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## **DIGITALISATION OF THE ECONOMY AND THE ISSUES OF INEQUALITY IN THE GLOBAL SOCIETY**

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**Abstract:** *Increasing prosperity, as well as the coexistence of persistent and deep inequalities, is one of the greatest paradoxes of our time, which in today's world undermines the entire modernisation process and global development dynamics. Undoubtedly, the digital revolution is transforming economies on a global scale, bringing with it huge potential economic gains and new challenges. In an era of complex economic, technological, geopolitical and environmental risks, the so-called growing social fragmentation is particularly striking, among other things, through the strong spread of digital inequalities (and the related concept digital divide), which further undermines social cohesion and global cooperation. Although digital progress has created enormous wealth in record time, it has remained concentrated around a small number of individuals, companies and countries, and all predictions are that this trajectory will continue, further deepening already growing inequality. The paper analyses the inequalities and stratification of the digital sphere and seeks to establish a link between sustainable development, rapid technological change and issues of inequality, and thus encourages debate and reflection on this challenge for researchers and public practitioners in the global context, by applying scientific methods of systematisation and analysis. In the coming period, new policies under the auspices of the new agenda will have to respond much better to the new dynamics of the digital economy in order to record more inclusive results in the global world. In a world where more than half of citizens have no or limited internet access, intensive work must be done to close the digital divide (especially in internet access), while inclusiveness would be crucial to building a digital economy that delivers for all, which is crucial for economic mobility and social participation. In order to turn the digital transformation curve towards a more prosperous tomorrow, collaborative and coordinated action at the global level is of great importance.*

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**Keywords:** *digital economy, digital divide, digital inequality, IT policy, technology adoption, new policy agenda*

**JEL classification:** *A12, A13, O33, O38*

## **DIGITALIZACIJA EKONOMIJE I PITANJA NEJEDNAKOSTI U GLOBALNOM DRUŠTVU**

**Sažetak:** *Sve veći prosperitet, kao i koegzistencija upornih i dubokih nejednakosti, jedan je od najvećih paradoksa našeg vremena, koji podriva čitav modernizacijski proces i globalnu razvojnu dinamiku. Nema sumnje da digitalna revolucija transformiše ekonomije na globalnom nivou, donoseći sa sobom ogromne potencijalne ekonomske dobitke, ali i nove izazove. U eri složenih ekoloških, geopolitičkih, ekonomskih i tehnoloških rizika posebno je upadljiva tzv. rastuća društvena fragmentacija koja se, između ostalog, manifestuje kroz snažno širenje digitalnih nejednakosti (i digitalnog jaza kao povezanog koncepta) što dodatno podriva društvenu koheziju i globalnu kooperaciju. Iako je digitalni napredak kreirao ogromno bogatstvo u rekordnom roku, ostao je koncentrisan oko malog broja pojedinaca, kompanija i zemalja, a sva predviđanja su da će se ova putanja nastaviti dodatno produbljujući već rastuću nejednakost. U radu se analiziraju nejednakosti i raslojavanje digitalne sfere i nastoji se uspostaviti veza između održivog razvoja, brzih tehnoloških promena i pitanja nejednakosti, te na taj način podstakne debata i promišljanje ovog izazova za same istraživače i javne praktičare u globalnom kontekstu, primenom naučne metode sistematizacije i analize. U narednom periodu nove politike pod okriljem nove agende moraće mnogo bolje da odgovore na novu dinamiku digitalne ekonomije kako bi se došlo do inkluzivnijih rezultata u globalnom svetu. U svetu u kome više od polovine građana nema ili ima ograničen pristup internetu, mora se intenzivno raditi na zatvaranju digitalnog jaza (posebno u pristupu internetu), dok bi inkluzivnost bila ključna za izgradnju digitalne ekonomije koja donosi sve ono što je presudno za ekonomsku mobilnost i društvenu participaciju. Kako bi se kriva digitalne transformacije okretala ka prosperitetnijem sutra od ogromne je važnosti saradnička i koordinirana akcija na globalnom nivou.*

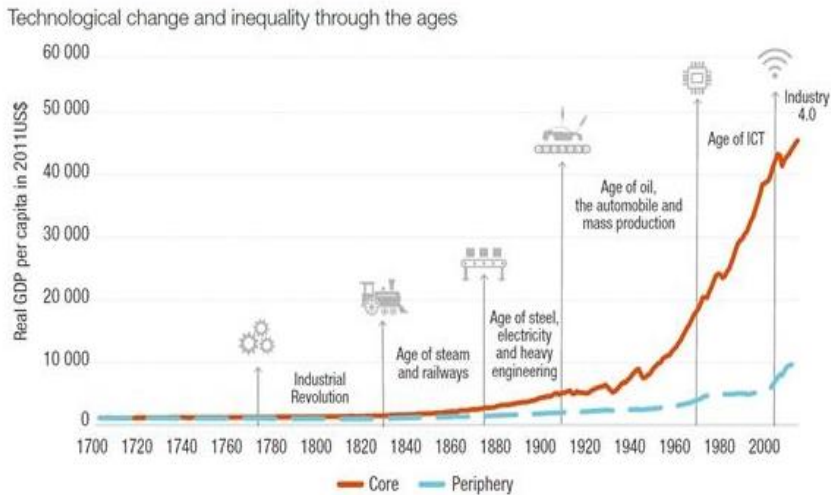
**Ključne reči:** *digitalna ekonomija, digitalni jaz, digitalna nejednakost, IT politika, tehnološka adaptacija, agenda nove politike*

## 1. INTRODUCTION

One of the greatest social transformations of the last decades is certainly the digital revolution which is an essential determinant of the way people live and communicate on the planet, which also marked the beginning of the process of transforming people into a kind of *Homo digitalis* (TWI2050 - The World in 2050 (2019)). The term digital economy refers to social and economic activities directly related to the use of digital technology by individuals, the private sector and the government. On the whole, a key determinant of the digital economy is the intensive use of information and communication technologies as a key driver of economic-structural optimisation, raising productivity levels, rapid innovation and inclusive, sustainable growth. The advantages of digitalisation for the economy and society are: 1. support to employment, health and education (People), 2. contribution to sustainability (Planet) and 3. enabling to the economic resilience of businesses (Prosperity).

