

"How to Overcome the Problems of the Digital Divide?"

Sofija Sekulic

Podgorica October, 2022.

SEMINAR PAPER - ESSAY

FROM THE SUBJECT DIGITAL ECONOMY

University of Montenegro Faculty of economics

Abstract:- The purpose of this paper is comparative analysis of different modalities to overcome the digital divide. In this paper qualitative method of research is applied, which is mainly reliant on secondary data and on the use of case study methodology. According to the applied methodology, mitigation of digital divide has been analyzed separately in Asia, India and EU countries. We consider that it is necessary to analyze developing countries and underdeveloped countries, in order to understand the seriousness of the backlog in those countries. The results from paper indicate the need to continue applying some of the proposed practices in the work and to continue paying attention to this problem. We have presented a large number of examples and conclusions, but the final solution cannot be fully grasped due to the complex character of this problem, which leaves room for future research on this topic.

Keywords: digital divide, overcoming, problem, solutions, technology.

I. INTRODUCTION

We are witnessing that the 21st century brings with it a large number of changes. What is definitely gaining momentum day by day are information and communication technologies (ICT) that are changing the way economies and people in them do business. The ability to access computers and the Internet itself has become of key importance for an individual so that he can fully engage in the economic, political and social aspects of the entire world. Others, who are members of less developed communities in terms of technology, are not provided with this access. It is precisely from this that the problem of the digital divide arises, which can be defined as the disparity between those who have modern technological innovations at their disposal and those who are lagging behind in this field. The question arises, whether and in what way technologically underdeveloped countries are able to catch up with other, technologically developed countries so that they can equally actively participate in economic, educational, cultural, political and similar processes?¹

Differences between countries have always been present. However, with the development of information and

¹Lazović V., Đuričković T. (2018). "The Digital Divide," Digital Economy 123-162.

communication technologies and the Internet, these differences are increasingly emphasized. Developed countries are successfully following technological progress and dictating the speed of development of digital society and the use of ICT in order to improve their socio-economic life. As a result, the gap is deepening, whereby underdeveloped countries remain many steps behind developed countries. Therefore, we can say that many countries are becoming digitally excluded, that is, excluded from numerous life opportunities and events.

According to the above, we can say that today the Internet has become a phenomenon that is represented globally and to a large extent affects both each individual and the entire society, changing it. So, the story of the digital divide and divisions in society is something that has been present since ancient times and is the subject of many debates and daily research all over the world. Certainly, one of the main questions to which we still do not have an exact answer today, is whether the rapid technological growth achieved by the least developed countries is a sufficient condition for catching up with the most developed?

II. DEFINING AND CAUSING THE DIGITAL DIVIDE

Like many phenomena in the economy, the digital divide is another one that can be defined in several different ways. Definitions change, just as technology changes and develops. At the very beginning, the digital divide appeared in political speeches and various articles, in the mid-1990s. Ever since then, the term digital divide has been associated with the computer, the Internet, information and communication technologies... Some definitions talk about differences in Internet access, while others talk about the type of technology used, differences between entities that use technology, and the like. One of the most comprehensive definitions was given by the OECD organization, which defines the digital divide as follows: "The digital divide refers to the gap between individuals, households,²

Initially, it was thought that the digital divide would disappear with the popularization and development of technology. Nevertheless, the division continues today, and its causes are numerous. The question is whether the digital divide between developed and developing countries is increasing or decreasing, and opinions differ. The most common causes of the digital divide are: economic,

²"Understanding the Digital Divide" (2001)www.oecd.org

technological, social, demographic factors and geographic location. Access to technology, lack of money, differences between regions are factors that, among others, condition the emergence of the digital divide. For some countries, the problem of the digital divide is still not such a popular topic, because in the foreground there is still absolute poverty and issues of existential importance...³

