**The State of Digitalization in Montenegro and Indonesia: A Comparative Study**

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**Abstract**

*The primary objective of this research is to conduct a comparative analysis of the state of digitalization in Montenegro and Indonesia. Therefore, the aim of this research is to analyze the current status of digitalization in these two countries, the effects of COVID-19 on the process of digitalization, as well as other potential factors that have affected the process of digitalization in Montenegro and Indonesia.*

*The research is based on methodology which includes review of existing scientific literature and various reports, government reports, strategies and other relevant documents, as well as data analysis in Montenegro and Indonesia. The results show that there are a number of concrete positive consequences of the coronavirus crisis when it comes to the process of digitalization, and that the role of governments is getting bigger in that regard. The mindset of people has changed in the past several years, which led to new needs, as well as new and faster ways of doing business, or life in general. However, several factors are identified that could hinder the process of digitalization in Montenegro and Indonesia. Therefore, due to poverty and digital illiteracy, especially in rural areas, it is questionable if the whole population of these two countries have enough knowledge, skills, sufficient technology and equipment to be able to adapt to new digital procedures.*

**JEL classification**: O 57, O 33

**Keywords**: Digitalization, COVID-19, digital illiteracy, government, Internet

**Introduction**

Digital transformation is one of the most important preconditions for development of countries, and as such represents the backbone of economic growth. This is especially true after the coronavirus crisis, which has imposed the need for faster digital development and a new way of thinking. Therefore, digital economy can bring a number of opportunities for developing countries, which, on the other hand, depends on the ability of countries and citizens to adapt to new technologies and conditions.

This paper aims to analyze and compare the status of digitalization process in two countries from two regions, Montenegro (Europe) and Indonesia (South East Asian Region). Therefore, the aim of this research is to analyze the current status of digitalization in these two countries, the effects of COVID-19 pandemic on the process of digitalization, as well as other potential factors that have affected the process of digitalization in Montenegro and Indonesia.

This research is based on methodology which includes desktop research (collecting quantitative and qualitative information with international reference data), as well as review and analysis of available documentation, i.e. scientific literature and various reports, government reports, strategies and other relevant documents.

Based on available scientific research, data and reports, the mindset of people has changed in the past several years, which led to new needs, as well as new and faster ways of doing business and life in general. On the other hand, there are several challenges that are raising the question if the whole population of Montenegro and Indonesia have enough knowledge, skills, sufficient technology and equipment on disposal to be able to adapt to new digital procedures. Therefore, based on these observations, two hypotheses regarding digitalization process in Montenegro and Indonesia are formulated:

***H1:*** *COVID-19 pandemic has accelerated the process of digitalization in Montenegro and Indonesia, increasing the role of government in that process*

***H2:*** *Digital illiteracy, availability of technology and share of rural population are hindering the digitalization process in both countries*

These hypotheses serve as a starting point for research and empirical investigation into the specific factors affecting the digitalization of Montenegro and Indonesia.

**State of Digitalization in Montenegro**

A number of works that analyses the process of digitalization from different aspects in Montenegro have been published. For example, digitization in terms of C-ITS, Agriculture and Healthcare has been addressed by Kara, P. et al.[[4]](#footnote-4) Digital transformation with focus on companies has been conducted by Golubović et al.[[5]](#footnote-5) Digital transformation with focus on digital marketing has been addressed by Melović et al[[6]](#footnote-6), etc. The state of digitalization as a whole has been addressed by the Situation Analysis, conducted by the Ministry of Public Administration, Digital Society and Media.

According to the Situation Analysis for Preparation of Montenegro Digital Transformation Strategy 2022-2026, one of the most important challenges identified was the lack of digital skills at several levels (employees in private and public organizations, students, but also the general public).[[7]](#footnote-7) Therefore, the need to strengthen the ICT sector in Montenegro is recognized as one of the most important challenges and potentials in situation analysis.

