DOI: 10.24193/tras.SI2025.5
Published First Online: 12/16/2025

PREPARING FOR SMART CITIES IN MONTENEGRO – THE STATE OF DIGITAL INCLUSION

Ivan JEKNIĆ
Sanja GRBOVIĆ
Dražen CEROVIĆ
Zoran KEKOVIĆ

Ivan JEKNIĆ (corresponding author)
Teaching Associate, PhD, Faculty of Political Sciences,
University of Montenegro, Podgorica, Montenegro
Tel.: 0038-267-582.900
E-mail: ivan.jeknic@gmail.com

Sanja GRBOVIĆ
Teaching Associate, PhD, Faculty of Law,
University of Montenegro, Podgorica, Montenegro
E-mail: sanjag@ucg.ac.me

Dražen CEROVIĆ
Full Professor, PhD, Faculty of Law,
University of Montenegro, Podgorica, Montenegro
E-mail: drazenc@ucg.ac.me

Zoran KEKOVIĆ
Full Professor, PhD, Faculty of Security Studies,
University of Belgrade, Belgrade, Serbia
E-mail: zorankekovic@yahoo.com

Abstract

The authors explore the state of digital inclusion and their various aspects in Montenegro, as one of the basic prerequisites for the expansion and growth of e-Government, with the aim of assessing its overall quality for future smart city development. This is done by analyzing the basic strategic framework of e-Government, as well as relevant parts of the most recent and most extensive public opinion survey on citizen satisfaction with e-Government in Montenegro, conducted as part of the activities established by the strategic framework. A better understanding of the current levels of digital inclusion in Montenegro allows for better-informed decision-making on the viability and strategic course of future development of smart cities in Montenegro, and on the measures and activities needed for their improvement.

Keywords: smart city, digital inclusion, citizen participation, e-Government, electronic services, local government, Montenegro.

Transylvanian Review of Administrative Sciences,
Special Issue 2025, pp. 86–101

1. Introduction

The concept of the smart city has emerged as a multidimensional and evolving framework designed to enhance urban sustainability, environmental responsibility, and social inclusivity through the integration of advanced digital technologies (Shamsuzzoha *et al.*, 2021; Kolotouchkina, Ripoll González and Belabas, 2024). Across the world, governments have adopted smart city strategies to meet citizens' needs and to promote quality of life, administrative efficiency, and social equity while fostering sustainable development (Singh *et al.*, 2022). By applying data analytics, digital infrastructure, and intelligent systems, smart cities aim to improve urban performance, optimize resource use, and strengthen resilience to local and global challenges (Tekin and Dikmen, 2024; Alhassan and Adam, 2021). Many leading cities, including Barcelona, Amsterdam, Copenhagen, Seoul, and Helsinki, have already introduced comprehensive smart city frameworks that demonstrate the transformative potential of digital innovation in urban governance.

Central to this transformation is the role of governance itself, particularly how public institutions use technology to manage urban systems, deliver services, and interact with citizens. In this respect, electronic governance (e-governance) emerges as a key operational dimension of the smart city paradigm, representing a fundamental, though distinct, component. While e-Government typically refers to the use of electronic and digital technologies to deliver public services, improve internal administrative efficiency, and facilitate communication between authorities and citizens (Ubaldi, 2013), e-governance extends this concept further. It encompasses a systemic transformation of governance processes and institutional arrangements through the strategic application of information and communication technologies (ICTs) at all levels of government (Mergel, Edelmann and Haug, 2019). The implementation of e-Government initiatives at the municipal level often depends on overarching national policies, digital infrastructure, and citizens' digital competencies. However, in some contexts, local authorities pursuing smart city development have surpassed national standards by adopting more comprehensive digital systems and encouraging participatory digital governance (European Commission, 2025; Makkonen and Inkinen, 2024, pp. 2–3; Bedeković and Grubišić, 2024). Despite numerous frameworks for evaluating the performance of smart cities and e-governance systems, no universal assessment model has yet been established (Toh, 2022).

The main goal of this paper is to assess the current level of digital inclusion in Montenegro and evaluate whether existing digital capacities are sufficient to support the effective implementation of e-Government services and, consequently, the development of smart cities. The authors argue that current levels of digital inclusion remain inadequate for supporting the smart-city concept; however, with well-designed administrative measures and targeted activities, outlined in the following sections, significant improvements are achievable.

After this introduction, the paper provides a theoretical overview of digital inclusion, e-Government, and smart cities, followed by a description of the methodology and data

sources. The authors then examine Montenegro's strategic framework for digital inclusion and smart city development and its effectiveness over the years. After that, the paper presents and analyzes empirical findings from public opinion surveys and population census results (secondary data analysis). These findings indicate persistent barriers, especially digital literacy levels, which limit citizens' ability to access and effectively use e-Government services, and in turn hinder smart city expansion in Montenegro.

The paper concludes that universal access to e-Government services cannot be achieved without sustained efforts to improve digital inclusion. Smart city development must therefore proceed in parallel with measures that support digital inclusion. To that end, the authors provide recommendations for a more effective strategic framework for e-Government, in order to significantly improve digital inclusion levels and smart city prospects.