There is some research that looks at defining the digital divide of vulnerable, underdeveloped populations. According to them, the digital divide is reduced access to information technologies, especially the use of the Internet for racial and ethnic minorities, people with disabilities, rural populations and populations of low socioeconomic status. According to TDI (Toward Digital Inclusion), Hispanics and African Americans are less likely than the rest of the nation to own a computer and have access to the Internet. More recently, an American survey found that 89% of households with an income of over \$75,000 have constant access to a computer and the Internet, while the same access for households with an income of less than \$30,000 is 55%. Therefore, there are numerous studies, data, and causes of the digital divide on this topic, but there are even more numerous ones that talk about reducing and overcoming it.⁴

III. OVERCOMING THE DIGITAL DIVIDE

The digital divide, as a complex issue and a complex problem, is the subject of research by a large number of scientists and institutions. Those who try to find solutions to overcome it, claim that a detailed breakdown into several tasks is necessary at the very beginning.⁵:

- **Universal access**- subsidizing internet access by the state. For a large number of households, owning a computer and constant access to the Internet is still a big expense, and at the same time their use is becoming inevitable. Therefore, this approach suggests that households with lower incomes and opportunities should be at the center of attention of this problem. State governments should direct part of the subsidies to this type of population.
- **Internet access centers**- the primary users of these centers are the unemployed, individuals with a lower level of education and a lower level of income. Part of the funds should be set aside for the development of these centers, because it is considered to be a useful investment. In this way, the use of computers would be increased for those who need it.
- **Training of technological personnel**- this is another approach that is thought to be useful, provided the

previous two approaches are met. Just having a computer is not enough if there is no professional staff working to increase information literacy in society. The high speed of changing technology requires constant investment in increasing IT knowledge.

- **Public attitude towards technology**- this solution tells us about the importance of raising society's awareness of technology. Many still perceive technology as a luxury that is not so necessary, yet in the 21st century technology should be seen as a crucial need. A real example that confirms the importance of technology is the newly created situation caused by the global pandemic of the Covid-19 virus. Working from home and online classes have increased the use of computers and the Internet like never before.

IV. MOBILE PHONES FOR BRIDGING THE DIGITAL DIVIDE

One of the important directions for reducing the gap is the installation and development of mobile networks around the world. According to research from 2004, it was predicted that by the end of 2010, 4 million people will be using mobile phones.⁶ Today, with the incredible progress of technology in the last decade, as much as 62.17% of the population owns a mobile phone, which amounts to 4.88 billion people. As far as smartphones are concerned, 3.80 billion people use them and they make up 48.41% of the world's population.⁷

³Lazović V., Đuričković T. (2018). "The Digital Divide", Digital Economy p. 126

⁴Chang, BL, Bakken, S., Brown, SS, Houston, TK, Kreps, GL, Kukafka, R., ... & Stavri, PZ (2004). "Bridging the digital divide: reaching vulnerable populations" Journal of the American Medical Informatics Association 448.- 457.

⁵<https://cs.stanford.edu/people/eroberts/cs181/projects/digital-divide/start.html>, accessed - March 2021.

⁶Boyera, S. (2007). "Can the mobile web bridge the digital divide?", Interactions, 12-14.

⁷<https://www.bankmycell.com>, accessed – March 2021.

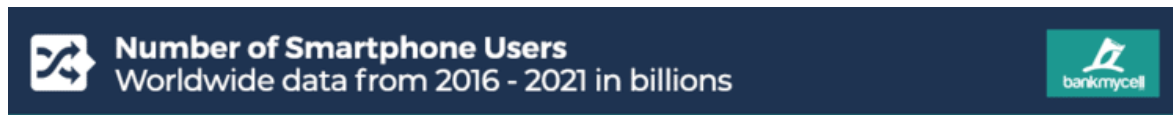


Fig. 1: Number of smartphone users (www.bankmycell.com)