On the other hand, digitalisation is not a panacea and there is a huge concern nowadays about the impact of digital technology on overall inequality as a multidimensional, multi-layered and cumulative phenomenon and one of the biggest challenges facing everyone today, with adverse economic, social, and political consequences (Qureshi, 2021; Maceviciute & Wilson, 2018). The fact that dramatic technological progress is predominantly concentrated in developed and advanced world economies and that there are great divisions between countries is clearly confirmed by Figure 1, where the beginnings of digital inequalities are linked even during the first industrial revolution. It can be clearly seen that with each new revolution, digital inequality is spreading, which is primarily reflected in unequal access to public goods, social services and products - from ICT infrastructure through health and education to electrification.

As the biggest and most dangerous risk for the next decade (in addition to climate change, environmental degradation and cyber security), as well as a critical, primarily short-term threat, the proliferation of the digital divide can undermine prospects for an inclusive recovery and worsen societal fractures (World Economic Forum, 2021). As a cumulative, multi-layered and multidimensional phenomenon, digital inequality requires efficient action with social, spatial, cultural, political, environmental, and knowledge features (ISSC, IDS & UNESCO, 2016). As key barriers on the path of progress towards digital inclusion, the following stand out in the first place: rapidly accelerating automation, gaps in technology skills and capabilities and gaps in technology regulation, growing digital dependency, as well as, information suppression and manipulation (World Economic Forum, 2021).



2- Why was every wave of progress associated with sharper inequality between countries? Which challenges will developing countries need to overcome in the case of industry 4.0?

*Figure 1. Waves of technological change and the great divide, inequality and technological change over time through the centuries ( "Core" refers to Western Europe, the United States, New Zealand, Australia, Canada and Japan, while "Periphery" refers to the rest of the world)*

*Note.* United Nations, 2021, p. xiii

The primary goal and central focus of the paper is the theoretical and empirical explication of the phenomenon of digital inequality (and the digital divide as a related concept), as well as providing certain insights to policymakers around the world to better understand the social impact and multiple nature of this phenomenon and practical guidelines and tools for implementing a number of steps to more effectively bridge the gap in the digital world. The paper is structured so that it is divided into three logically connected wholes. In the first part of the paper, a brief insight into the socially relevant and very complex phenomenon of digital inequality is offered. The second part points to the deeper implications of digital inequality as a relevant social issue that will continue to evolve over and over again, along with the growing penetration of new technologies. The third part proposes concrete measures to be taken in order to alleviate digital inequalities. Also, in this section, we recognise the importance of a new agenda and policy for creating an inclusive, open, enabling and fair and non-discriminatory digital economy on a global scale. The key

findings contained in this paper, apart from theoretical ones, also have practical importance in terms of guidelines and recommendations that could be useful to economic policymakers.

## **2. THE PHENOMENON OF DIGITAL INEQUALITY - THEORETICAL FOUNDATIONS**

Digital inequality as a political "hot topic" (Southe Centre, 2021; Maceviciute & Wilson, 2018; Büchi & Vogler, 2017; Robinson et al., 2015; Acemoglu, 2002; Ramalingam & Hernandez, 2016; van Deursen et al., 2017; Antonelli, 2003) can be seen both as a cause and as a consequence of wider social inequality. This relationship can be labelled as ambiguous, contested and complex regarding the relationship between inequality and technology. This is because at the same time new technological solutions improve access to basic services, raise productivity levels, lead to accelerating economic growth rates and facilitate the exchange of knowledge and information, but they are also a generator of huge, deepening, extreme and long-lasting inequalities (inequality of outcome; inequality of opportunities; and inequality of impact). Digital inequality manifests itself through four levels, in terms of: access to ICT; (2) adoption of ICT; (3) appropriation of ICT and (4) results of ICT use (Table 1).

Two key reasons for the uneven distribution of digital dividends (benefits) from the use of digital technologies are (World Bank, 2016): (1) the exclusion of more than half of the world's population for any reason outside of digital modernisation flows and the digital economy; and (2) some of the benefits of digital technologies outweigh the risks that arise simultaneously and are reflected in: a. polarisation of the labourlabour market (due to the replacement of routine jobs with new skills, workers are under increasing pressure to compete for lower paid jobs); b. due to the lack of accountability and transparency of institutions, increased public sector investment in digital technologies strengthens the position of the ruling elites, which has the direct consequence of stronger state control and policy capture and c. the absence of a competitive business environment due to natural monopolies leads to market concentration in favor of already existing firms, while the dominant part of the profits goes directly into the hands of well-connected, more capable and educated people.

Table 1

*The cycle of ICT adoption seen through the prism of the level of digital inequality*

<b>Focus: Developing countries</b>	<b>ICT access →</b>	<ul style="list-style-type: none"> <li>▪ Basic access to Internet-based ICT</li> <li>▪ Internet penetration rates still low in developing countries, close to saturation in developed countries</li> <li>▪ inequality primarily driven by macro-economic factors</li> </ul>
	<b>ICT adoption →</b>	<ul style="list-style-type: none"> <li>▪ Decision to adopt Internet, given access</li> <li>▪ inequality in uptake primarily driven by socio-demographic factors (age, education, income)</li> </ul>
<b>Focus: Developed countries</b>	<b>ICT appropriation →</b>	<ul style="list-style-type: none"> <li>▪ ability to use ICT effectively towards a purpose &amp; types of use</li> <li>▪ inequality primarily driven by awareness, skills, and social factors</li> </ul>
	<b>→ ICT use outcomes</b>	<ul style="list-style-type: none"> <li>▪ Outcome of using ICT, e.g. economic benefit, knowledge, etc.</li> <li>▪ inequality primarily driven by disparities in ICT appropriation</li> </ul>

*Note.* Adapted from Reinartz, A. (2016). *Digital Inequality and the Use of Information Communication Technology*. Dissertation Zur Erlangung des akademischen Grades eines Doktors der Wirtschaftswissenschaften an der Universität Passau.