2. Theoretical overview

An increasingly critical, yet insufficiently explored dimension of smart governance is digital inclusion. Digital inclusion refers to equitable and secure access to ICTs and online public services, as well as the necessary skills and literacy to use them effectively, regardless of citizens' age, socioeconomic status, education level, disability or geographical location. Without inclusive access, a smart city cannot fulfil its fundamental purpose. Exclusion from digital participation has been described as a new form of social inequality, comparable in its implications to historical barriers such as limited access to education or employment (Keković and Ninković, 2025; Urs *et al.*, 2023; Hosu and Hosu, 2019).

The concept of the inclusive smart city (ISC) expands upon the smart city paradigm by highlighting the need to embed principles of fairness, accessibility, and citizen participation within digital urban transformation. De Oliveira Neto and Kofuji describe the ISC as a system capable of recognizing and digitally linking physical environments and everyday objects, thus transforming real-world data into usable digital resources (De Oliveira Neto and Kofuji, 2016). Roy emphasizes that inclusivity in this context requires a democratic orientation, one that actively connects digital infrastructures with marginalized populations to enhance their access to work, education, healthcare, and markets while strengthening community resilience (Roy, 2016). Similarly, Lee and others contend that the inclusive smart city must be grounded in the values of equality and livability, ensuring that technological progress translates into social well-being (Lee, Woods and Kong, 2020). Lepore, Testi and Pasher (2023) propose that the development of ISCs should be supported and organized through a quadruple helix framework, which integrates collaboration among government institutions, academia, industry, and citizens. Building on this, Kummitha argues for participatory and citizen-led interventions that promote communication and cooperation between these actors (Kummitha, 2019). Taken together, these perspectives conceptualize the inclusive smart city as a collaborative and equitable model in which technological innovation is directed toward improving the lives of all members of society.

To advance digital inclusion, governments must address both social and technological barriers, ranging from low digital literacy to accessibility limitations and linguistic diversity, to ensure that all citizens can participate in and benefit from e-governance systems (Makkonen and Inkinen, 2024, pp. 4-8; Urs *et al.*, 2023; Adam and Alhassan, 2021; Hosu and Hosu, 2019). A city cannot be truly 'smart' if substantial parts of its population are digitally excluded.

While digital inclusion and smart cities have been common topics of scientific research, this paper aims to discuss and expand upon digital inclusion in the early stages of smart city development in the case of Montenegro. In this context, Montenegro presents a relevant case for examining the evolving landscape of digital transformation at the local level as part of the broader process of creating future smart cities, due to relatively low levels e-Government development. Although awareness of the significance of digital governance has grown, implementation remains fragmented and uneven. The country's progress toward smart city development will depend largely on how effectively e-governance frameworks can translate strategic objectives into inclusive and participatory digital practices.

3. Methodology

Given the theoretical background, the research questions addressed in this paper are as follows:

RQ1: What are the current levels of digital inclusion in Montenegro?

RQ2: To what extent do the current levels of digital inclusion in Montenegro support the effective implementation of e-Government services, and by extension, smart cities?

This paper argues that the existing level of digital inclusion related to e-Government services in Montenegro is currently insufficient to support the effective implementation of the smart city concept. However, with the introduction and planning of appropriate administrative measures and activities, outlined and discussed in the paper, there could be significant improvements in digital inclusion, allowing for the successful development of smart cities in Montenegro.

The research is based on a quantitative and qualitative analytical approach that draws upon two complementary sources: (1) the strategic documents guiding national digital transformation, and (2) relevant empirical data from the most recent public opinion survey on citizens' satisfaction with e-Government services (published in May 2024), including selected census data from the latest population census of Montenegro (related to digital literacy).

The strategic framework encompasses four national strategies that define the priorities and long-term objectives of digital transformation and e-Government in Montenegro. These documents provide the context for assessing the alignment between national policies and digital inclusion.

The public opinion survey introduces an empirical dimension to the analysis by capturing citizens' experiences, levels of access, and satisfaction with e-Government services.

Although the authors did not conduct the survey, its findings are used due to the comprehensiveness and representativeness of its sample, comprising over 1,000 participants from all age groups, economic backgrounds, and regions of Montenegro. The data remains relevant and valid in 2025, as the survey was conducted within the current strategic period. No new strategic documents have been adopted since then, and the legal framework has undergone minimal change. The survey is also the latest part in a series of surveys carried out over the years with the same sample size and methodology, thus allowing for a comparative overview of data. For the purposes of this study, only those survey results directly related to digital inclusion in e-Government were selected for analysis (more details in Section 4).

By combining these strategic, statistical, and empirical dimensions, the methodology ensures that the research is strategically informed, empirically grounded, socially responsive, and supported by reliable evidence.

4. The strategic framework of Montenegro for digital inclusion and smart cities

In determining the state of digital inclusion in Montenegro, it is essential to first analyze the overall strategic framework of e-Government development. In Montenegro, the strategic framework for the development of e-Government at the local level consists of several policy documents currently in the process of implementation for a strategic period of 4 to 5 years. These include strategies and other related documents, such as annual action plans and reports. The primary policy documents for e-Government and local government in Montenegro are the Strategy of the Digital Transformation of Montenegro for 2022–2026 (Government of Montenegro, 2021a), the Strategy of Public Administration Reform for 2022–2026 (Government of Montenegro, 2021b), and the Strategy of Regional Development of Montenegro for 2023–2027 (focused on local government, see: Government of Montenegro, 2023). These three documents make up the base strategic framework for the development and improvement of e-Government at the local level.