According to the Final Report on the Implementation of the Information Society Development Strategy 2016-2020, 50% of all activities were fully implemented, 31% of activities were partially implemented, and 20% of planned activities remained not implemented.[[8]](#footnote-8) As a reason for the delay or lack of implementation of a large number of activities, the institutions especially recognized the specificity of the situation caused by the COVID-19 pandemic, in addition to the lack of funds and capacity. In addition, the lack of consensus of relevant institutions in defining priorities and deadlines, lack of financial resources and ambitious deadlines were recognized as key challenges.

When it comes to digital development of Montenegro, its level is analyzed by the various international institutions and organizations. For example, according to the United Nations (UN eGovernment Survey 2020)[[9]](#footnote-9), Montenegro was ranked 75th in 2020 on the eGovernment Development Index, with a drop of 17 places from previous survey conducted in 2018. According to the same United Nations survey, the performance of the Electronic Services Index shows that Montenegro has not only results that are significantly below the sub region average (southern Europe), but also below the world average (in Montenegro this index is 54.12%, while the world average is 56.2%).[[10]](#footnote-10)

When it comes to the e-participation index[[11]](#footnote-11), which assesses the use of electronic services by which public administration provides information to citizens, position of Montenegro in 2020 was significantly lower compared to 2016, moving from 17th place to 100th place. Similar research into digital development is being conducted by the OECD. The report Competitiveness in Southeast Europe 2021[[12]](#footnote-12) shows that in 2018 Montenegro did not have a list of fully digital services provided in the public sector. Although these studies measure the relative progress of countries in the process of improving e-government, there is a plenty of room for improvement when it comes to the reform processes in Montenegro.

The e-government portal, which has over 80,000 users, was implemented in 2011 and lags behind modern trends in terms of technology and good user experience. According to the survey conducted by the Institute Alternative[[13]](#footnote-13), only a third of Montenegrin citizens are aware that services provided by the Montenegrin Government are available in electronic format. Additionally, in 2019, MPADSM, in cooperation with UNDP and IPSOS Strategic Marketing[[14]](#footnote-14) conducted a survey on the quality and satisfaction of citizens with e-services. The results from this study showed that over half of the citizens who learned about public administration e-services have not used any of them in the previous two years, about 20% state that they have used them infrequently, while the same number have used them occasionally or frequently. Additionally, more than three quarters of Montenegrin citizens are not informed about public administration e-services. On the other hand, companies are more informed than citizens - close to 90% of entrepreneurs estimate that their company is mostly or fully informed about e-services.

According to the National Report and Plan for Improving the Digital Agenda in Montenegro[[15]](#footnote-15), conclusion is that the general legislative framework for e-government is at high level compared to other countries in the region. However, one of the biggest challenges is the disparity between law and practice and the relatively low awareness of public institutions about the value of providing e-services compared to traditional services.

One of the indicators that are important in regard to process of digitalization in one country is the number of ICT companies in that country. Therefore, according to the data from the Digital Innovation Profile[[16]](#footnote-16) published by the International Telecommunication Union - ITU[[17]](#footnote-17), there were 970 companies within the ICT sector, that employ 4,441 workers in 2020, which compared to 2019 means an increase in the number of companies by 17%, and the number of employees by 15%. According to the analysis conducted in 2020 by the Digital Transformation Committee of the Montenegro Managers Association[[18]](#footnote-18), one of the key issues are that the IT sector in Montenegro is ”insufficient, even poorly developed and absolutely not competitive at the regional level”, the basic characteristics of the IT sector are an average small number of employees, small financial, and thus the development potential of IT companies, while there is no strategic document in Montenegro related to the development of the IT sector. When it comes to strategic IT projects, worth even several million euro, almost none in the recent past have been awarded to Montenegrin IT companies because few of them today have the capacity to deal with such challenges. Outflow of staff is also an issue, as due to the sharp demand for IT professionals in Western markets, countries outside the EU are becoming their significant source of workers.

However, Montenegrin ICT sector is still at an early stage of development and has a lot of potential for improvement. Its development largely depends on state aid and the improvement of e-government services, but is recognized as one of the most important sectors for future economic development.

