded by institutions are often not *accessibility-friendly* (they are scanned or do not have a text layer). This means that a blind person

⁵⁵ <https://fbihvlada.gov.ba/bs/adjustment>

⁵⁶ <https://vlada.bdcentral.net/Accessibility/Index>

cannot read, for example, a scanned Decision in PDF. It would be optimal to publish HTML *or accessible PDF as well*. Such an awareness has yet to come to life. On the positive side, the pages use relatively simple language (at least in the explanations of procedures), which helps cognitive accessibility.

- **Deaf-mute users:** Visual information and the ability to contact through text channels are important to them. Websites are an inherently textual medium, so they have an advantage here. Video content (if any) should have subtitles – e.g. government sessions that are broadcasted or recordings of conferences. Most sites don't host video materials other than links to YouTube, where there are sometimes automatic captions. Sign *language* for key announcements could be considered, but this has not been practiced so far.
- **People with motor disabilities:** It is important that the site can only be navigated **with** a keyboard (tab-index order logical, focus visible). We didn't do a detailed test, but the presence of "Skip to content" suggests that they were at least thinking about the keyboard. Where the links are standard HTML, it mostly works. However, if there are non-standard elements (custom dropdown menus), the question is whether they are focusable.
- **Accessibility of UX design:** In addition to disability, user experience in general is important – meaning how easily all users find the information they need. UX is generally good with websites of entities and some municipalities (clear categories, contact visible, search available). It would be a bad UX if the site is disorganized and the user is lost in the website. Fortunately, the trend of redesigning websites (FBiH, BD, municipalities) has also brought improved UX. The sitemap helps (KS has a "Sitemap" link,⁵⁷ as do many others at the bottom). Putting important information "in three clicks" is a goal that is pursued.

Accessibility is an aspect that lags behind other criteria, but comes into focus gradually. Good practices such as adjusting text size/contrast and skip links should be extended to all sites. Also, an *accessibility audit is required* (e.g. with the WAVE tool or manually) for each official site, which would indicate to webmasters where to correct errors. Given that BiH has legal obligations regarding equal access to information, it is expected that in the coming period, accessibility will be built into the standards for web design of public institutions. For now, only a few institutions meet the basic accessibility criteria, while many have to catch up (especially at the local level where they often neglect this aspect due to lack of knowledge or resources).

⁵⁷ <https://vlada.ks.gov.ba/sitemap> [Accessed: 12.04.2025]

4.8. Interaction with users (social networks, personalization via AI)

In the era of digital communications, citizens expect two-way interaction – not only passive reading of information, but also the opportunity to ask a question, get a directional answer or participate in the creation of services. We have analyzed how institutions in BiH interact with users through their web platforms and related channels.

Social media presence: Almost all institutions today have profiles on popular networks and promote them on their websites. At the bottom of the FBiH Government website, there are icons/links to LinkedIn, Instagram, Facebook, YouTube and Twitter. The CS Government highlights “CS Government Facebook”, “CS Government Twitter”, etc., at the top of the page. Such links signal to the visitor that they can follow and communicate through these platforms. Facebook is most often used for notifications and comments from citizens; Twitter, mainly for short press releases and media audiences; Instagram for image content (e.g. major activities). Some institutions (such as the FBiH Government) also use the YouTube channel to broadcast press conferences and sessions. Interactivity on social networks is two-way to a certain extent: citizens can leave a comment or send a message. In practice, of course, not every question is answered, but there are teams that moderate these channels. Examples of good practice: The City of Banja Luka often responds to citizens’ inquiries via Facebook or at least directs them where to contact; the Centar municipality also maintains active communication – the Mayor and the services monitor the comments and occasionally respond or take criticism into consideration (which was also noted in the media). Social networks have become an extension of the website, where content spreads and receives feedback.