There are numerous socio-economic and political conditions that have led to the rapid development of mobile phones, especially in rural areas, and thus to the reduction of the digital divide. Some of them are: ease of use, numerous prepaid services, increasing liberalization of the telecommunications system. The use of mobile phones requires much less information literacy, in principle they are cheaper than computers, and therefore more accessible to a large number of households. Popular prepaid services specifically in the example of Africa make up to 95% of all mobile telephony services, because with their simplicity and low price they represent a very attractive way of communication and information in technologically underdeveloped parts of the country. If we take the data that there are 1.05 billion people living in rural areas whose daily income is an average of 1.25 US dollars, mobile phones certainly represent a more practical and accessible source of information, as well as a means of communication that improves their lives.⁸

The people of Zambia presented an interesting way of overcoming the digital divide through an SMS service that provides numerous market information to its users. In cooperation with the National Farmers Union of Zambia (ZNFU) in 2006, a primarily inexpensive way to get information on prices, weather forecast, list of available buyers, business information and the like was presented. Namely, it is a very innovative and simple method where interested farmers, traders, buyers, processors by sending an SMS message to a specific number can in just a few seconds receive reliable information about the list of available buyers on the market, as well as their personal information in order to successfully enter the contact. In order to ensure the reliable operation of the platform, a large number of

⁸Samii, R. (2009). "Mobile phones: the silver bullet to bridge the digital divide", Participatory Learning and Action p. 3

local institutions are responsible for monitoring and maintaining the system.⁹

A similar service that includes the use of mobile phones was also recorded in Tanzania, and it is known under the name "Shu Shu Shus service". A large number of poor farmers got access to mobile phones thanks to this very project. A large number of so-called market spies use this platform to send SMS messages containing information about prices, sellers and buyers present in the local market. The information obtained is then published on radio stations or city bulletin boards. This interesting way of obtaining information allows farmers to improve their production and sales, while combining available technological tools.¹⁰

When we talk about the impact of mobile phones on the problem of the digital divide, we must make a distinction between those expensive phones, such as the iPhone, Samsung flagship models and those cheap models dominated by Nokia. According to official data, the best-selling phone ever in the world is the Nokia 1100, which sold as many as 250 million copies.¹¹ From this we conclude that what is crucial for buying a mobile phone is its price. However, the problem lies in the fact that the cheapest phone model cannot provide access to the Internet, and thus to a lot of information. If we want to close the present gap in the use of mobile phones, it is necessary to direct a part of the international funds for development towards subsidizing mobile phones equipped with the Internet. An example of this is the International Financial Organization, which operates as a branch of the World Bank, which granted part

⁹Samii, R. (2009). "Mobile phones: the silver bullet to bridge the digital divide", Participatory Learning and Action, pp. 5 - 6

¹⁰Samii, R. (2009). "Mobile phones: the silver bullet to bridge the digital divide", Participatory Learning and Action, p. 6 - 7

¹¹Hamill, L. (2021 March 13). The best selling cell phones of all time, www.decluttr.com

of its funds to Celtel, a telecommunications company based in Africa. These funds are intended for the development of the Mobline network in the countries of Congo, Madagascar, Malawi and Uganda.

V. AN EXAMPLE OF OVERCOMING THE GAP – INDIA

India, as one of the less developed countries in the world, is particularly concerned about the rapidly increasing gap between the urban population and the rural population. This gap is mostly conditioned by the increasingly rapid development of information technologies. The fruits of IT give positive results only in the most developed and computerized economies. Despite the certain development of the Internet, which brings with it the innovations of online shopping, sending e-mails and the like, there is still great poverty, unemployment and illiteracy in India.

In order to better understand the problem of the digital divide in India, we should mention a few data that speak about the degree of underdevelopment of India. Adult literacy in India is 58.8%, while the female literacy rate is 47.3%. About 50 million inhabitants speak English. The main problem that slows down the development of information technology in this country is the infrastructure itself, which consists of electricity, IT penetration and the Internet industry.¹²

There are several areas that are given importance when talking about solutions to the digital divide, which include: distance education, telemedicine, market outreach, local development... Below are some of the initiatives undertaken in India, which are for its development of undoubted importance.