### 3. DIGITAL INEQUALITY AND DIGITAL DIVIDE AS A CONSEQUENCE OF DIGITALISATION OF ECONOMY - FACTS AND KEY ISSUES

Digital inequality is certainly at odds with universal global values such as equitable, sustainable and inclusive development, social justice, collective empowerment and individual freedoms, peaceful coexistence and cultural pluralism (ISSC, IDS & UNESCO, 2016). The maintenance and reproduction of social and economic disparities are also achieved through the so-called digital divide - which is nothing but a gap in terms of adequate access to modern information and communication technologies (primarily the Internet) for individuals, households, companies and geographical areas, as well as their use for the whole spectrum of activities (Hernandez & Roberts, 2018; George, 2021; van Dijk, 2020; Heeks, 2021; ITU, 2018; Várallyai et al., 2015; Nieminen, 2016; Sparks, 2013; Larghi et al., 2015; van Deursen et al., 2017; Vartanova & Gladkova, 2019; van Dijk, 2005; van Dijk, 2006; Rao, 2005; Acharya, 2017; Andrews et al., 2018). The term dates back to the 1990s and underlines the existence of a separation between those who gain access to new

forms of information technology and those who are unable to do so. However, the technological gap is actually a historical artefact and by no means just a modern phenomenon (South Centre, 2021).

The following stand out as key determinants of the digital divide: (Sorj, 2008, p. 47): 1) differences in the physical infrastructure for transmission; 2) differences in access to connection equipment (access line, computer and modem); 3) differences in training regarding the use of the Internet and computers; 4) the difference in the level of intellectual abilities, capacity for internet communication, and the possibility of effective use of available information; 5) different abilities to create and use specific contents that are intended for the needs of different segments of the population. While first, the two criteria refer to passive dimensions of Internet access, the last three dimensions define areas of potential active appropriation.

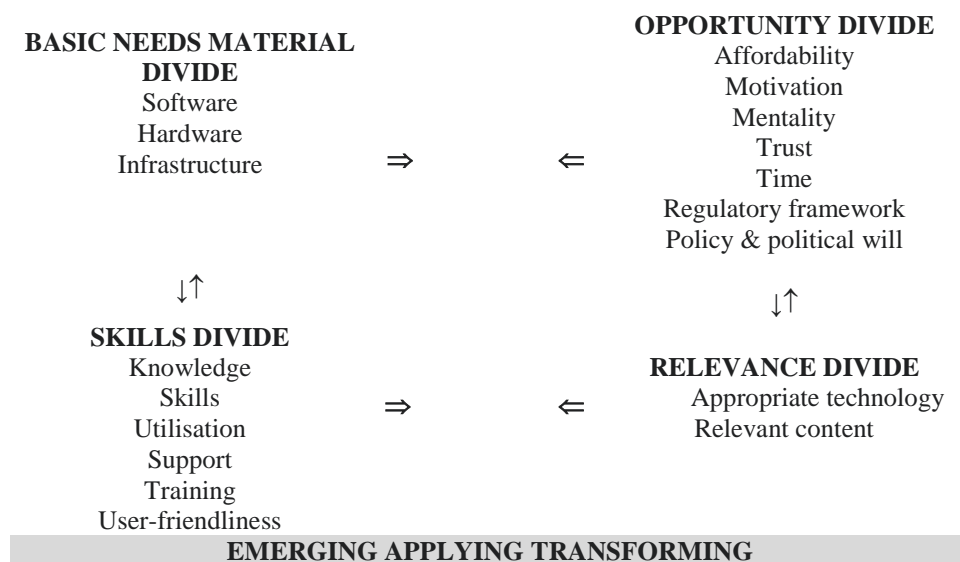


Figure 2. Cumulative view of the digital divide

*Note.* Björk Gudmundsdottir, G. (2010). *From digital divide to digital opportunities? A critical perspective on the digital divide in South African schools*. University of Oslo, Faculty of Educational Sciences.

The digital divide concept is multi-layered in nature, which can also be shown graphically (see Figure 2). The essential aspect in the mentioned figure is certainly the material divide as the backbone for any use of information and communication technologies, considering that it directly concerns the access to

software, hardware, infrastructure and computers - and other types of the divide are built on and based on this type.

Table 2

*Principles for digital transformation*

<b>Principles for digital transformation</b>	<b>Example measures</b>
<i>Enabling digital infrastructure, further expansion, and innovations</i>	<ul style="list-style-type: none"> <li>• Universal access to high-quality, low-cost mobile broadband.</li> </ul>
<i>Online services</i>	<ul style="list-style-type: none"> <li>• Online governance to support public services and participation.</li> <li>• Online finance and payments to facilitate trade and business services.</li> <li>• Regulatory security for online identity and privacy.</li> <li>• Online national systems (or “platforms”) for health care and education.</li> </ul>
<i>Digital systems to increase the efficiency of resource use</i>	<ul style="list-style-type: none"> <li>• Smart grids and the Internet of Things for sustainable cities.</li> </ul>
<i>Analytical packages for exploration and monitoring</i>	<ul style="list-style-type: none"> <li>• Income redistribution to address income inequalities arising from digital scale-up.</li> <li>• Tax and regulatory systems to avoid monopolisation of Internet services.</li> <li>• Democratic oversight of cutting-edge technologies (biotech, nanotech, artificial intelligence, big data, autonomous systems).</li> <li>• Universal access to high-quality, low-cost mobile broadband education to avoid new digital divides and to develop capacities for sustainable digitalization.</li> <li>• Aligning the emerging digital technologies and infrastructures with human norms and the paradigm of sustainable development.</li> </ul>

*Note.* TWI2050 - The World in 2050 (2019). *The Digital Revolution and Sustainable Development: Opportunities and Challenges*. International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria.

There are three main mechanisms by which digital technologies can increase income, empower citizens and reduce poverty, namely (World Bank, 2016): (i) inclusion - removing physical barriers to reach remote populations and reducing transaction and information costs; (ii) efficiency - the costs of existing services and transactions can be reduced by automating existing processes and (iii) innovation - in terms of rapid scaling of digital platforms with almost zero level of marginal costs. Although one such question is still without a definitive answer, in order for digital transformation to make a significant contribution to



the realisation of the concept and goals of sustainable development, some of the key principles and priorities are presented as follows in Table 2.

#### 4. DIGITAL INEQUALITY IN GLOBAL LIGHT - EMPIRICAL FINDINGS

There are two scales for analysing the digital divide, namely: 1. global (gap between different countries (mainly developed and developing countries) and continents) and 2. domestic (gap between regions and parts within one country) (Mardikyan et al., 2015, p. 2). Table 2 provides data on global participation in the digital economy, and once again emphasises the need to find more thoughtful approaches to ensuring universal and meaningful connectivity, and overall calculated on a more even distribution of benefits to all members of society.