Where do smart cities factor in the strategic framework? Unfortunately, there are no specific strategic goals in these documents regarding the development of smart cities. Smart cities are mentioned only nominally in the Strategy of the Digital Transformation of Montenegro (Government of Montenegro, 2021a, pp. 71, 85), while most operative goals and measures aimed at the local level in these documents are oriented towards the improvement of e-services (increasing the variety of services, accessibility, trust, citizen participation, etc.) and sustainable regional development (better infrastructure, increasing economic growth in economically weaker municipalities, etc. (Interoperable Europe, 2024; Shamsuzzoha *et al.*, 2021; Mergel, Edelmann and Haug, 2019a). However, by their very nature, these measures and goals are directly contributing to the future development of smart cities in Montenegro.

The strategic framework of Montenegro covers a variety of e-Government and local government problems and goals. This includes digital inclusion at both the strategic and operational levels. The concept of digital inclusion is established primarily in the Strategy of Digital Transformation, while nominally mentioned in other strategies (similarly to smart cities), and many goals, objectives, measures, and activities defined and determined by these documents are aimed at improving certain aspects of digital inclusion. Within the strategic framework, digital inclusion can be divided into four segments: accessibility, usage, citizen participation, and digital literacy (Government of Montenegro, 2021a; Government of Montenegro, 2021b; Government of Montenegro, 2023).

In analyzing the aforementioned strategies, it is important to highlight the challenges to digital inclusion identified during their drafting, in order to gain a clearer understanding of the current state of e-Government and determine the best course and measures for the improvement of digital inclusion. One of the primary challenges is the insufficient availability of e-services, as most of these services still cannot be fully delivered electronically. The number of e-service delivered remains extremely low compared to the total number of public services used by citizens, which can be attributed to limited promotion of the digitalization efforts at the national and local level, and to issues such as low levels of digital literacy among the Montenegrin population and, consequently, digital non-inclusiveness (UNDESA, 2024; Government of Montenegro, 2023; Government of Montenegro, 2021b; Government of Montenegro, 2021a; Shamsuzzoha *et al*., 2021; Urs *et al.*, 2023).

In comparison to the previous results from reports on the realization of these strategic documents in earlier strategic periods (before 2022), the same or similar problems have been observed in their implementation: lack of funds, low accessibility and citizen participation, unwillingness or lack of knowledge of public servants, delays in implementation, etc. (Government of Montenegro, 2021b, p. 26; Ministry of Public Administration, Digital Society and Media of Montenegro, 2021, pp. 3–7; Ministry of Public Administration of Montenegro, 2020; Cerović, Gasmi and Prlja, 2018, pp. 31–38). It remains to be seen how many of these strategic and operative goals will be completed at the end of the strategic period (2022-2026). In the past, there have been incremental improvements at the end of each strategic period, but again, the overall results remain low in comparison to EU standards (UNDESA, 2024; ReSPA, 2023).

When discussing the levels of digital development, it is necessary to consider the results of Montenegro compared to other countries. According to the UN eGovernment Survey, in 2024 Montenegro ranked 81st on the global e-Government development index (out of a total of 193 countries), marking a drop of 10 positions compared to 2022, when it held the 71st place, and a decline of 36 positions compared to 2014, when it ranked 45th (UN E-Government Knowledgebase, 2024). Regarding the e-Participation Index, which measures the use of electronic services through which the public administration provides information to citizens, enables interaction with stakeholders, and facilitates participation in decision-making and policy formulation, Montenegro's status had also dropped

significantly compared to the previous decade. The country dropped from the 17th place in 2016 to the 85th place in 2024 (UN E-Government Knowledgebase, 2024; UNDESA, 2024). Overall, this puts Montenegrin citizens at a disadvantage compared to those of the EU in terms of access to e-services (among other problems of administrative reform (European Commission, 2024; Cerović, Gasmi and Prlja, 2018).

There is no systematic approach in practice towards improving electronic services or digital inclusion in local government. Advancements in e-Government at the municipal level so far have been piecemeal and entirely dependent on the cooperation and political will of local governments, and they are more often than not unwilling or uninterested in the strengthening of digital inclusion. In fact, most e-Government measures aimed at the local level are focused on improving the digital infrastructures of municipalities, rather than digital inclusion (Ministry of Public Administration of Montenegro, 2020, pp. 4, 11; Ministry of Public Administration of Montenegro, 2025).

All things considered, there is insufficient strategic planning for the effective implementation of smart cities. It is recommended that the next series of strategic documents (for 2026 and onwards) introduce this concept as a strategic goal for local municipalities, with a more detailed approach to digital inclusion as a distinct strategic and operative goal in public policy documents on regional development (local government), and not just on digital transformation. This should be done in close cooperation with local authorities, determining the best outcomes for the local communities (operative and strategic goals, measures, and activities) and their specific needs and capabilities (financial and other). As active participants, local governments will be more engaged and willing to work on the realization of smart cities and digital inclusion as long-term goals. This will set up a framework to allow local governments to begin developing this concept in their administrative activities (e-services), while also increasing accessibility and use of e-services, as well as trust and participation of the local public, as was done in certain parts of China, the USA, UK, and Romania (Tekin and Dikmen, 2024, pp. 2–25; Kolotouchkina, Ripoll González and Belabas, 2024, pp. 3362–3365; Urs *et al.*, 2023, pp. 159–164; Liu *et al.*, 2020; Hosu and Hosu, 2019).