- **Kisan Call Center** –This is an initiative launched by the Ministry of Agriculture, Government of India and the Department of Agriculture and Cooperation (DAC). The main role of this call center is to answer questions raised by farmers, in the local language. With just one call, a farmer can get answers to certain questions and problems from various experts and graduated farmers. These services are available around the clock. If the farmer is not satisfied with the answer or advice at the first level, the question can be further referred to an expert at the second level, who works in the state institution for giving advice. The aim of this initiative and the effort of the institutions mentioned above is to bridge the gap between the actual source of information and the user using the phone.¹³
- **Lifeline of India** –In this case, the charity is concerned with promoting human rights and sustainable development. The aim is to explore the idea of a telephone information service, to enable farmers to record a question and receive a recorded answer shortly afterwards. The company "Cisco" was hired to co-finance this initiative. On average, 350 calls are received per day, and a database of over 88,000 frequently asked questions has been

created. Consumer satisfaction with this service was rated at 96%.¹⁴ This initiative, originally named as "Life lines India", is beneficial for the advancement of technology in rural areas by educating farmers. Not only is it aimed at reducing the digital inequality, by increasing the use of technology in certain areas, but it also improves the future of workers due to quick and easy information and obtaining new knowledge.

- **Department of Information Technologies (TDIL¹⁵)** – This department strives to facilitate the interaction between man and machine. The main obstacle is the language barrier, so access to multilingual knowledge resources is needed. In this way, it invests in the development of innovative customer services.
- **Libraries** -Two types of benefits are offered here that are very important for the development of technology. First, the Internet is free for public use, and second, there are librarians as a human resource to help visitors navigate. Libraries can thus create a path to the network, for people who do not have a computer or access to the Internet at home or at work. Also, apart from adults, it is one key resource to invest in, for the sake of children. In this way, they are provided with good conditions for schooling, if they learn to use the Internet and computers in time. Various opportunities are offered for the formation of partnerships and trade union organizations with libraries, to bridge the digital and information divide. However, this solution requires additional investments, both in the form of infrastructure and in the form of qualified labor.
- **Askhaja E-Centers** –In Kerala, e-centres are being set up to provide access to ICT technologies to the entire society, even to very remote areas. The level of IT literacy is being raised, with various training programs, as well as local content that is accessible and appropriate for multiple interest groups. The favorable outcomes of these centers are an increase in economic growth, by creating opportunities for additional employment of the population. It is important to mention that they are located and distributed, so that they are accessible to different areas. Therefore, a powerful Internet network is expanding, which contributes to the development of literacy, e-commerce, communication, dissemination of information...
- **Bhoomi Project** –deals in Land Title Registration and is located in Karnataka. This project covers 6.7 million workers and farmers, and it deals with a large number of land records. Bhoomi centers are located all over India. Land records in this project are viewed by touching the screen at the kiosks. The project reduced interactions with the bureaucratic hierarchy of the state revenue department, i.e. the project has shown advantages through the fast functioning of the online mode.¹⁶

¹⁴Bansode, SY, & Patil, SK (2011). "Bridging digital divide in India: Some initiatives", Asia Pacific Journal of Library and Information Science, p. 61

¹⁵Technology development for Indian languages

¹⁶Bansode, SY, & Patil, SK (2011). "Bridging digital divide in India: Some initiatives", Asia Pacific Journal of Library and Information Science, p. 62

¹²www.worldbank.org, accessed March – 2021.

¹³Bansode, SY, & Patil, SK (2011). "Bridging digital divide in India: Some initiatives", Asia Pacific Journal of Library and Information Science, p. 61

VI. AN EXAMPLE OF OVERCOMING THE GAP - ASIA

At the end of the last century and the beginning of this one, Asia entered the "modern" world heritage, and the year 2004 (taken as the year that marked the enormous growth of telecommunication multimedia devices as the primary choice of man in the field of technology) and telecommunications prosperity speak in favor of this. Asia has entered the era of convergence using IP, that is, various multimedia (voice, video, network-mobile and other connections) that go along with IP.