To summarize, numerous activities have been implemented in Montenegro since 2016 and have laid the foundation for further development and digital transformation. Basic laws are prepared and adopted, a large number of public e-services are available. Additionally, due to geographical proximity, cultural proximity, lower labor costs, Montenegrin IT staff and companies are attractive to European clients. However, there are several obstacles that are hindering the process of digitalization in Montenegro. According to the Situation Analysis, the lack of coordination at central and high level regarding the implementation of digital transformation activities at national and sectoral level is evident. One of the problems are insufficient digital skills and IT skills in public administration and society as a whole, as well as lack of ICT human resources and low public investment in IT development. Additionally, continued brain drain due to more attractive conditions in other countries, as well as small market and changes in political arena that affect the prioritization of digital transformation are issues that are slowing down the progress in digital development of Montenegro. However, the challenges in the digital transformation of Montenegro identified in the Situation Analysis are addressed through two strategic goals as a part of Strategy: improving capacities and capabilities for digital transformation of Montenegro, and strengthening digital awareness of Montenegrin society and digital competitiveness of ICT sector.[[19]](#footnote-19)

**State of Digitalization in Indonesia**

There are a number of available works that analyses the process of digitalization in Indonesia. Current picture of the penetration of information and communication technology in society is presented in Telecommunication Statistics in Indonesia 2022 publication.[[20]](#footnote-20) Digital transformation in Indonesia has been analyzed by Economic Research Institute for ASEAN and East Asia.[[21]](#footnote-21) There have been several studies attempted to provide an overview of ICT skills of Indonesian society, for example a study by Juditha[[22]](#footnote-22), Saleh[[23]](#footnote-23), and Syarifudin[[24]](#footnote-24), although all three studies focus only on a certain region. However, a study by Ariansyah and Anandhita[[25]](#footnote-25), as well as by Wilantika, et al.[[26]](#footnote-26) aim to investigate the inequality in ICT skills on the national level, that is among all provinces in Indonesia. Additionally, the effect of digital capability on competitiveness through digital innovation has been addressed by Hartono and Halim.[[27]](#footnote-27)

Indonesia has the largest economy in Southeast Asia and has several of the vital ingredients needed to become a digital leader. According to the IBM, its vibrant technology start-up ecosystem is second only to Singapore within the region.[[28]](#footnote-28) Indonesia has produced its own multi-billion-dollar tech platforms, a home-grown Gojek “super-app”, and numerous tech startups. It has one of the fastest growing e-commerce markets in the world, and it has used digitalization to accelerate inclusive development, reaching the poor with better targeted social assistance, national identification programs, and financial services. The adoption of e-payments in 2017 revolutionized cash transfer programs, resulting in more than 12 million of the poorest Indonesians gaining access to savings accounts within two years, promoting financial inclusion.[[29]](#footnote-29)

The federal government has been a vocal champion of digital transformation, especially during and after the COVID-19 pandemic. Led by the Ministry of Communication and Informatics, the Government of Indonesia has embarked on an ambitious nation-wide Digital Transformation Program. The 2021-2024 Indonesia Digital Roadmap focuses on four strategic domains: 1) modernizing digital infrastructure, 2) accelerating digital government, 3) strengthening the digital economy with a focus on attracting and supporting micro, small and medium enterprises, and 4) strengthening its digital society to increase uptake of digital innovations with programs focused on uplifting basic to more advanced capabilities for all Indonesians.[[30]](#footnote-30) Alongside these efforts, the National Artificial Intelligence Strategy 2020-2045 was unveiled in 2020.

According to the BPS-Statistics Indonesia, in the last five years the use of Information and Communication Technology in Indonesia had shown rapid development. The most rapid development of ICT indicator was the use of internet in households, which reached 86.54% in 2022.[[31]](#footnote-31) The growth of internet use in households is also followed by the growth of the population who own cellular phones. For example, only 39.11% of the population owned a cellular phone in 2011 – meanwhile, in 2022, 67.88% of the population owned a cellular phone. However, two types of gaps are worth noting. First, wide gaps in cellular penetration persist between urban and rural areas - 73.58% of urban population has owned at least one mobile phone, while 60.18% of population use mobile phones in rural areas.[[32]](#footnote-32) Second, the number of internet users is much lower than that of cellular users, meaning that a significant number of Indonesians still use mobile phones with 2G technology – without the capacity to access the internet.[[33]](#footnote-33) Nevertheless, more people tend to own cellular phones, especially after the COVID-19 when the demand for various activities carried out without face-to-face contact made cellular phones an important tool in people’s lives.