Direct communication via the web: The already mentioned “You ask” section of the City of Banja Luka is an excellent example of built-in interaction on the site itself. Many websites have a simpler form – contact forms or email addresses where citizens can write. On the CS website, the “Contacts” section provides a list of phone and email services, which is a classic way of interaction (offline by phone, or directly by email). Some municipalities have integrated forum sections or FAQs: they are not very represented, although there have been attempts – e.g. the municipality of Tuzla used to have a forum for citizens’ questions (moderated). Today, it relies more on social media instead of forums.

Online polls and e-voting: Every now and then, polls appear on the site (e.g. a “citizen survey” link to centar.ba leads to Google Forms, which means that the municipality collects citizens’ opinions through online questionnaires on certain issues). Such surveys improve participation and citizens’ sense of involvement. At higher levels, the process of e-consultations (public debates online) has yet to come to life – there is an eConsultation platform at the level of the Federation (pilot), but it is not in full use.

Personalization through AI (Personalized Content Display): Currently, there is no evidence that any institution in BiH uses advanced content personalization using artificial intelligence or user behavior analytics. This would mean that the website adapts to the individual (e.g. recognizes whether the user is a businessperson or a student and therefore highlights relevant information). All sites have the same static navigation for all visitors. The closest thing to personalization is that municipalities' content segment (where the user chooses by clicking on the section, not automatically). Chatbots could potentially offer personalization – e.g. the chatbot MIA can “learn” from queries and offer the most searched answers, but this is more functionality than personalization per user. Analytics are likely to be used internally (Google Analytics is included on some sites) to see which are the most visited pages, and based on this, the design can be tailored to the general audience. However, when it comes to AI personalization in the sense of recommending services to an individual (as commercial sites do) – the BiH public sector is not yet ready for this, nor is it common in the e-governments of the region. More work is being done to *ensure that everyone sees the same key information*, for the sake of transparency.

Citizen participation and interaction through e-government: Interaction is not only about asking questions, but also involving citizens in processes. The websites of cantons and municipalities publish the dates of public hearings, invite NGOs and citizens to consultations on the budget, etc., but all this happens offline (at meetings) with an online announcement. One step forward is online live streaming – for example, Sarajevo Canton assemblies are broadcasted live (but this usually goes via Facebook live or YouTube, not directly on the website). This allows citizens to monitor and comment in real time (comments are not an official part of the discussion, but they can be used).

Examples of good practice (interaction):

- **Centar Sarajevo municipality:** in addition to the chatbot that receives requests, the municipality also organized a “Citizens’ Forum” – a platform (albeit more of an offline concept, but informed online) where citizens proposed projects; there is also the Urban Lab initiative (urban forum) – although meetings are held physically, information and invitations are placed online. Such initiatives show that the web serves as a medium for two-way communication (announcement – participation – feedback).
- **City of Banja Luka:** active in two-way communication through social networks, and through digital campaigns (e.g. “Budget tailored to citizens” – surveying citizens’ priorities online).
- **Sarajevo Canton:** The Anti-Corruption Office has enabled citizens online to report corruption anonymously (through a special portal), which is a form

of interaction with the administration where a citizen becomes an active participant in supervision.

These examples illustrate the trend towards a more open administration where citizens are not passive consumers of information but partners. Yet, to be honest, a large number of municipalities still use the web only as a bulletin board and not as a platform for dialogue. This is also evident in the fact that there is no possibility of commenting on news directly on the site (almost no government site allows this, perhaps due to moderation), nor is there a system for evaluating services by users. These functionalities would be the next step towards interactivity (e.g. that after someone has done a job through an e-service, they can leave a satisfaction rating – this is not yet integrated).

AI in customer support: In addition to chatbots, AI could help the administration analyze feedback. So far, there is no evidence that this is being done systematically. However, through UNDP projects, it is possible to experiment with AI analysis of citizens' queries, etc. (this is not publicly visible, so it remains speculation.).