When we talk about the digital divide and Asia, according to research from 2005 (published by the World Economic Forum based on the analysis of empirical secondary data from relevant institutions) that speaks of the readiness of Asian countries for the 3G network, Singapore was in the upper part of the world ranking. , Hong Kong, Japan and Malaysia¹⁷. While in the lower part of the ranking were India ranked as 39th, China as 41st and Indonesia as 51st. Looking at this Sperman ranking, we can conclude a great correlation between the competitiveness of the economy at the time and the preparedness of the 3G network.

The authorities in Singapore have started to overcome the digital divide with some direct (active) measures brought by the Ministry of Education in the form of guidelines for information literacy in 1997. The initial step of these measures was to emphasize the importance of information literacy and education, as well as to introduce it into regular levels of education, with special attention to the students of that time who were the bearers of change. Within five years of these measures, the Ministry of Education spent 1.2 billion US dollars on equipping educational institutions. The second "master's" plan, also lasting five years, building on the previous one, had the goal of upgrading the creativity of students and professors in teaching, as well as IT training. Another in a series of projects that is worth mentioning is the "National Program for Information Technology Literacy", and its role was reflected in the IT literacy of 10% of the population, as well as in increasing the chances of finding a job in the newly created digital environment. As an incentive to overcome the digital divide, government services via IP, such as tax returns, etc., were introduced. This measure was called PS21.

Malaysia had a positive attitude towards overcoming the digital divide. The national information technology agenda had 3 lines of action in overcoming this gap, the first being IT development, human resource development through IT and IT-based applications. Within five years, 1.5 billion US dollars were invested in these three lines of action.¹⁸ Overcoming is also supported by some projects such as "smart" houses or digitization in the natural

sciences. Programs enabling distance learning at higher education institutions were also introduced.

Japan, as the capital of the digital world, can boast of having an ICT nation. What rhetoric was to Ancient Greece, it is the IT sector to Japan, i.e. the basic educational material of the nation from an early age. Although they do not have a digital divide problem, they have introduced a "good practice" program where they have diversified their education system with an initiative to nurture morals, a renaissance in the form of spirituality, as well as scientific and information literacy.

In China, the Ministry of Education ordered at the beginning of this century that both teachers and students must take an IT literacy course. A big progress was that in a few years they managed to enable every third educational institution to enable mandatory and optional attendance of ICT programs and courses. However, we know that the communist system in China is still rigid and that the censorship of information is great, and ICT education brings a whole set of news and information, which is the opposite of the desired state of the authorities in China. However, they introduced a few more measures with a deadline of 2010, but this was their optimum at the time.

VII. THE PROBLEM OF THE DIGITAL DIVIDE IN THE EUROPEAN UNION

When we talk about the European continent, there are many countries, nations, cultures, economic positions... So, in order to overcome the digital divide, we will take the EU as an indicator, and as for Montenegro, let the EU be the reference point. The EU, as a modern country, did not have a big precedent that drastically reduced the digital gap, because that gap was at a medium-low level from the beginning. In 2012, the number of EU citizens who used smartphones, tablets or devices that had access to the Internet was 36%, while in two years it jumped to 51%...¹⁹ European theorists of economic and social inequalities have a hypothesis that the digital divide in the EU will not disappear as long as there are socio-economic inequalities. The EU wants widespread Internet among its citizens, so in 2010 they adopted the following three goals: 1) that by 2013, all EU citizens should have access to the "basic" Internet; 2) fast IP, speeds of 30 megabits per second, to all Europeans; 3) for 50% of households IP speed of 100 megabits per second.²⁰

¹⁷Sharma, R. (2008). Bridging the digital divide in Asia - challenges and solutions. International Journal of Technology, Knowledge & Society, p. 17

¹⁸Sharma, R. (2008). Bridging the digital divide in Asia - challenges and solutions. International Journal of Technology, Knowledge & Society, p. 26

¹⁹[https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI\(2015\)573884_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI(2015)573884_EN.pdf), p. 2