5. The 2024 Survey results and discussion

In order to determine the levels of digital inclusion in Montenegro, it is also necessary to acquire data and review the experiences and opinions of the end-users of e-services, the citizens. To that end, a Survey on Citizens' Satisfaction with Existing and Identification of Needs for New Electronic Services in Montenegro (the Survey), targeting the general population, was carried out as part of the planned activities of the current strategic framework. Similar public opinion surveys were conducted in 2019, 2021, and 2022, also as planned activities envisaged by strategic documents. The 2024 Survey represents the third and most recent cycle of such research, conducted according to the same methodology as the 2021

and 2022 surveys, thereby enabling a comparative analysis of their results, in order to assess progress over time. All three surveys were conducted by CEED Consulting LLC, a research agency based in Podgorica, Montenegro, in cooperation with the UNDP and the Montenegrin Ministry of Public Administration (UNDP, 2024, pp. 1–4; Government of Montenegro, 2021a, pp. 37, 98, 127). The authors did not participate in data gathering and processing for the survey but are using the collected data (in conjunction with other relevant data, such as those from the latest population census) to determine and examine the levels of digital inclusion for the purposes of this paper (secondary data analysis).

The primary aim of the latest Survey was to assess citizens' attitudes, experiences, and preferences related to the use of existing electronic public services offered by public administration bodies (including both state institutions and local self-governance units), and to generate evidence-based recommendations for their improvement. The survey also aimed to determine the population's level of digital literacy and competence, their habits and attitudes toward the use of e-services, and the factors influencing their choice of service access methods. The findings of the survey, complemented by a comparative analysis with data from the two preceding survey cycles, provide valuable inputs for researchers and policymakers (UNDP, 2024, p. 4). These results support the formulation and refinement of action plans aimed at advancing digital inclusion, increasing usage of e-services, and guiding the development and introduction of new e-Government services and concepts (such as smart cities).

For carrying out the survey, the research agency engaged interviewers working in the field within their local communities. In addition to the interviewers' long-standing experience, individual and small-group trainings were conducted to support the implementation of the study. During these trainings, interviewers received detailed information on the survey's objectives, target groups to be questioned, structure and content of the questionnaire, as well as fieldwork procedures. Interviewer performance and the quality of completed questionnaires were monitored continuously during data collection as well as during data processing.

Fieldwork was conducted during March and April 2024. The planned sample size was 1,040 respondents. However, the survey questions were ultimately answered by a total of 1,081 respondents. The target groups were adults (men and women) aged 18 and older residing in urban and rural areas across all three regions and all 25 municipalities of Montenegro. Additionally, the Survey included persons of different age groups, educational backgrounds, and levels of monthly income. Socio-demographic characteristics were collected to ensure that the sample represented all relevant categories of Montenegrin citizens, thereby better reflecting the general population (UNDP, 2024).

The survey was carried out using computer-assisted telephone interviewing (the CATI method), while 30% of the interviews were conducted face-to-face. Data processing, analysis, and all necessary logical consistency checks were performed using the Statistical Package for the Social Sciences (SPSS). The margin of error at a 95%

confidence level, assuming a 50% incidence rate, was 2.97%. In accordance with the survey objectives, the research agency's analytical team carried out data analyses. Given the sample design and the methodology applied, the findings presented in this report can be considered valid for informing policymaking related to the development of electronic public services (UNDP, 2024, p. 4).

Only the survey results from questions relating to different aspects of digital inclusion are analyzed and discussed. These are questions regarding citizens' knowledge of using a computer and the internet, familiarity and awareness of electronic public services (relating to digital literacy usage and accessibility of e-services), preferences in using e-services and reasons for not using these services (relating to usage and accessibility), and use of e-participation internet portals (relating to electronic participation). Additionally, census data from the latest Population Census (from 2023) are also used to better ascertain the levels of digital literacy in Montenegro.

According to the survey results, around 47.1% of respondents reported having an intermediate level of knowledge in using the internet (an increase compared to the 2022 survey results). About 17.2% considered themselves highly knowledgeable (a decrease from 20.5% in 2022), while 30.8% rated their skills as basic, and 4.9% said they had no knowledge at all (an improvement compared to 9.4% from 2022). It is important to note that digital literacy has been shown to be closely related to age, monthly income, and educational background – higher levels of digital literacy and use of e-services were found in younger groups with higher income and education levels. The largest groups with basic or no knowledge of internet use were respondents over the age of 65 who have only lower incomes or primary education. Similar findings were recorded in the 2021 and 2022 surveys (UNDP, 2024, pp. 6–7; Elena-Bucea *et al.*, 2021). For comparison, in Denmark, which is the highest-rated country in the world according to the 2024 UN E-Government Index (UNDESA, 2024, p. 41), about 39% of citizens rated themselves as highly skilled in internet use ('digital skills'), according to a 2023 study (Statistics Denmark, 2024).

For greater accuracy of the survey results regarding digital literacy, it is essential to review information from the most recent Population Census conducted in 2023 in Montenegro (the Census). According to the Census, there are 511,189 individuals aged 15 and older living in Montenegro. Of that number, just under half, specifically 49.84%, are computer literate, while 37.03% possess partial knowledge of computer use. A significant share (12.90%) reports having no computer skills at all, and only 0.23% did not respond to this question (Monstat, 2023).