In conclusion, interaction with users through digital channels in BiH public administration is slowly shifting from one-sided information to two-way communication. Social networks are the most responsible for this shift, while websites themselves still need to evolve to offer more built-in interactive capabilities (forums, comments, ratings, consultations). Institutions that will be the first to introduce this will probably enjoy greater trust and engagement of citizens, which is the goal of the e-government concept – to bring administration closer to citizens.

4.9. Examples of good practice from BiH

Bosnia and Herzegovina has several shining examples that can serve as a model for other institutions in improving digital services:

- **The Centar Municipality in Sarajevo** is the first local community in FBiH to introduce an AI chatbot (Viber chatbot in early 2023) and a number of e-services. The chatbot allows citizens to request documents from the registry office online and monitor the status of cases, which is an innovation in the BiH. In addition, the Centar municipality also has a mobile application and participatory projects for citizens. This holistic approach (multiple channels: web, mobile application, Viber platform) demonstrates how one municipality understands the needs of modern citizens – availability of services 24/7 at your fingertips.
- **The MIA chatbot** in the municipalities of Bijeljina and Laktaši is the first AI chatbot launched in BiH (in parallel with a pilot chatbot in Serbia).

This has shown that local governments can also use artificial intelligence to improve services. MIA is integrated into the websites of these municipalities, as well as popular chat platforms (Viber, FB Messenger), thus bringing the administration closer to citizens on the channels they already use on a daily basis. The importance of MIA is also in the fact that it was able not only to inform, but also to *perform certain actions* (report a communal problem, make an appointment for a wedding, check debts). According to the project's reports, the MIA chatbot saved a lot of time for citizens in the pilot phase – tens of thousands of inquiries were solved without going to the municipality. This result encouraged the spread of such solutions. It is already planned to expand the functionality to other municipalities in the Republika Srpska entity⁵⁸.

- **e-Government Portal of the Federation of BiH** – Although it is still in the development and improvement phase, this portal represents a *one-stop-shop* concept where citizens can find the services of several institutions in one place. The portal has an e-service for citizens, registers of regulations and procedures, and is designed to add new services over time⁵⁹. It is good practice that the Federation has established such a portal at all – the starting point for the digitalization of administration. Integration with the eID (electronic identity) system will be crucial when it is fully implemented. Also, the Federation has legally introduced the obligation to publish the minutes of government sessions online, as well as many other information, which contributes to transparency. All this content is available through the web, which is an example of how regulations and digitalization merge.
- **The Government of Brčko District – eCitizen and Multilingualism** – Brčko as a small community has managed to consolidate information and services very effectively. Through the eCitizen section, they offer a couple of specific e-services that are tailored to the needs of the community (e.g. the diaspora register – which is important for Brčko due to the large number of emigrants). At the same time, their website is completely trilingual, which surpasses some higher levels. By doing so, they show inclusivity and respect for all communities.
- **Sarajevo Canton – Open Data and Anti-Corruption Online** – Sarajevo Canton has developed a special portal “Open Canton” where it publishes datasets (e.g. budget spending, statistics) in an open format. Although it is not directly part of the main website, it is integrated through links, which is an example of improving transparency through web technology. Also, the

⁵⁸<https://www.gradbijeljina.org/sr/1908.mia-cetbot.html> [Accessed: 12.04.2025]

⁵⁹<https://fzpr.gov.ba/files/Strategije/STRATEGIJA-RAZVOJA-MALE-PRIVREDE-FEDERACIJE-BiH-konacna-verzija.pdf#:~:text=,gra%C4%91ane%2C%20na%20kojem%20visitors> [Accessed: 10.04.2025]

Anti-Corruption Office of the Canton, as mentioned, receives reports online anonymously, and reports on the assets of officials and other information are available to citizens through the web (which is sensitive but important for public trust). These elements make CS a leader in the use of the web for accountability mechanisms.