²⁰[https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI\(2015\)573884_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI(2015)573884_EN.pdf), p. 2

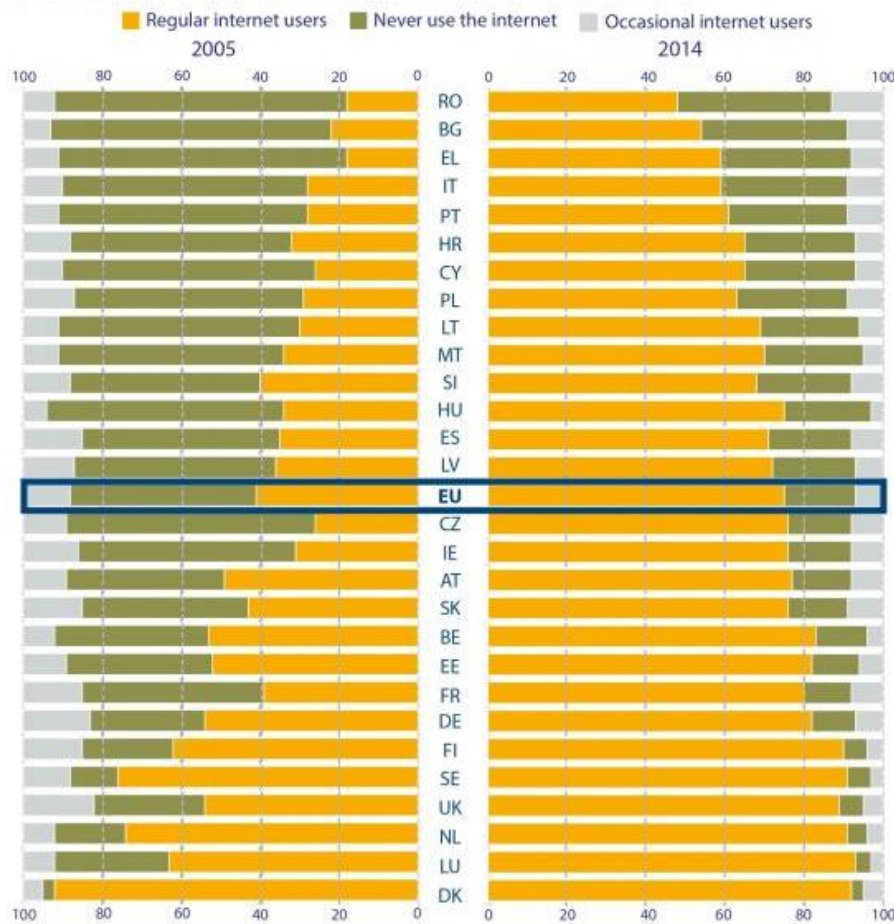


Fig. 2: Progress in regular internet use (www.europarl.europa.eu)

Actions implemented in this matter were eEurope 2002 and 2005 or i2010 strategy. The EU focused its activities on three main instruments: 1) financing instruments; 2) regulations; 3) engagement of interested parties. In overcoming the digital divide, the EU used its structural funds, i.e. grants from them. Overcoming was helped by the Connecting Europe Facility and the European Fund for Strategic Investments, which provide loans, guarantees and capital to bridge the digital divide. Finances amounted to 1.14 billion euros, including 170 million euros for encouraging the expansion of the basic network in public and private companies. In the budgeting of those funds, the columns for rural areas remained empty. In the period from 2007 to 2013, 17.8 billion euros were invested in the ICT sector, while around 1.5 billion euros were invested in rural e-development. Another of the measures to overcome the gap was the act on the single telecommunications market, that is, the "connected continent". This proposal was passed by the European Parliament in 2015.²¹

The first goal was met, because every family had access to internet speeds of 144 kilobits per second. By 2014, 70% of households in the EU had fixed internet, with a few percent lower in rural areas. However, even 30% of EU households did not have an IP at the end of 2015. It is clear that it is not a problem of a technical nature but rather