According to the BPS, the internet is most accessed through cellular phones, and it is used for various activities, such as getting information/news, social media, and entertainment. On the other hand, the percentage of households that own a computer in 2022 was 18.04%.[[34]](#footnote-34) Since 2019, the percentage of households owning a computer had been stable at 18%.[[35]](#footnote-35) When it comes to internet penetration, the situation has improved in Indonesia. By 2022, 66.48% of Indonesia’s population had internet access, in comparison to 39.90% in 2018.[[36]](#footnote-36) However, internet penetration in Indonesia is relatively low compared to other countries, such as United States, Singapore, Malaysia and Korea, which have more than 80% penetration. Moreover, internet penetration in urban areas is higher than in rural areas, 74.16% compared to 56.11%, respectively.[[37]](#footnote-37) The increasing percentage of the population accessing the internet occurred in all regions in Indonesia. The highest percentage of internet access was in DKI Jakarta Province with a value of around 85.55% in 2021 and 84.65% in 2022, while the lowest percentage was in Papua Province in 2021 (26.49%) and in 2022 (26.32%).[[38]](#footnote-38) However, based on regional classification, both urban and rural areas had an increase in the percentage of internet users. The government’s policy to expand internet access in the 3T (underdeveloped, frontier, and outermost) areas, which are generally in rural areas, was starting to show results where the increase in internet users in rural areas was higher than in urban areas.

ICT plays an important role in the economy. The rapid development of technology in Indonesia has also driven high demand for ICT goods. In 2018-2022, according to the BPS, exports of ICT goods have grown by 47.65%, while imports of ICT goods grew by 26.82%.[[39]](#footnote-39) This shows a positive trend in the last five years that Indonesia’s ability to send ICT goods abroad is faster than bringing in ICT goods from abroad to meet domestic needs.

National development, especially in Information and Communication Technology contributes to the economic progress of a country, not least Indonesia. But the uneven development of ICT among provinces in Indonesia has resulted in a digital divide. Therefore, there are several challenges that are hindering the digitalization process in Indonesia.

Despite its progress and growth potential, Indonesia needs to accelerate the pace of its digital transformation. According to the report by ERIA, it faces various challenges in this respect. Improving connectivity and minimizing the digital divide are top priorities. Moreover, the economic geography of Indonesia is characterized by its archipelagic profile. The interlinkages amongst different islands or regions are rather weak, and the cost of domestic logistics remains high. This has fragmentized national economic activities and created barriers for economic growth, making unevenness the key feature of the Indonesian economy as well as many other aspects of development.[[40]](#footnote-40)

Internet speed and access remain an issue. A digital divide between richer and poorer households persists. Digital literacy remains low and digitalization among micro and small businesses still has a long way to go.

Among other issues, some studies have confirmed the presence of the gap in ICT access between male and female[[41]](#footnote-41), between adolescents in urban and rural[[42]](#footnote-42), and among cities.[[43]](#footnote-43) The Indonesian government has been executing several projects to cope the access issue, for example Palapa ring project to serve all districts with optical fiber backbone networks, integrated broadband villages to facilitate local society in remote are in access the internet and to provide appropriate local content, etc.[[44]](#footnote-44) However, according to some studies, digital divide is not only about inequality in access, but also in motivation, skills, and impact. In that regard, according to the results of the study by Ariansyah, ICT skills inequality, also known as the second-level digital divide, is present among the population in all provinces in Indonesia.[[45]](#footnote-45) Inequality of ICT skills in this study is mainly investigated at the provincial level and measured relative to the capital of Indonesia, namely Jakarta. Therefore, there are 14, 18, 12 and 15 provinces, respectively, for data and information literacy, communication and collaboration, software, and problem-solving, in which their people have a lower likelihood to have more ICT skills than those in DKI Jakarta. The study also found that seven provinces are lower in all ICT skills groups, and six provinces are lower in three ICT skills groups. The majority of those provinces are located in eastern Indonesia.[[46]](#footnote-46)