Table 3

*Global participation in the digital economy*

Indicator	2018 Data	Penetration	Source
World Population	7.6 billion	-	UN
Mobile Broadband Subscriptions	5.3 billion	69%	ITU
Unique Mobile Subscribers	5.1 billion	67%	GSMAi
Unique mobile internet subscribers	3.5 billion	47%	GSMAi
Internet Users	3.9 billion	51%	ITU
Active Social Media Users	3.5 billion	45%	Datareportal / Hootsuite
Fixed Broadband Subscriptions	1.1 billion	14%*	ITU

*Note.* State of Broadband Report 2019. Geneva: International Telecommunication Union and United Nations Educational, Scientific and Cultural Organization. Licence: CC BY-NC-SA 3.0 IGO, p. 4.

##### 4.1. HOW CAN TECHNOLOGY IMPACT INEQUALITY IN GLOBAL PERSPECTIVE?

For the purposes of empirical analysis, we have adopted the position that the appropriate metrics are relevant because it offers certain facts and evidence on the basis of which it is possible to draw lessons for individual and collective behaviour in order to achieve sustainable, successful and equitable digital transformation of the global economy. The geographical disparities in the development of the digital economy on a global scale are best evidenced by the analyses and indicators given below.

In order to benefit from today's digitalised economy and society, individuals and societies must be empowered to effectively use the latest technological

solutions (ICT), known as digital inclusion, which is a key prerequisite for macro-economic development, personal income growth and the creation an equitable and sustainable digital society. In this regard, it would be useful here to refer to the so-called Digital Inclusion Index (RB DII), which was conceived by Roland Berger<sup>1</sup>, and which is evaluates the degree of digital inclusion regarding the possibility of using digital tools and accessing the Internet. The evaluation refers to 82 countries, both developed and developing countries around the world, which record a share in the global gross domestic product of 93% for 2019 and which include 90% of the world's population. The index relies on four fundamental levers, namely: 1. accessibility [in terms of digital accessibility by individuals], 2. affordability [in terms of sustainability of financing digital access], 3. ability [in terms of the level of digital readiness and literacy related to knowledge of ICT] and 4. attitude [in terms of enthusiasm regarding the use of ICT and the level of trust in it] (for regional scores see Figure 4.).

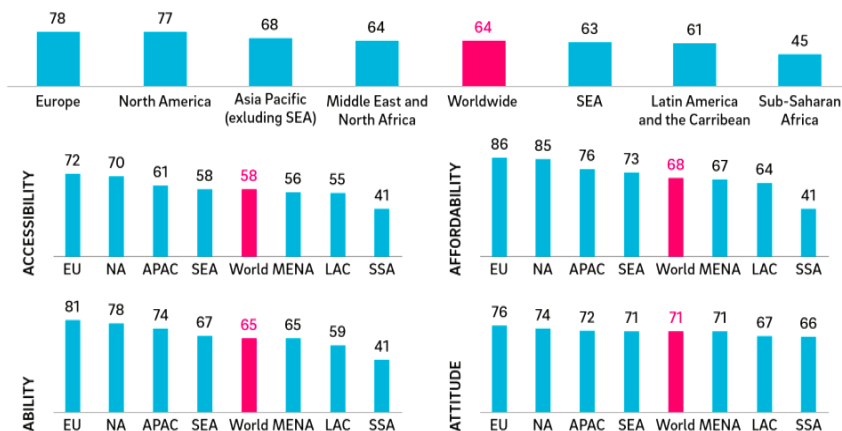


Figure 3. Regional ranking, breakdown and results by four key levers for measuring the degree of digital inclusion (max. score = 100).

Note.

<https://www.rolandberger.com/en/Insights/Publications/Bridging-the-digital-divide.html>  
According to a recent study by Roland Berger entitled "Bridging the digital divide"<sup>2</sup>, the main conclusion is (score between 2017 and 2020) if governments and societies proactively do not work on strengthening digital inclusion, the consequences are a great immobilisation of the labour force, which causes a slowdown in economic growth, and a deepening of the digital divide, which

<sup>1</sup> It is a leading global consulting firm founded in 1967.

<sup>2</sup> Available at: <https://www.rolandberger.com/en/Insights/Publications/Bridging-the-digital-divide.html>

undermines social cohesion. According to Figure 3, in terms of the region according to the dimension of digital inclusion, Sub-Saharan Africa, Southeast Asia and South America are at the very bottom and dominate.

Table 4

*Regional distribution of countries by EGDI (EGDI E-Government Development Index) level, 2016, 2018 and 2020*

		<b>Very High EGDI</b>	<b>High EGDI</b>	<b>Middle EGDI</b>	<b>Low EGDI</b>
<b>AFRICA</b>	2020		14	33	7
	2018		8	33	13
	2016		5	23	26
<b>AMERICAS</b>	2020	7	23	5	
	2018	3	22	10	
	2016	2	15	17	1
<b>ASIA</b>	2020	15	19	12	1
	2018	8	24	13	2
	2016	6	21	17	3
<b>EUROPE</b>	2020	33	10		
	2018	27	16		
	2016	19	24		
<b>OCEANIA</b>	2020	2	3	9	
	2018	2	3	9	
	2016	2	10		2

*Note.* United Nations. (2020). *E-Government Survey 2020, Digital Government in the Decade of Action for Sustainable Development - With addendum on COVID-19 Response*. New York: United Nations, Department of Economic and Social Affairs.

For the purposes of our analysis of digital inequality in the global world, it is also relevant E-Government Development Index - EGDI. Table 4 provides an overview of regional E-government development, which can identify important trends and effects measured by the aforementioned index for the period 2016-2020, and, at the same time, confirm the persistence of digital divides between countries and regions. As for 2020, the smallest share of countries in the group with a high EGDI score (4%) is recorded in Oceania and the largest in Europe (58%) which remains the leader in e-government development. As for the United States, 86% of the region consists of a group of countries with very high and high levels of EGDI, which almost doubled compared to 2016, while the remaining 14% are five countries with average values of this indicator. When it comes to Asia, there is only one country in the group with low EGDI, while in the group with medium, high and very high EGDI, respectively 12 (26%), 19 (40%) and 15 (32%) countries. More than half of the countries (61%) in Africa

belong to the group that records medium EGDI, while the number of countries from the group of high EGDI is extremely low (26% of the region), despite the fact that it has doubled from 8 to 14 since 2018. As can be seen in Table 5, all regions have contributed to the increase in the global EGDI average by improving their own average values since 2018, with the greatest progress being recorded in Oceania and Africa (growth of EGDI values by 14%). With an average EGDI value of 0.8170, the leader in the development of e-government, as well as the share of countries in the group with the largest EGDI, is certainly Europe. When it comes to 2020, despite significant progress in Oceania and Africa, their EGDI regional averages remain below the global average (0.60), 0.5269 and 0.3914, respectively, while higher values of the index are recorded in the United States (0.6341) and Asia (0.6373), which is for the first time in the second position by regional EGDI value.