Age structure significantly influences the level of digital literacy. Among young people aged 15 to 29, around 80% are computer literate. However, with increasing age, digital literacy levels decline rapidly. In the 50–59 age group, fewer than 37% of individuals are computer literate, while among those aged 60–69, the percentage drops to only 22.82%. The situation is particularly concerning among the oldest citizens: digital literacy among individuals aged 70 and above is just 9.69% (Monstat, 2023). Overall, there is a strong

correlation between age and digital literacy: younger generations are nearly fully digitally included, while older and oldest generations remain largely excluded. Although the digital transformation of cities is often seen as a technical challenge, the data suggest that it is fundamentally a social issue reflecting existing inequalities (Kolotouchkina, Ripoll González and Belabas, 2024, pp. 3359–3361).

These findings confirm the persistently low level of digital literacy in Montenegro, which continues to represent a key challenge for developing e-Government. Addressing the issue of low digital literacy at the population level requires a systematic approach, combining short-term and long-term measures. Short-term measures include training programs and public education initiatives to facilitate access to and use of electronic services. Long-term measures involve revising primary and secondary school programs to better integrate digital literacy as an important part of education.

Returning to the survey results, about 57.9% of respondents stated that they were either fully (5.7%) or mostly (52.2%) familiar with electronic services, which is almost the same as in 2022, when this share was 58%. However, compared to 2022, there has been a slight reduction in those fully familiar (8.1% fully and 49.9% mostly familiar). Notably, almost a third of respondents (32.2%) said they had heard of electronic services, but knew almost nothing about them (UNDP, 2024, pp. 16, 44). This is a matter of public awareness of e-services, which is closely linked to digital inclusion, whereby increasing public awareness of e-services also increases their accessibility and citizen participation. Addressing this problem requires wide-ranging promotional campaigns aimed at the general population and marginalized social groups.

Respondents were also asked why they had not used certain electronic services. The main reasons were no need (50%), lack of awareness (28.6%), preference for in-person interaction (23.6%), insufficient technical knowledge (21%), lack of trust in service delivery (19.3%), and unsuccessful attempts to use them (10.7%). In the 2022 survey, the figures were higher for those reporting no need (55.9%), while other reasons were somewhat lower: lack of awareness (23.9%), preference for in-person contact (20.7%), insufficient technical knowledge (19%), lack of trust (15.1%), and failed attempts (7.5%). In 2024, almost all percentages have increased except for the share of citizens reporting no need for e-services. This suggests a decline in knowledge and awareness, as well as a drop in trust in the effectiveness and efficiency of electronic public services. In addition, a large share of respondents (around 25,3%) believe their request to an administrative authority will be resolved faster if delivered in person (although this number has greatly improved since 2022, when the same belief was shared by 35,3% respondents (UNDP, 2024, pp. 17, 32, 44–45).

Evidently, a significant number of citizens prefer to use in-person or paper-based services, which is another barrier to digital inclusion and e-Government. This can be due to a lack of knowledge (awareness), a lack of trust in the effectiveness of administrative authorities, or difficulties navigating e-service platforms. These results point to systemic

issues within the public administration itself. Therefore, it is essential to take measures to improve the efficiency and reliability of electronic service delivery to prevent a further decline in both service quality and public trust.

Most e-services in Montenegro are available via internet portals, such as the E-Government portal and others: eGovernment, eHealth, eTaxes, ePayments, eEducation, eDocuments, etc. (see: https://euprava.gov.me/, http://dokumenta.me/, and http://biraci.me/). One of the most important portals relating to digital inclusion is the e-Participation portal (https://euprava.gov.me/eparticipacija) (a platform for citizens to take part in public debates for the adoption and drafting of regulations and public policy documents in Montenegro). When it comes to the e-Participation portal, more than two-thirds of respondents (64.9%) stated that they are not familiar with the portal or the opportunities it offers. Among those who are aware of the portal, most belong to the younger population (18–24 years old) and citizens between the ages of 44 and 64. Furthermore, about 21.1% of respondents reported that they rarely, occasionally, or regularly use this portal, while around 14% said they are aware of it but never use it. The results are similar to those from 2022. In 2024, only 1.2% of respondents said they use the portal regularly (compared to 4% in 2022 (UNDP, 2024, pp. 37–38, 45). From a digital inclusion perspective, these results highlight a serious lack of citizen engagement in decision-making and administrative processes in Montenegro. This is a problem that urgently requires targeted measures to resolve (publicity, education, improved user-friendliness of the portals, etc.), as citizen participation is considered one of the key factors of a successful smart city (Tekin and Dikmen, 2024, pp. 2–5; Kolotouchkina, Ripoll González and Belabas, 2024).

In general, the survey results can be reliably linked to certain shortcomings in the implementation of e-Government regulations and strategic objectives, as explained previously in this paper. These include low levels of digital literacy among citizens and users of e-Government services, a lack of interest and awareness of existing e-services, as well as low trust in e-services compared to paper-based public services. Moreover, a significant number of citizens even believe their requests will be processed faster if submitted in person.