Similarly, according to the study by Wilantika et al., digital divide occurs between Special Capital Region Jakarta and other provinces.[[47]](#footnote-47) The results of study indicated that there was 1 province with the low digital divide rate, 19 provinces with the medium digital divide rate, and 14 provinces with the high digital divide. In other words, provinces that need more attention in the development of ICT access and infrastructure to bridge the digital divide and achieve the equity are Aceh, North Sumatera, Jambi, Bengkulu, Riau Islands, Yogyakarta, Banten, Bali, Central Sulawesi, Southeast Sulawesi, Maluku, North Maluku, Papua, West Papua.[[48]](#footnote-48)

Therefore, technological transformation in Indonesia should take into account the different needs and opportunities of each region to avoid exacerbating development disparities. Therefore, targeted policies are needed to prepare these areas for digitalization.

To summarize, Indonesia is generally in good shape to harness the digital society. The next step is to complete a digital-friendly development ecosystem to facilitate digital transformation and create opportunities to realize the potential of data-driven growth. According to the ERIA, given the country’s stage of digitalization and economic vision, four policy priorities for Indonesia should be improving connectivity, prioritizing development of the smartphone economy, liberalizing the digital economy, and supporting skills development.[[49]](#footnote-49)

As the world’s fourth most populous country after China, India, and the United States, Indonesia should have major potential to be a leader of the global economy. A national digital transformation can be a breakthrough to dramatically improve Indonesia’s economy and elevate its position on the world stage.

**Conclusion**

Montenegro has made notable strides in implementing e-governance and digital services. Initiatives such as digital identity cards and online public services aim to enhance government efficiency and citizen engagement. The emergence of startups and innovation hubs indicates a shift toward economic diversification, with a focus on sectors like tourism and information technology. Additionally, Montenegro has seen improvements in digital infrastructure, particularly in urban areas, with high-speed internet access. However, challenges persist in rural regions, where efforts are ongoing to bridge connectivity gap.

Indonesia boasts a vibrant digital economy, marked by a flourishing tech startup ecosystem, robust digital payment systems, and widespread e-commerce platforms. The dynamic entrepreneurial landscape reflects a strong commitment to digital innovation. Indonesia has embraced a comprehensive digital transformation agenda, exemplified by the “Making Indonesia 4.0” roadmap. The government is actively working to modernize industries, promote technology adoption, and address regulatory frameworks to stimulate innovation. However, geographical diversity of Indonesia poses significant challenges to digital infrastructure development. While progress has been made in urban areas, rural and remote regions continue to face connectivity issues, necessitating ongoing efforts to expand access.

On one side, Montenegro focuses on enhancing government services and citizen engagement through digital means, while in contrast Indonesia takes a more comprehensive approach, emphasizing industry-wide digital transformation and innovation. Montenegro’s digitalization efforts align with economic diversification, particularly in tourism and IT. Indonesia’s approach emphasizes building a robust digital economy, with a strong emphasis on tech startups, digital payments, and e-commerce. However, both countries grapple with infrastructure challenges, but the nature of these challenges differs. Montenegro primarily faces issues in rural connectivity, while Indonesia’s archipelagic geography presents a broader infrastructure development challenge.

To summarize, there are a number of concrete positive consequences of the coronavirus crisis when it comes to the process of digitalization, and the role of governments is getting bigger in that regard. The mindset of people has changed in the past several years, which led to new needs, as well as new and faster ways of doing business, or life in general. However, several factors are identified that could hinder the process of digitalization in Montenegro and Indonesia. Therefore, due to poverty and digital illiteracy, especially in rural areas, it is questionable if the whole population of these two countries have enough knowledge, skills, sufficient technology and equipment to be able to adapt to new digital procedures.