Table 5

*Regional average EGDI values, 2020*

REGION	AVERAGE EGDI, 2020	AVERAGE EGDI, 2018
Africa	0.3914	0.3423
Americas	0.6341	0.5898
Asia	0.6373	0.5779
Europe	0.8170	0.7727
Oceania	0.5269	0.4611

*Note.* United Nations. (2020). *E-Government Survey 2020, Digital Government in the Decade of Action for Sustainable Development - With addendum on COVID-19 Response*. New York: United Nations, Department of Economic and Social Affairs

The Economist Intelligence Unit's Country Forecast service has recently begun analysing and assessing how prepared countries around the world are for radical technological change through three basic categories, as follows: (1) access to the internet - internet usage and mobile phone subscriptions; (2) digital economy infrastructure (e-commerce, e-government and cyber-security) and (3) openness to innovation (international patents granted, research and development (R&D) spending, and the research infrastructure) (for detail see: Economist Intelligence Unit, 2018). In relation to the above, Table 5 gives a ranking according to the criterion of technological preparedness for most economies around the world, while the findings indicate the following (Economist Intelligence Unit, 2018, p. 2): (a) For the period 2013-2017, according to the index of technological readiness at the very top as the top countries are Sweden and Finland, while in the top 10 are also Australia and the advanced economies of Asia, as well as several other Western European countries; (b) For the upcoming period 2018-2022, the situation is changing so that analysts predict

that France and the USA will enter the top ten best economies in the world, while Sweden, Singapore and Australia impose themselves as the ones with the best technological performance and (c) At the very bottom of the scale for the observed historical periods when it comes to the previously mentioned observed index are predominantly developing countries from the continents of Africa, Asia and Latin America, which is mainly explained by weak institutional capacity and high levels of corruption in these countries which undermine investment in sophisticated digital infrastructure.

As a composite indicator of the global digital ecosystem at the country level, the Digital Platform Economy Index (DPE Index) incorporates 12 relevant pillars for 116 countries, as follows:<sup>3</sup> (I) Digital Technology Infrastructure - it concerns the establishment of a set of institutional standards related to digital technology, as well as coordination and management related to it, and concerns: 1. *Digital openness* - refers to the degree of institutional support of the country in terms of the level of use and coverage of digital technologies, which is quantified by the percentage of individuals and households that have access to the Internet; 2. *Digital freedom* - it concerns the level of freedom provided by the government and its institutions in terms of the affirmation of new digital technologies and 3. *Digital protection* - refers to the level of regulatory and legal protection against piracy and cybercrime; (II) Digital User Citizenship - it concerns implicit social norms and explicit legitimation that ensures the participation of stakeholders in the digital sphere, and unites: 1. *Digital literacy* - it concerns the level of competence of citizens when it comes to the use of digital platforms and technology, and computer systems; 2. *Digital access* - it concerns the possibility of access to new digital technologies by citizens; and 3. *Digital rights* - it concerns the legal and human rights of citizens regarding the protection of their privacy and the use of digital technologies; (III) Digital Multi-sided Platform - refers to: The *Networking* pillar - concerns network and other externalities related to the use of digital technologies; 2. *Matchmaking* component - in terms of valorising the effectiveness of the model of multi-sided platforms and 3. *Financial facilitation* - numerous aspects of finance are covered and related to the creation of conditions for the realisation of financial transactions through the Internet and encouraging the opening of startups and (IV) Digital Technology Entrepreneurship - it concerns the ability to create newly created value through the use of digital platforms, and to experiment and generate new entrepreneurial innovations.

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<sup>3</sup> For detail see: Global Entrepreneurship and Development Institute (GEDI). *The Digital Platform Economy Index 2020*, <https://thegedi.org/wp-content/uploads/2020/12/DPE-2020-Report-Final.pdf>, p. 8-9.

Table 6

*Technological Readiness Ranking*

2013-17			2018-22		
Country	Score	Ranking	Country	Score	Ranking
Finland	9.71875	1	Australia	9.71875	=1
Sweden	9.4375	2	Singapore	9.71875	=1
Australia	9.15625	=3	Sweden	9.71875	=1
Austria	9.15625	=3	US	9.4375	=4
Germany	9.15625	=3	Finland	9.4375	=4
Netherlands	9.15625	=3	France	9.4375	=4
Singapore	9.15625	=3	Germany	9.4375	=4
Japan	8.875	=8	Japan	9.4375	=4
South Korea	8.875	=8	Netherlands	9.4375	=4
Taiwan	8.875	=8	Austria	9.15625	=10
US	8.59375	=11	Belgium	9.15625	=10
Canada	8.59375	=11	Hong Kong	9.15625	=10
Denmark	8.59375	=11	South Korea	9.15625	=10
France	8.59375	=11	Taiwan	9.15625	=10
Hong Kong	8.59375	=11	Canada	8.875	=15
Israel	8.59375	=11	Denmark	8.875	=15
New Zealand	8.59375	=11	Estonia	8.875	=15
UK	8.59375	=11	New Zealand	8.875	=15
Belgium	8.3125	=19	Switzerland	8.875	=15
Estonia	8.3125	=19	Israel	8.59375	=20
Norway	8.3125	=19	UK	8.59375	=20
Switzerland	8.3125	=19	Norway	8.3125	22
UAE	8.03125	23	Ireland	8.03125	=23
Qatar	7.46875	=24	Spain	8.03125	=23
Spain	7.46875	=24	UAE	8.03125	=23
Czech Republic	7.1875	=26	Lithuania	7.75	26
Ireland	7.1875	=26	Czech Republic	7.46875	=27
Italy	7.1875	=26	Italy	7.46875	=27
Lithuania	6.90625	=29	Malaysia	7.46875	=27
Malaysia	6.90625	=29	Poland	7.46875	=27
Poland	6.90625	=29	Qatar	7.46875	=27
Russia	6.90625	=29	Argentina	7.1875	=32
Chile	6.625	=33	China	7.1875	=32
Portugal	6.625	=33	Russia	7.1875	=32
Slovenia	6.625	=33	Slovenia	7.1875	=32
Argentina	6.34375	=36	Chile	6.90625	=36
China	6.34375	=36	Portugal	6.90625	=36
Brazil	6.0625	=38	Slovakia	6.90625	=36
Bulgaria	6.0625	=38	Bulgaria	6.625	=39
Hungary	6.0625	=38	Hungary	6.625	=39
Latvia	6.0625	=38	Ukraine	6.625	=39
Saudi Arabia	6.0625	=38	Costa Rica	6.34375	=42
South Africa	6.0625	=38	Cyprus	6.34375	=42
Ukraine	6.0625	=38	India	6.34375	=42
Costa Rica	5.78125	=45	Latvia	6.34375	=42
Kuwait	5.78125	=45	South Africa	6.34375	=42
Cyprus	5.5	=47	Brazil	6.0625	=47
India	5.5	=47	Saudi Arabia	6.0625	=47
Slovakia	5.5	=47	Croatia	5.78125	=49
Bahrain	5.21875	=50	Kuwait	5.78125	=49
Croatia	5.21875	=50	Mexico	5.78125	=49
Greece	5.21875	=50	Romania	5.78125	=49
Kazakhstan	5.21875	=50	Thailand	5.78125	=49
Thailand	5.21875	=50	Turkey	5.78125	=49
Turkey	5.21875	=50	Colombia	5.5	=55