- **City of Bijeljina – digital services:** In addition to the MIA chatbot, Bijeljina also has other e-services: electronic applications for subsidies to farmers, SMS notifications for utility bills, GIS portal of investment locations, etc. All this is advertised on the city's website. They have shown that even a medium-sized city can keep up with technology and offer concrete benefits to citizens through the web.
- **RS Economic Development Agency (APIF)⁶⁰** – although it can be seen from the SIGMA report that not all procedures are online yet, APIF has launched a portal for registering a company online (partially functional). This is a big step considering that business registration is one of the most complex services. By integrating with the court and the Tax Administration, they worked on the principle of “one-stop shop”. Although it turned out that there is still no complete automation (it is necessary to physically submit some documents), there is still a will to implement it through a web portal.

From the above examples, several lessons of good practice can be drawn: **1)** focus on the user – services are designed to save time and walking for citizens (chatbot instead of coming to the counter, online form instead of paper); **2)** multichannel – a combination of web, mobile applications, Viber platform, which increases availability; **3)** transparency and openness – multilingualism, open data, online reports of corruption, all this builds trust; **4)** cooperation – often the best projects are the result of cooperation with international organizations or the private IT sector (e.g. GIZ, UNDP, technology partners), which suggests that institutions should be open to such assistance to accelerate innovation. It is also important to point out that the UN E-Government index also measures the component of e-Participation (citizen involvement).⁶¹

4.10. Regional comparison

A comparison of the implementation of EU Directive 2016/2102 in the Western Balkans region shows significant differences (Table 2.):

Croatia: As a member of the EU since 2013, it has implemented the Directive through national legislation with mandatory accessibility standards for all public

⁶⁰ <https://www.apif.net> [Accessed: 02.04.2025]

⁶¹ <https://capital.ba/izvjestaj-un-o-razvoju-e-uprave-bih-posljednja-u-regiji/> [Accessed: 05.05.2025]

institutions. A national monitoring system has been established that enables continuous monitoring and high compliance with the directive.

Serbia: In the process of joining the EU, it is still in the process of drafting a normative framework and does not have a comprehensive law on web accessibility. There is a need for a clearer regulation and monitoring system. Some institutions are implementing pilot projects for the implementation of accessibility.

Montenegro: As a candidate for EU membership, it is in the phase of harmonization of legislation with the EU directive as part of the negotiation process. The main challenges include limited resources and capacity for implementation, and the need for technical support.

North Macedonia: Also, a candidate for EU membership, it is preparing a legislative framework with periodic revisions in line with EU standards. More consistent implementation and addressing the shortage of specialized personnel is needed.

Table 2. A regional comparison

State	Status of implementation of EU Directive 2016/2102	Key challenges and achievements
Croatia	Implemented through national legislation; Mandatory standards for all public institutions from 2019.	Continuous monitoring and high compliance; A national monitoring system has been set up
Serbia	In the development of the normative framework, there is no comprehensive law on web accessibility	Clearer regulation and monitoring are needed; Pilot projects in a number of institutions.
Montenegro	In the phase of harmonization of legislation with the EU directive as part of the negotiation process	Limited resources and capacity for implementation; Technical support required
North Macedonia	Preparation of the legislative framework, with periodic revisions in accordance with EU standards	More consistent implementation required; Shortage of specialized staff

Source: Author, according to research results.

5. CONCLUSION

The digital maturity of websites of public institutions in Bosnia and Herzegovina is uneven – ranging from basic information portals to advanced interactive platforms. Global indices and analyses place Bosnia and Herzegovina among the laggards in e-government (96th place in the UN ranking 2022; low score according to EU eGovernment criteria)⁶², which is reflected in the limited offer of fully online

⁶²<https://www.sigmaweb.org> [Accessed: 15.04.2025]

services and poor integration between levels of government. Still, detailed research shows that positive changes are taking place beneath the surface:

- **New technologies** such as **chatbots** have found application in pioneering municipalities (Centar Sarajevo, Bijeljina, Laktaši), demonstrating how AI can bring administration closer to citizens and speed up procedures (e.g. a chatbot issues documents without waiting in line). Higher levels of government have not yet implemented chatbots on their portals, but the entities have established the basics of e-government (portals for e-services, digital registers), which gradually builds the infrastructure for more advanced services.
- **The functionalities of websites** have expanded: in addition to publishing news and laws, more and more websites offer search, online forms, case tracking, and even the possibility of submitting applications electronically. However, the level of service depends on the institution – while some municipalities provide an almost complete digital experience for the most common services, others (especially government authorities) still mostly refer the user to physical arrival. It is necessary to continue the digitization of the so-called *Life-Event services* (such as company registration, registration of a newborn, issuance of licenses) to make them available online, as currently most services remain in analog mode.
- **The technical quality** of the sites is at a satisfactory level in terms of security (they all use HTTPS) and basic optimization, but speed (by optimizing content) and mobile adaptability can be improved for those sites that have not yet done so. Institutions that have recently redesigned websites have responsive designs, which is a good practice to follow (as more and more citizens access via mobile devices).
- **The quality of the content** is generally acceptable: the information is up-to-date, relevant and available in multiple languages wherever it is expected. Transparency of information is better than before – budgets, public calls, official gazettes are published – but there is room to increase the transparency of services (through clear explanations of procedures, publication of service standards, and feedback to citizens). It is positive that some institutions structure the content according to the needs of users (e.g. sections for citizens, business, youth), which facilitates navigation and understanding.
- **Website accessibility** for people with disabilities remains an area for improvement. While some websites have options to adjust text size and contrast, most do not yet meet all accessibility standards. It is necessary to incorporate *the principles of universal design* in each new redesign – this includes clear contrasts, text descriptions for all multimedia content, the

ability to navigate with a keyboard, etc. The state could adopt guidelines or regulations on web accessibility in the public sector, which would ensure that no one is excluded from digital services.

- **Interaction with users** through digital channels is slowly becoming a standard. Institutions are present on social networks and thus have opened additional channels of communication. Although formal communication still mostly flows through the official protocol (letters, emails), informal feedback from networks and online inquiries is increasingly appreciated. The most advanced municipalities have enabled citizens to ask questions via web forms and get an answer, thus showing that they value the opinion of citizens. Through online surveys and consultations, the authorities realize that they can obtain useful inputs for decision-making. Such e-participation is still in the beginning, but promising – ultimately, digital transformation is not only the introduction of technology, but also the change of the culture of the relationship between government and society towards greater openness.

Realistically, Bosnia and Herzegovina still has a lot of work to do to catch up with the European average in e-government. However, the examples given in this research show that knowledge and innovation exist within the country, they just need to be systematically supported and expanded. The implementation of new technologies (AI, mobile platforms) in the public sector should be a mean to the ultimate goal: a more efficient, transparent and inclusive service to citizens. In this respect, websites are a mirror of the modernization of public administration. With the continuation of these positive trends, we can expect that the next evaluations will show a significant leap in the quality and use of digital services in Bosnia and Herzegovina, to the benefit of citizens and the economy.

Research based on this theoretical framework can point to specific shortcomings in terms of compliance with WCAG 2.2, but also offer concrete recommendations. Suggestions may include:

- training of officials and developers for WCAG standards,
- the adoption of the National Accessibility Act;
- periodic audits of the websites of public institutions,
- development of a national tool for automatic accessibility checks.

Such an approach contributes to the development of inclusive digital governance, which is in line with the principles of transparency, equity and efficiency in the delivery of public services.

Based on the conducted research and analysis of the literature, the following recommendations can be made for future researchers:

Longitudinal studies: It is necessary to conduct longitudinal studies that will monitor the progress of website accessibility over time, especially after the implementation of new legal frameworks and international standards. Such studies would make it possible to monitor the effectiveness of the implemented measures and identify long-term trends.