**References**

Ariansyah, Kasmad, Anandhita, Vidyantina, Sari, Diana, Investigating the Next Level Digital Divide in Indonesia, Technology Innovation Management and Engineering Science International Conference, 2019

B. Saleh, “Literasi Teknologi Informasi dan Komunikasi (TIK) Masyrakat di Kawasan Mamminasata,” *J. Pekommas*, vol. 18, no. 3, pp. 151-160,2015

Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022*

C. Juditha, “Tingkat Literasu Teknologi informasi Komunikasi pada Masyarakat Kota Makassar,” *J. Penelit. Komun.,* vol. 14, no.1, 2011

Digital Maturity Assessment of Montenegro (2021), E-gov Academy

Digital Transformation Committee of the Montenegro Managers Association (2020), *Assumptions for Development of Digital Transformation and Cross-Section of Situtation in Montenegro, Overview from perspective of IT sector*

Economic Research Institute for ASEAN and East Asia (2023), *Accelerating Digital Transformation in Indonesia: Technology, Market, and Policy*

G. Gayatri et al., “Digital Citizenship Safety Among Children and Adolescents in Indonesia,” *J. Penelit. Dan Pengemb. Komun. Dan Inform*., vol. 6, no. 1, 2015.

Golubović, V.; Mirković, M.; Mićunović, N.; Srića, V. Digital Transformation in Montenegro-Current Status, Issues and Proposals for Improvement. J. Comput. Sci. 2021, 9, 1-12.

Hartono, Hendry, Halim, Erwin, The Effect of Digital Capability on Competitiveness through Digital Innovation of E-Travel Business in Indonesia, International Conference on Information Management and Technology, 2020

1. K. Rohman and E. Bohlin, “An assessment of Mobile Broadband Access in Indonesia: A Demand or Supply Problem?” *Internetworking Indones. J*., vol. 3, no. 2, pp. 15-22, 2011

IBM Center for The Business of Government (2023), *Realizing Indonesia’s Digital Transformation Ambition: From AI to IoT*

ITU Publications (2020), *Digital Inovation Profile Montenegro*, *https://www.itu.int/dms\_pub/itu-d/opb/inno/D-INNO-PROFILE.MONTENEGRO-2020-PDF-E.pdf*

Kara, P.A.; Ognjanović, I.; Maindorfer, I.; Mantas, J.; Wippelhauser, A.; Šendelj, R.; Laković, L.; Roganović, M.; Reich, C.; Simon, A.; et al. (2023), The Present and Future of a Digital Montenegro: Analysis of C-ITS, Agriculture, and Healthcare. Eng 2023, 4, 341-366.

Melović, B.; Jocović, M.; Dabić, M.; Vulić, T.B.; Dudic, B. The impact of digital transformation and digital marketing on the brand promotion, positioning and electronic business in Montenegro, Technol, Soc. 2020, 63, 101425.

Ministry of Public Administration, Digital Society and Media (2021), *Montenegro Digital Transformation Strategy 2022-2026, with Action Plan 2022-2023*

Ministry of Public Administration, Digital Society and Media (2021), *Final Report on the Implementation of the Information Society Development Strategy 2016-2020*

OECD (2021), *Competitiveness in South East Europe 2021; A Policy Outlook, Competitiveness and Provate Sector Development*, OECD Publishing, Paris

1. Palaon, Hilman (2024), *Indonesia’s digital success deserves more attention*, Lowy Institute

S. Syarifuddin, “Literasi Teknologi Informasi dan Komunikasi,” *J. Penelit. Komun*., vol. 17, no. 2, pp. 153-164, Dec. 2014

V. H. Anandhita and K. Ariansyah, “Gender Inequality on the Internet Access and Use in Indonesia: Evidence and Implications,” in *2018 International Conference on ICT for Rural Development (IC-ICTRuDev)*, 2018, pp. 142-147

Wilantika, Nori, et al. Grouping of Provinces in Indonesia According to Digital Divide Indeks, 6th International Conference on Information and Communication Technology, 2018

<https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/114-Montenegro>

<https://institut-alternativa.org>

<https://www.undp.org/content/dam/montenegro/docs/publications/NHDR/NHDR2018/E-services%20survey_MNE.pdf>