Colombia	4.9375	=56	Jordan	5.5	=55
Mexico	4.9375	=56	Kazakhstan	5.5	=55
Romania	4.9375	=56	Philippines	5.5	=55
Tunisia	4.9375	=56	Serbia	5.5	=55
Morocco	4.65625	=60	Sri Lanka	5.5	=55
Philippines	4.65625	=60	Bahrain	5.21875	=61
Jordan	4.375	=62	Greece	5.21875	=61
Serbia	4.375	=62	Morocco	4.9375	=63
Azerbaijan	4.09375	=64	Tunisia	4.9375	=63
Iran	4.09375	=64	Azerbaijan	4.65625	=65
Sri Lanka	4.09375	=64	Vietnam	4.65625	=65
Kenya	3.53125	=67	Indonesia	4.375	=67
Vietnam	3.53125	=67	Iran	4.375	=67
Ecuador	3.25	=69	Ecuador	3.8125	=69
Egypt	3.25	=69	Peru	3.8125	=69
El Salvador	3.25	=69	Egypt	3.53125	=71
Indonesia	3.25	=69	El Salvador	3.53125	=71
Dominican Republic	2.96875	=73	Kenya	3.53125	=71
Pery	2.96875	=73	Algeria	3.25	=74
Venezuela	2.96875	=73	Cuba	3.25	=74
Algeria	2.6875	=76	Dominican Repub.	2.96875	76
Cuba	2.6875	=76	Pakistan	2.6875	=77
Pakistan	2.40625	78	Venezuela	2.6875	=77
Bangladesh	2.125	=79	Bangladesh	2.40625	79
Nigeria	2.125	=79	Nigeria	2.125	80
Angola	1.28125	=81	Libya	1.84375	81
Libya	1.28125	=81	Angola	1.5625	82

*Note.* Economist Intelligence Unit. (2018). *Preparing for disruption - Technological Readiness Ranking*. The Economist Intelligence Unit Limited.

Within this segment, the following dimensions stand out: 1. *Digital adaptation* - it concerns the adaptive capabilities of entrepreneurial agents in terms of the use of new technologies; 2. *The Digital absorption* pillar - it concerns the advanced capabilities of entrepreneurial agents related to the construction of new business models and/or digital products and services, all in relation to the options provided by the development of new digital technologies and 3. *Technology transfer* pillar - here, we take into account a kind of knowledge spillover effect that is initiated through the process of identification, evaluation and exploitation of new opportunities that the latest technology brings with it for relevant actors. Based on the cluster analysis of the previous 12 pillars, global disproportions regarding the development of the digital entrepreneurship ecosystem can be clearly seen, which is also shown in Table 5 Table 7 clearly shows that a huge number of countries (54 of them, out of a total of 116) are included in the Laggards category (DPE INDEX mean score = 17.4), while only seven countries are in the Leaders group (DPE INDEX mean score = 61.3). The group of leading countries in terms of the achieved level of development of the digital entrepreneurship ecosystem is dominated by European (Nordic and Anglo-Saxon) and North American nations which are the best in all twelve pillar score averages, while at the bottom are low-developed Asian and African countries, along with some relatively poor Latin American and European nations.

Table 7

*Four groupings of countries based on average results decomposed into 12 relevant pillars*

Categories/groups	Leaders	Followers	Gainers	Laggards
Digital Access	82.3	74.9	43.7	11.1
Digital Freedom	80.2	60.3	35.3	22.2
Digital Protection	88.3	74.2	37.5	14.6
Digital Literacy	77.4	59.2	33.6	24.1
Digital Openness	76.6	71.7	43.2	13.4
Digital Rights	68.5	62.8	36.3	22.2
Networking	84.1	64.2	37.2	19.1
Matchmaking	82.7	61.3	40.6	18.1
Financial Facilitation	79.3	70.1	38.3	16.8
Digital Adoption	81.8	63.0	39.0	18.6
Technology Absorption	83.3	59.1	34.4	22.9
Technology Transfer	82.0	63.2	35.8	20.6
<i>Digital Platform Economy Index score mean</i>	77.7	61.3	35.9	17.4
Number of cases	7	20	35	54