²¹[https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI\(2015\)573884_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI(2015)573884_EN.pdf), p. 6

due to the preferences of the population, 45% of the population considered it unnecessary, 41% had a barrier of lack of "skill", the other reasons are found in the high cost of access and equipment needed for "surfing". As we know that the EU is a union of several European countries, so we can assume that the digital divide has decreased disproportionately across its members. Thus, the biggest reduction of this gap came from BENELUX, Finland, Sweden and Great Britain. Bulgaria, Romania, Greece and Portugal lead the rear in this aspect.²²

VIII. CONCLUSION

In the previous chapters, it was pointed out that the digital divide stems from the socio-economic gap, that is, there will be a digital divide as long as there is this type of social gap. Puck, statedwe explained the instruments and measures that produced results, explained how they function and learned that almost all measures made some contribution to overcoming the digital divide, and which one was the best, let the present day, or the current possibility of IP access in countries that used different measures, judge. It is very importantto mentionthat the measures to overcome

²²[https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI\(2015\)573884_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI(2015)573884_EN.pdf), p. 3

the digital divide differ according to the cultures of the countries and the customs of the people, as well as the present economic systems. We are in the initial explanations processed mobile phones, as the most used electronic device today and as one of the best models for overcoming the digital divide, due to its more affordable price than a computer, tablet... We are also here investigated some examples of African countries, which, by overcoming the digital divide, have helped people in rural settlements and their living and agricultural lives. We also singled out Singapore, Japan, China... Singapore as a mirror of overcoming the digital divide with strong activist measures and large spending, Japan as a country that has digital DNA and the ease of this transformation, as well as China that limited its measures for the sake of the economic system. Also in our work, we specifically analyzed the methods and solutions used by India, on the basis of which we can conclude that a lot of funds and work are being invested. Nevertheless, despite this, its lag in this field, in relation to developed countries, is still noticeable.

Looking from the current point of view, it is clear that the digital gap will decrease "by itself", that is, the trend of globalization and digitization is the present and the future, whether some countries want to adapt or not. Technology is well on its way to becoming an integral part of the lives of a large number of people, which will improve the living standards of numerous countries.

REFERENCES

- [1.] Samii, R. (2009). "Mobile phones: the silver bullet to bridge the digital divide", *Participatory Learning and Action*, 59(1), 44-50.
- [2.] Rao, SS (2005). "Bridging the digital divide: Efforts in India", *Telematics and informatics*, 22(4), 361-375.
- [3.] Bansode, SY, & Patil, SK (2011). "Bridging digital divide in India: Some initiatives", *Asia Pacific Journal of Library and Information Science*, 1
- [4.] <https://cs.stanford.edu/people/eroberts/cs181/projects/digital-divide/start.html>, March 2021.
- [5.] https://www.pcworld.com/article/149075/mobile_phones.html, July 2008.
- [6.] <https://www.decluttr.com/blog/2018/07/13/what-are-the-best-selling-cell-phones-of-all-time/>, March 2021.
- [7.] Lazović V., Đuričković T. (2018). "The Digital Divide," *Digital Economy* 123-162.
- [8.] Chang, BL, Bakken, S., Brown, SS, Houston, TK, Kreps, GL, Kukafka, R., ... & Stavri, PZ (2004). "Bridging the digital divide: reaching vulnerable populations" *Journal of the American Medical Informatics Association*, 11(6), 448-457.
- [9.] Boyera, S. (2007). "Can the mobile web bridge the digital divide?", *Interactions*, 14(3), 12-14.
- [10.] OECD (2001), "Understanding the Digital Divide", *OECD Digital Economy Papers*, No. 49, OECD Publishing, Paris
- [11.] Sharma, R. (2008). *Bridging the digital divide in Asia - challenges and solutions*. *International Journal of Technology, Knowledge & Society*, 1(3).
- [12.] [https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI\(2015\)573884_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/573884/EPRS_BRI(2015)573884_EN.pdf), December 2015.