<https://nvo35mm.mepublications/download/36>

https://www.itu.int/en/Pages/default.aspx

1. Faculty of International Economics, Finance and Business, University of Donja Gorica [↑](#footnote-ref-1)
2. Faculty of Business and Economics, Universitas Islam Indonesia [↑](#footnote-ref-2)
3. Faculty of Business and Economics, Universitas Islam Indonesia [↑](#footnote-ref-3)
4. Kara, P.A.; Ognjanović, I.; Maindorfer, I.; Mantas, J.; Wippelhauser, A.; Šendelj, R.; Laković, L.; Roganović, M.; Reich, C.; Simon, A.; et al. (2023), The Present and Future of a Digital Montenegro: Analysis of C-ITS, Agriculture, and Healthcare. Eng 2023, 4, 341-366. [↑](#footnote-ref-4)
5. Golubović, V.; Mirković, M.; Mićunović, N.; Srića, V. Digital Transformation in Montenegro-Current Status, Issues and Proposals for Improvement. J. Comput. Sci. 2021, 9, 1-12. [↑](#footnote-ref-5)
6. Melović, B.; Jocović, M.; Dabić, M.; Vulić, T.B.; Dudic, B. The impact of digital transformation and digital marketing on the brand promotion, positioning and electronic business in Montenegro, Technol, Soc. 2020, 63, 101425. [↑](#footnote-ref-6)
7. Ministry of Public Administration, Digital Society and Media (2021), *Montenegro Digital Transformation Strategy 2022-2026, with Action Plan 2022-2023* [↑](#footnote-ref-7)
8. Ministry of Public Administration, Digital Society and Media (2021), *Final Report on the Implementation of the Information Society Development Strategy 2016-2020* [↑](#footnote-ref-8)
9. https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/114-Montenegro [↑](#footnote-ref-9)
10. Digital Maturity Assessment of Montenegro (2021), E-gov Academy [↑](#footnote-ref-10)
11. https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/114-Montenegro [↑](#footnote-ref-11)
12. OECD (2021), *Competitiveness in South East Europe 2021; A Policy Outlook, Competitiveness and Provate Sector Development*, OECD Publishing, Paris [↑](#footnote-ref-12)
13. https://institut-alternativa.org [↑](#footnote-ref-13)
14. https://www.undp.org/content/dam/montenegro/docs/publications/NHDR/NHDR2018/E-services%20survey\_MNE.pdf [↑](#footnote-ref-14)
15. https://nvo35mm.mepublications/download/36 [↑](#footnote-ref-15)
16. ITU Publications (2020), *Digital Inovation Profile Montenegro*, *https://www.itu.int/dms\_pub/itu-d/opb/inno/D-INNO-PROFILE.MONTENEGRO-2020-PDF-E.pdf* [↑](#footnote-ref-16)
17. https://www.itu.int/en/Pages/default.aspx [↑](#footnote-ref-17)
18. Digital Transformation Committee of the Montenegro Managers Association (2020), *Assumptions for Development of Digital Transformation and Cross-Section of Situtation in Montenegro, Overview from perspective of IT sector* [↑](#footnote-ref-18)
19. Ministry of Public Administration, Digital Society and Media (2021), *Montenegro Digital Transformation Strategy 2022-2026, with Action Plan 2022-2023* [↑](#footnote-ref-19)
20. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-20)
21. Economic Research Institute for ASEAN and East Asia (2023), *Accelerating Digital Transformation in Indonesia: Technology, Market, and Policy* [↑](#footnote-ref-21)
22. C. Juditha, “Tingkat Literasu Teknologi informasi Komunikasi pada Masyarakat Kota Makassar,” *J. Penelit. Komun.,* vol. 14, no.1, 2011 [↑](#footnote-ref-22)
23. B. Saleh, “Literasi Teknologi Informasi dan Komunikasi (TIK) Masyrakat di Kawasan Mamminasata,” *J. Pekommas*, vol. 18, no. 3, pp. 151-160,2015 [↑](#footnote-ref-23)
24. S. Syarifuddin, “Literasi Teknologi Informasi dan Komunikasi,” *J. Penelit. Komun*., vol. 17, no. 2, pp. 153-164, Dec. 2014 [↑](#footnote-ref-24)
25. Ariansyah, Kasmad, Anandhita, Vidyantina, Sari, Diana, Investigating the Next Level Digital Divide in Indonesia, Technology Innovation Management and Engineering Science International Conference, 2019 [↑](#footnote-ref-25)