Legend: **Leaders:** Canada, Iceland, Netherlands, Sweden, Switzerland, United Kingdom, United States; **Followers:** Australia, Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Hong Kong, Ireland, Israel, Japan, South Korea, Luxembourg, Malta, New Zealand, Norway, Singapore, Spain, Taiwan, **Gainers:** Argentina, Bahrain, Brazil, Bulgaria, Chile, China, Costa Rica, Croatia, Cyprus, Czech Republic, Georgia, Greece, Hungary, Italy, Latvia, Lithuania, Macedonia, Malaysia, Mauritius, Mexico, Montenegro, Oman, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Slovakia, Slovenia, Turkey, Ukraine, United Arab Emirates; Uruguay; **Laggards:** Albania, Algeria, Armenia, Azerbaijan, Bangladesh, Benin, Bosnia and Herzegovina, Botswana, Burundi, Cambodia, Cameroon, Colombia, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Guatemala, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Lebanon, Madagascar, Malawi, Mali, Moldova, Mongolia, Morocco, Namibia, Nepal, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Rwanda, Senegal, Serbia, Sri Lanka, South Africa, Tanzania, Thailand, Tunisia, Uganda, Vietnam, Zambia, Zimbabwe

*Note.* Global Entrepreneurship and Development Institute (GEDi). *The Digital Platform Economy Index 2020.*

Network Readiness Index (NRI) for 2020 very well recognises the dominance of digital technologies in today's networked world and, as such, rests, through a holistic concept, on four basic dimensions: 1. Technology (the level of technology is the backbone of even more serious participation of a given country in the global economy); 2. People (the achieved level of application of technological solutions by people is considered); 3. Governance (an evaluation of the convenience of the national environment for the fruitful affirmation of the digital economy in terms of the level of trust, inclusion and regulatory burdens is carried out), and 4. Impact (the humane, economic and social dimension of participation in the digital economy itself is assessed). NRI 2020, as a global benchmark for the application and utilisation of ICT, ranks a total of 134 economies based on their performance across 60 variables (for detail see:



Portulans Institute, 2020). At the regional level, NRI 2020 clearly reveals that the first three countries in each region are in fact a clear reflection of disparities in regional performance, which is clearly shown in Table 8.

Table 8

*The Network Readiness Index 2020, Top 3 Countries by region*

AFRICA <i>NRI2020</i>	<b>Mauritius</b>	<b>South Africa</b>	<b>Kenya</b>
	61	76	82
ARAB STATES <i>NRI2020</i>	<b>United Arab Emir.</b>	<b>Qatar</b>	<b>Saudi Arabia</b>
	30	38	41
ASIA & PACIFIC <i>NRI2020</i>	<b>Singapore</b>	<b>Australia</b>	<b>Korea Republic</b>
	3	12	14
CIS <i>NRI2020</i>	<b>Russian Federation</b>	<b>Armenia</b>	<b>Kazakhstan</b>
	48	55	56
EUROPE <i>NRI2020</i>	<b>Sweden</b>	<b>Denmark</b>	<b>Netherlands</b>
	1	2	4
THE AMERICAS <i>NRI2020</i>	<b>United States</b>	<b>Canada</b>	<b>Uruguay</b>
	8	13	47

Global ranks in parentheses. CIS = Commonwealth of Independent States.

Note. Portulans Institute (2020). *The Network Readiness Index 2020 - Accelerating Digital Transformation in a post-COVID Global Economy*.

The potential impacts of digital inequality on social well-being are considered through: (1) Internet use (digital participation), (2) Internet skills (digital potential), and (3) a sense of belonging to the information society (digital perception) (for detail see: BÜCHI et al., 2018). In an environment where 50% of the world's population does not have Internet, digitisation has resulted in a deep divide between the relatively privileged who have ultimate access to digital dividends, reflected in greater financial inclusion, better digital political and economic empowerment, and remote access to education and health information; on the other hand, there are people with less access to digital technologies and the ability to reap digital dividends, who are falling behind more and more (Hernandez & Roberts, 2018). In the global context, when it comes to access to mobile broadband (3G or above) up to 90% of the population achieves it in most regions, while the largest gap is recorded in the case of Africa and the CIS, where 23 and 11% of the population, respectively, does not have access to the mentioned network. In complete contrast to the Sustainable Development Goal 9 (propagates the view that universal access to the Internet

must be ensured in the least developed countries), about 15% of the SIDS population does not have access to a broadband mobile network, as well as approximately 1/4 of the population in LDCs and LLDCs (for detail see Table 9). In addition to the previous, it is useful to note that Internet access at home is twice as high in urban areas compared to rural areas (for detail see Table 10). In the global sense, in rural areas only about 38% of households had access to the Internet at home, which is almost twice less than in urban areas observed by the same criteria (about 72%). Contrary to the situation in developed countries, disparities between rural and urban areas are much more pronounced when it comes to developing countries, so we have 2.3 times more access to the Internet in urban areas compared to predominantly rural countries. For example, in Africa, Internet access at home is 4.5 times higher in urban areas compared to rural areas, where it was only 6.3%. As for other regions in the world, Internet access at home in rural areas ranged between 37 and 78%, and in urban areas this percentage is significantly higher and ranges between 70 and 88%.

Table 9

*Population coverage by type of mobile network, 2020\**

World	4G (84.7%)	3G (8.5%)	
Africa	4G (44.3%)	3G (33.1%)	2G (11.0%)
Arab States	4G (61.9%)	3G (28.9%)	
Asia & Pacific	4G (94.2%)		
CIS= Commonwealth of Ind. States.	4G (80.8%)	3G (7.8%)	2G (9.9%)
Europe	4G (97.2%)		
The Americas	4G (88.7%)		
Developed	4G (97.0%)		
Developing	4G (82.2%)	3G (10.0%)	
LDCs	4G (40.5%)	3G (35.7%)	2G (12.7%)
LLDCs	4G (43.4%)	3G (31.6%)	2G (18.6%)
SIDS	4G (61.2%)	3G (24.5%)	

\*ITU estimate

*Note.* ITU (2020). *Measuring digital development - Facts and figures 2020*. ITU Publications, International Telecommunication Union, Development Sector, Geneva Switzerland.

Table 10

*Percentage of household with computer and/or Internet access at home, 2019\**

	<b>Internet access</b>		<b>Computer access</b>	
	<i>Urban</i>	<i>Rural</i>	<i>Urban</i>	<i>Rural</i>
World	72%	37%	63%	25%
Africa	28%	6%	17%	2%
Arab States	74%	38%	67%	34%
Asia & Pacific	70%	36%	60%	22%
CIS	81%	66%	72%	50%
Europe	88%	78%	82%	66%
The Americas	74%	50%	67%	34%
Developed	87%	81%	84%	66%
Developing	65%	28%	54%	17%
LDCs	25%	10%	17%	3%
LLDCs	46%	14%	37%	8%

\* ITU estimate, Insufficient data available to produce estimates for SIDS.