Compared to leading countries such as Germany and Denmark (Statistics Denmark, 2024), Montenegro's results in the field of e-Government are significantly weaker. On the other hand, relative to earlier surveys, the 2024 results do show progress in certain areas. However, citizens in Montenegro face difficulties in accessing information about electronic services, or prefer traditional public services, due to a lack of trust in the quality of e-services or limited digital skills. Additionally, many citizens are simply unaware of their availability (such as the e-Participation portal). Therefore, future measures and activities of state and local institutions should focus on improving public awareness of available e-services, simplifying and facilitating their use for all social groups, raising citizens' digital literacy, strengthening trust, and increasing the efficiency, effectiveness, availability, and diversity of electronic public services. Without significant improvements in these areas, it will be difficult to effectively build the smart city concept in Montenegro.

On the other hand, it could be argued that comparisons with Denmark and Germany may not be suitable or fair, especially given Denmark's current position as the world leader in e-Government. Therefore, it would be reasonable to also evaluate Montenegro in relation to other Western Balkan countries, either already in the EU (Croatia) or working on EU membership (Serbia, Albania, and others). This can be done best using the UN e-Participation Index, which allows for comparisons of e-participation levels with all Western Balkan countries (and the world) for the same time period (2024). Unfortunately, Montenegro ranks the lowest among Western Balkan countries when it comes to e-participation. Within the e-Participation Index, Croatia ranks 15, Serbia ranks 19, Albania ranks 49, Bosnia and Herzegovina ranks 78 and North Macedonia ranks 76, while Montenegro ranks 85 (UNDESA, 2024; UN e-Government Knowledgebase, 2024; ReSPA, 2023).

Although digital inclusion and e-Government require significant financial and administrative resources, local governments may view smart city initiatives as too costly, demanding, or simply unnecessary given current levels of digital inclusion. It could be argued that smart city development is unnecessary in Montenegro, a sparsely populated country with mostly small towns and only one city with more than 70,000 inhabitants (Podgorica, over 179,000). It may also be claimed that e-Government services are redundant in municipalities with fewer than 10,000 residents, where paper-based services still meet local needs (or are preferred). However, most Montenegrins live in urban areas well suited for smart city solutions. In fact, smart city initiatives can be easier and cheaper to implement in low-density environments, such as small municipalities, delivering strong results in relatively short time frames. Even if short-term costs exceed immediate benefits, long-term gains are likely to outweigh them. The financial and operational advantages of e-Government are well established in both theory and practice.

However, census and survey data reveal significant challenges that directly affect access to e-Government services in Montenegro, first among them being digital (il)literacy. While digital technologies can formally enable faster, more efficient, and more transparent access to public services, their actual availability, usability, and even reliability remain limited for a large portion of the population. This means that the digitalization of public administration in Montenegro, if not implemented with care and guided by the principles of digital equity, may unintentionally further marginalize already vulnerable groups: the elderly, rural populations, and those with lower levels of education.

6. Conclusion

Based on results from previous strategic periods and empirical data (survey and census numbers and findings), the implementation of current strategic documents will most likely yield only small incremental improvements for digital inclusion, insufficient for the development of advanced e-Government concepts such as smart cities. Furthermore, there is no focus on digital inclusion at the local level. The strategic framework suffers

from a lack of effective application and a systematic approach to smart cities and digital inclusion. At the end of each past strategic period, implementation of operative measures shows good results and improvements in many areas of e-Government when compared to previous periods. However, the overall numbers of e-Government development remain low (which may indicate that the strategic framework also suffers from low expectations). Additionally, similar operational measures and activities have resulted in little overall effect and progress in previous strategic periods. This is because the government has not taken into account the state and needs of the population at the local and national level, while local government participation has been mostly absent during the drafting of strategic documents, except for the Strategy of regional development. It is possible to assume the same outcomes will occur at the end of the current strategic period as well, given that the pattern so far remains unchanged.

Given these findings and the purpose of this paper, it is unlikely that an effective and accessible smart city can be built without resolving existing low levels of digital inclusion. In fact, development of e-Government systems at the local level in areas with low digital literacy (or other aspects of digital inclusion) could be difficult, or even outright ill-advised. Therefore, this requires major changes to public policy and its implementation in the strategic framework of Montenegro for 2026 and onward. Firstly, it is necessary to introduce digital inclusion and smart cities as strategic goals in future public policy documents on local government (strategy for regional development), and not just e-services (strategy of digital transformation), as previously discussed. Secondly, local authorities should take steps to determine the viability of e-Government services in relation to digital inclusion in their local municipality, identify challenges, and ascertain measures to overcome them. Thirdly, all of this should be done in close consultation and cooperation with the local public (citizens, the business community, and civil sector), as was done in Denmark (UNDESA, 2024; Kolotouchkina, Ripoll González and Belabas, 2024).

Considering all these factors, it can be concluded that universal access to e-Government services cannot be achieved without systematic support for the digital inclusion and empowerment of all population groups. Smart cities cannot truly be 'smart for all' while a significant segment of the population remains excluded due to a lack of basic digital competencies or knowledge about the availability of e-services. Therefore, the development of e-Government (and smart cities) must be accompanied by parallel efforts to improve digital literacy, accessibility, trust, and knowledge of e-services. All these measures, activities, and efforts should be determined, planned, carried out, and monitored within a strategic framework established with the participation of local communities (citizens and local authorities). Should these measures prove insufficiently effective, the strategic framework must be reassessed and adapted to ensure more substantial and impactful outcomes.