Cost-benefit analysis: It is recommended to examine in detail the cost-benefit relationship of implementing accessibility in the context of limited budgets of public institutions in developing countries. Such an analysis could help institutions prioritize investments in accessibility.

Cultural and Linguistic Adaptations: Research on cultural and linguistic barriers in multiethnic societies such as BiH, with the aim of adapting inclusive standards to local contexts. This is especially important in countries with multiple official languages and different scripts.

Comparative studies of the tools: Further studies of the effectiveness of different accessibility evaluation tools are needed, especially in the context of the specific needs of the Western Balkans. Different tools can produce different results, so it's important to identify the most suitable ones for regional needs.

Regional Comparative Analyses: Conduct in-depth comparative studies between the Western Balkan countries and EU Member States in order to identify best practices in the implementation of digital accessibility standards. Such analyses would enable the transfer of knowledge and experience between countries.

Researching the specific needs of users: Studies focused on different groups of users with disabilities in BiH, including war veterans and people with post-traumatic stress. This is specific for post-conflict societies like BiH.

Impact on democratic processes: Research on how accessibility to public institutions' websites affects the democratic participation of citizens with disabilities. Accessibility can be key to political rights and civic engagement.

Accessibility Sustainability Analysis: Longitudinal studies on how institutions maintain accessibility standards after initial implementation. It is necessary to understand the factors that contribute to the long-term sustainability of accessibility.

Research on integration with emerging technologies: Studies on how emerging technologies such as AI, chatbots, and voice assistants can improve the accessibility of public institutions' websites, especially in the context of limited resources.

User Experience Analysis: Qualitative research that directly involves users with disabilities in the evaluation of public institutions' websites, in order to gain insights into the real needs and challenges that users face.

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KVALITET WEB STRANICA JAVNIH INSTITUCIJA U BOSNI I HERCEGOVINI: IZAZOVI I PREPORUKE ZA INKLUZIVNO DIGITALNO UPRAVLJANJE

SAŽETAK

Rad istražuje digitalnu zrelost javnih institucija Bosne i Hercegovine na svim nivoima vlasti (državni, entitetski, Brčko distrikt, kantonalni i općinski) kroz komparativnu procjenu tehničkog kvaliteta, funkcionalnog i sadržajnog kvaliteta njihovih službenih web-stranica. Istraživanje obuhvata pet skupova kriterija: tehnički kvalitet, funkcionalnosti, sadržajni kvalitet, pristupačnost (usklađenost s WCAG 2.2) i interakciju s korisnicima. Metoda istraživanja kombinira kvantitativne alate – **Google Lighthouse, PageSpeed Insights, GTmetrix, SEMrush, Alexa ranking i WAVE Accessibility Tool** – s kvalitativnim pregledom strukture i upotrebljivosti stranica. Uzorak čini 15 državnih institucija, 25 entitetskih/ministarstava, Vlada Brčko distrikta, 10 kantona i 20 općina/gradova. Cilj rada je ispitati zastupljenost i nivo razvoja tehničkog, funkcionalnog i sadržajnog kvaliteta službenih portala na svim nivoima vlasti te utvrditi koje je preduvjete potrebno ispuniti za daljnji uspješan napredak digitalne uprave. Istraživanje je provedeno s namjerom da se utvrdi u kojoj mjeri su web-stranice javnih institucija u Bosni i Hercegovini prilagođene digitalnom vremenu: koriste li napredne funkcionalnosti poput online obrazaca, chatbotova, sistema obavještanja kao i način na koji ostvaruju komunikaciju sa građanima. Sve analize su provedene elektronskim putem. Doprinos rada proizlaze iz činjenice da istraživanje obuhvata zemlju u razvoju, gdje su budžeti i digitalni kapaciteti niži nego u razvijenim državama, što utječe na rezultate pristupačnosti i naprednih funkcija.

Ključne riječi: *Digitalna zrelost, e- Vlada, Bosna i Hercegovina, web standardi, chatbot.*

JEL: M37