26. Wilantika, Nori, et al. Grouping of Provinces in Indonesia According to Digital Divide Indeks, 6th International Conference on Information and Communication Technology, 2018 [↑](#footnote-ref-26)
27. Hartono, Hendry, Halim, Erwin, The Effect of Digital Capability on Competitiveness through Digital Innovation of E-Travel Business in Indonesia, International Conference on Information Management and Technology, 2020 [↑](#footnote-ref-27)
28. IBM Center for The Business of Government (2023), *Realizing Indonesia’s Digital Transformation Ambition: From AI to IoT* [↑](#footnote-ref-28)
29. Palaon, Hilman (2024), *Indonesia’s digital success deserves more attention*, Lowy Institute [↑](#footnote-ref-29)
30. IBM Center for The Business of Government (2023), *Realizing Indonesia’s Digital Transformation Ambition: From AI to IoT* [↑](#footnote-ref-30)
31. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-31)
32. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-32)
33. Economic Research Institute for ASEAN and East Asia (2023), *Accelerating Digital Transformation in Indonesia: Technology, Market, and Policy* [↑](#footnote-ref-33)
34. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-34)
35. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-35)
36. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-36)
37. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-37)
38. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-38)
39. Badan Pusat Statistik (2023), *Telecommunication Statistics in Indonesia 2022* [↑](#footnote-ref-39)
40. Economic Research Institute for ASEAN and East Asia (2023), *Accelerating Digital Transformation in Indonesia: Technology, Market, and Policy* [↑](#footnote-ref-40)
41. V. H. Anandhita and K. Ariansyah, “Gender Inequality on the Internet Access and Use in Indonesia: Evidence and Implications,” in *2018 International Conference on ICT for Rural Development (IC-ICTRuDev)*, 2018, pp. 142-147 [↑](#footnote-ref-41)
42. G. Gayatri et al., “Digital Citizenship Safety Among Children and Adolescents in Indonesia,” *J. Penelit. Dan Pengemb. Komun. Dan Inform*., vol. 6, no. 1, 2015. [↑](#footnote-ref-42)
43. I. K. Rohman and E. Bohlin, “An assessment of Mobile Broadband Access in Indonesia: a Demand or Supply Problem?” *Internetworking Indones. J*., vol. 3, no. 2, pp. 15-22, 2011 [↑](#footnote-ref-43)
44. Ariansyah, Kasmad, Anandhita, Vidyantina, Sari, Diana, Investigating the Next Level Digital Divide in Indonesia, Technology Innovation Management and Engineering Science International Conference, 2019 [↑](#footnote-ref-44)
45. Ariansyah, Kasmad, Anandhita, Vidyantina, Sari, Diana, Investigating the Next Level Digital Divide in Indonesia, Technology Innovation Management and Engineering Science International Conference, 2019 [↑](#footnote-ref-45)
46. Ariansyah, Kasmad, Anandhita, Vidyantina, Sari, Diana, Investigating the Next Level Digital Divide in Indonesia, Technology Innovation Management and Engineering Science International Conference, 2019 [↑](#footnote-ref-46)
47. Wilantika, Nori, et al. Grouping of Provinces in Indonesia According to Digital Divide Indeks, 6th International Conference on Information and Communication Technology, 2018 [↑](#footnote-ref-47)
48. Wilantika, Nori, et al. Grouping of Provinces in Indonesia According to Digital Divide Indeks, 6th International Conference on Information and Communication Technology, 2018 [↑](#footnote-ref-48)
49. Economic Research Institute for ASEAN and East Asia (2023), *Accelerating Digital Transformation in Indonesia: Technology, Market, and Policy* [↑](#footnote-ref-49)