References:

1. Adam, I.O. and Alhassan, M.D., 'Bridging the Global Digital Divide through Digital Inclusion: The Role of ICT Access and ICT Use', 2021, *Transforming Government: People, Process and Policy*, vol. 15, no. 4, pp. 580–596, DOI: 10.1108/TG-06-2020-0114.
2. Alhassan, M.D. and Adam, I.O., 'The Effects of Digital Inclusion and ICT Access on the Quality of Life: A Global Perspective', 2021, *Technology in Society*, vol. 64, art. no. 101511, DOI: 10.1016/j.techsoc.2020.101511.
3. Bedeković, M. and Grubišić, K., 'Digitalizacija javne uprave i njena primjena u odabranim područjima' [Digitalization of Public Administration and Its Implementation], 2024, *Zagrebačka pravna revija*, vol. 13, no. 1.
4. Cerović, D., Gasmi G. and Prlja, D. 'The Thorny Road to Public Administration Reform in Montenegro', 2018, *Transylvanian Review of Administrative Sciences*, Special Issue, pp. 27–43, DOI: 10.24193/tras.SI2018.2.
5. De Oliveira Neto, J.S. and Kofuji, S.T., 'Inclusive Smart City: An Exploratory Study', in *Universal Access in Human-Computer Interaction, Proceedings of the Interaction Techniques and Environments: 10th International Conference, UAHCI 2016,* Held as Part of HCI International 2016, Toronto, ON, Canada, July 17–22, 2016, Proceedings, Part II, 10, Springer International Publishing: Berlin/Heidelberg, Germany, 2016, pp. 456–465.
6. Elena-Bucea, A., Cruz-Jesus, F., Oliveira, T. and Coelho, P.S., 'Assessing the Role of Age, Education, Gender and Income on the Digital Divide: Evidence for the European Union', 2021, *Information System Frontiers*, vol. 23, pp. 1007–1021, DOI: 10.1007/s10796-020-10012-9.
7. European Commission, 'Montenegro 2024 Report', 2024, [Online] available at https://enlargement.ec.europa.eu/montenegro-report-2024_en, accessed on July 21, 2025.
8. European Commission, 'Smart Cities and Communities', 2025, [Online] available at https://digital-strategy.ec.europa.eu/en/policies/smart-cities-and-communities, accessed September 5, 2025.
9. Government of Montenegro, 'Strategy of Public Administration Reform 2022-2026', 2021b, [Online] available at https://www.gov.me/dokumenta/823842f4-2ffd-4a0d-936e-c1b00c669115, accessed on August 20, 2025.
10. Government of Montenegro, 'Strategy of the Digital Transformation of Montenegro 2022-2026', 2021a, [Online] available at https://www.zzzcg.me/wp-content/uploads/2022/02/strategija-digitalne-transformacije-sa-ap-1.pdf, accessed on August 20, 2025.
11. Government of Montenegro, 'Strategy of the Regional Development of Montenegro for the Period of 2023-2027', 2023, [Online] available at https://wapi.gov.me/download-preview/4b0f63fd-e49d-4f0c-9f09-99426dc8d51b?version=1.0, accessed on August 20, 2025.
12. Hosu, R. and Hosu, I., "Smart' in Between People and the City', 2019, *Transylvanian Review of Administrative Sciences*, Special Issue, pp. 5–20, DOI: 10.24193/tras.SI2019.1.
13. Interoperable Europe, 'Montenegro, 2024 Digital Public Administration Factsheet, Supporting Document', 2024, [Online] available at https://interoperable-europe.ec.europa.eu/sites/default/files/inline-files/NIFO_2024%20Supporting%20Document_Montenegro_vFinal.pdf, accessed on August 24, 2025.
14. Keković, Z. and Ninković, V., *Zaštita kritične infrastructure, sistemski pristup* [Critical Infrastructure Protection, Systemic Approach], Belgrade: Centar za analizu rizika i upravljanje krizama [Center for Risk Analysis and Crisis Management], 2025.

15. Kolotouchkina, O., Ripoll González, L. and Belabas, W., 'Smart Cities, Digital Inequalities, and the Challenge of Inclusion', 2024, *Smart Cities*, vol. 7, no. 6, pp. 3355–3370, DOI: 10.3390/smartcities7060130.
16. Kummitha, R.K.R., 'What Do Our Cities Need to Become Inclusive Smart Cities', 2019, *EPW Engage*, vol. 54, no. 13, [Online] available at: https://www.epw.in/engage/article/what-do-our-cities-need-become-inclusive-smart-cities, accessed on July 21, 2025.
17. Lee, J.Y., Woods, O. and Kong, L., 'Towards More Inclusive Smart Cities: Reconciling the Divergent Realities of Data and Discourse at the Margins', 2020, *Geography Compass*, vol. 14, no. 9, e12504, DOI: 10.1111/gec3.12504.
18. Lepore, D., Testi, N. and Pasher, E., 'Building Inclusive Smart Cities through Innovation Intermediaries', 2023 *Sustainability*, vol. 15, no. 5, art. no. 4024, DOI: 10.3390/su15054024.
19. Liu, Z., de Jong, M., Li, F., Brand, N., Hertogh, M. and Dong, L., 'Towards Developing a New Model for Inclusive Cities in China – The Case of Xiong'an New Area', 2020, *Sustainability*, vol. 12, no. 15, art. no. 6195, DOI: 10.3390/su12156195.
20. Makkonen, T. and Inkinen, T., 'Inclusive Smart Cities? Technology-driven Urban Development and Disabilities', 2024, *Cities*, vol. 154, art. no. 105334, DOI: 10.1016/j.cities.2024.105334.
21. Mergel, I., Edelmann, N. and Haug, N., 'Defining Digital Transformation: Results from Expert Interviews', 2019, *Government Information Quarterly*, vol. 36, no. 4, art. no. 101385, DOI: 10.1016/j.giq.2019.06.002
22. Ministry of Public Administration of Montenegro, 'Analysis of the State of Electronic Services with Proposed Measures for Their Improvement', Government of Montenegro, 2020, [Online] available at https://www.gov.me/dokumenta/e965f2a4-7eb5-452f-b81d-813d0c56ca43, accessed on July 10, 2025.
23. Ministry of Public Administration of Montenegro, 'Dukaj - Digitalizujemo lokalne samouprave u skladu sa savremenim standardima' [Dukaj - We Are Digitizing Local Governments in Accordance with Modern Standards], 2025, Press Release, [Online] available at https://www.gov.me/clanak/dukaj-digitalizujemo-lokalne-samouprave-u-skladu-sa-savremenim-standardima, accessed on August 25, 2025.
24. Ministry of Public Administration, Digital Society and Media of Montenegro, 'Final Report on the Implementation of the Information Society Development Strategy 2016–2020', 2021, [Online] available at https://www.gov.me/dokumenta/8d416f35-814a-4ffc-b5c0-0b2365ca8346, accessed on July 15, 2025.
25. Monstat, 'The 2023 Census of Population, Households, and Dwellings. Population by Computer Literacy', Release 168/2024, 2024, [Online] available at https://www.monstat.org/uploads/files/popis%202021/saopstenja/Poznavanje%20rada%20na%20racunaru%20ENG%20SAOP%C5%A0TENJE.pdf, accessed on June 25, 2025.
26. ReSPA (Regional School of Public Administration), 'Western Balkan Regional Study on Digitalization in Government', Danilovgrad: ReSPA, 2023, [Online] available at https://kmp.respaweb.eu/pubs/21/western-balkan-regional-study-on-digitalisation-in-government-en-language, accessed on July 25, 2025.
27. Roy, S., 'The Smart City Paradigm in India: Issues and Challenges of Sustainability and Inclusiveness', 2016, *Social Scientist*, vol. 44, no. 5–6, pp. 29–48.
28. Shamsuzzoha, A., Nieminen, J., Piya, S. and Rutledge, K., 'Smart City for Sustainable Environment: A Comparison of Participatory Strategies from Helsinki, Singapore and London', 2021, *Cities*, vol. 114, art. no. 103194, DOI: 10.1016/j.cities.2021.103194.

29. Singh, T., Solanki, A., Sharma, S.K., Nayyar, A. and Paul, A., 'A Decade Review on Smart Cities: Paradigms, Challenges and Opportunities', 2022, *IEEE Access*, vol. 10, pp. 68319–68364, DOI: 10.1109/ACCESS.2022.3184710.
30. Statistics Denmark, 'Digitalisation, State of Digital Development and Infrastructure', 2024, [Online] available at https://www.dst.dk/en/Statistik/temaer/digitalisering, accessed on May 24, 2025.
31. Tekin, H. and Dikmen, I., 'Inclusive Smart Cities: An Exploratory Study on the London Smart City Strategy', 2024, *Buildings*, vol. 14, no. 2, art. no. 485, DOI: 10.3390/buildings14020485.
32. Toh, C.K., 'Smart City Indexes, Criteria, Indicators and Rankings: An In-depth Investigation and Analysis', 2022, *IET Smart Cities*, vol. 4, no. 3, pp. 211–228, DOI: 10.1049/smc2.12036.
33. Ubaldi, B., 'L'administration électronique, support de l'innovation dans les services publics' [E-government, A Support for Innovation in Public Services], 2013, *Revue Française D'administration Publique*, no. 146, pp. 449–464, DOI: 10.3917/rfap.146.0449.
34. UN E-Government Knowledgebase, 'Country Data for Montenegro Croatia, Serbia, Albania, North Macedonia, and Bosnia and Herzegovina', 2024, [Online] available at https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/114-Montenegro, accessed on July 25, 2025.
35. UNDESA (United Nations Department of Economic and Social Affairs), 'E-Government Survey 2024. Accelerating Digital Transformation for Sustainable Development', 2024, [Online] available at https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2024, accessed on July 25, 2025.
36. UNDP (United Nations Development Programme), 'Report Public Administration Digitalization Citizen Satisfaction with Existing and Identification of Needs for New E-Services. General Population – Citizens. Third Survey Cycle', 2024, [Online] available at: https://www.undp.org/sites/g/files/zskgke326/files/2025-03/eng_01_reportj_e-services_citizensi_final_1707.docx.pdf, accessed on July 20, 2025.
37. Urs, N.H., Zhao, R.E., Hamlin, J. and Hamlin, A.R., 'E-Government, Strategic Planning and Co-Production: Can Technology Promote Greater Citizen Engagement in a Rapidly Changing and Turbulent World. the University Response', 2023, *Transylvanian Review of Administrative Sciences*, Special Issue, pp. 149–166, DOI: 10.24193/tras.SI2023.9.