*Note.* ITU (2020). *Measuring digital development - Facts and figures 2020*. ITU Publications, International Telecommunication Union, Development Sector, Geneva Switzerland.

Most of the offline population lives in the least developed countries (see Table 11 and Table 12), so we have that in developed countries, almost 87% of individuals are online (using the Internet), while in the least developed countries (LDCs), in 2019, only 19% of the population is online. Europe has the highest rates of Internet use, while Africa is the region with the lowest rates of Internet use.

Table 11

*Percentage of individuals using the Internet, by region, 2019\**

Europe	82.5
The Americas	77.2
CIS	72.2
Asia & Pacific	48.4
Arab States	51.6
Africa	28.2
World	53.6

\* ITU estimate.

*Note.* ITU (2020). *Measuring digital development: Facts and figures 2019*, ITU Publications, International Telecommunication Union, Geneva Switzerland.

Table 12

*Percentage of individuals using the Internet, by development status, 2019\**

Developed Countries	86,6%
Developing Countries	47.0%
LDCs	19,1%

\* ITU estimate.

*Note.* ITU (2020). *Measuring digital development: Facts and figures 2019*, ITU Publications, International Telecommunication Union, Geneva Switzerland.

It is also characteristic of developing countries that the digital gender gap is growing very fast (for details, see Table 13 and 14).

Table 13

*Internet penetration rate for men and women, 2019\**

	<b>Male</b>	<b>Female</b>
Europe	84.9	80.3
The Americas	77.6	76.8
CIS	73.6	71.0
Asia & Pacific	54.6	41.3
Arab States	58.5	44.2
Africa	33.8	22.6
World	58.3	48.4
Developed	87.6	86.0
Developing	52.8	40.7
LDCs	24.4	13.9

*Note:* \* ITU estimate. The penetration rate concerns the number of men/women (as a % of the total male/female population) who use the Internet

\* ITU estimate.

*Note.* ITU (2020). *Measuring digital development: Facts and figures 2019*, ITU Publications, International Telecommunication Union, Geneva Switzerland.

Table 14

*The Internet user gender gap (%), 2013 and 2019\**

	2013	2019
Europe	9.4	5.3
The Americas	-0.4	1.0
CIS	7.5	3.6
Asia & Pacific	17.4	24.4
Arab States	19.2	24.4
Africa	20.7	33.0
World	11.0	17.0
Developed	5.8	2.3
Developing	15.8	22.8
LDCs	29.9	42.8

\* ITU estimate.

Note. ITU (2020). *Measuring digital development: Facts and figures 2019*, ITU Publications, International Telecommunication Union, Geneva Switzerland.

## 4.2. NEW WORLD OF POLICY CHALLENGES AND NEW AGENDA FOR POLICY LEADERS

Persistent digital divide on a global scale is still a current and popular issue, the solution of which requires due consideration and careful thought of policymakers and the construction and articulation of an innovative and more flexible political agenda that leans on but at the same time goes beyond the previous processes of creating a policy of amortising the digital gap<sup>4</sup> “Digital inclusion for all” is now a slogan that many governments make considerable efforts to put into practice, particularly in countries with high internet penetration.

In order to materialise the benefits of the digital revolution for their nations, policymakers around the world (both in developed and developing nations) should adhere to the following five key policy principles for driving digital prosperity (Atkinson & McKay, 2007, p. 5-7):

- 1) Give the Digital Economy Its Due: issues of information and communication technologies should not be viewed too simplistically as

<sup>4</sup> See, for example: Opening Education, *Beyond the digital divide: Rethinking digital inclusion for the 21st century*, Futurelab, by Neil Selwyn and Keri Facer, Futurelab, 2007, available at: [www.futurelab.org.uk/openingeducation](http://www.futurelab.org.uk/openingeducation)

part of IT policy and narrow side-line of economic policy, but as its center and central part;

- 2) **Actively Encourage Digital Innovation and Transformation of Economic Sectors:** despite the indisputable fact that the private sector is a key driver of digital transformation, government support for research in emerging IT areas is certainly needed, either through expanding the R&D tax credits or boosting direct funding. This is all the more so because in economic theory, the phenomenon of significant market failures (including network externalities and "chicken-or-egg" issues) is well documented, which greatly undermines the dynamics of digital transformation, all in the absence of adequate public policies to support it. In addition to a wide arsenal of policy measures (regulatory, tax and procurement policies) to encourage stronger transformation and greater investment in key sectors such as education, health, transport and other public policy areas, the government should increase the efficiency of public administration and the productivity of public sector management through its own use of ICT;
- 3) **Use the Tax Code to Spur IT Investment:** if we start from the indisputable statement that information and communication technologies have an incomparably greater impact on the level of productivity, it is necessary to design tax policies so as to encourage additional investments in newer generations of technological solutions. As IT is a "super capital" with a strong impact on productivity levels, policymakers should avoid taxing investments in this sector, especially in the domain of broadband telecommunications;
- 4) **Encourage Universal Digital Literacy and Digital Technology Adoption:** In order to achieve the equitable effects of digital transformation, the vast majority of citizens need to participate in it, which can be achieved, among other things, by strong synergies and partnerships between national governments and for-profit, non-profit and state and local government sectors;
- 5) **Do No Harm:** sound economic policy means not only providing active support to the IT sector, but also avoiding harm to the digital driver of growth, which further means avoiding the adoption of laws and regulations that would slow down the process of digital transformation. Despite the undoubted need for further insistence on consumer safety protection, policymakers are also obliged to keep the markets open for online competition and the entry of new competitors.

As we mentioned earlier, one of valid and powerful metric, which was conceived some 20 years ago, and is still relevant today is the Network

Readiness Index (NRI). NRI for 2020 especially recognises the accelerated penetration of new technological solutions in today's networked world and their significance for the realisation of the Sustainable Development Agenda 2030, and, as such, focuses on four fundamental dimensions in terms of the readiness of the world's nations for a digital future: 1. Technology, 2. People, 3. Governance and 4. Impact. The key messages derived from the conducted NRI 2020 analysis relate to the following (Portulans Institute, 2020, p. 18-19):

- Key Message No.1 – Digital transformation needs to be “System-wide”.

The most efficient countries, according to this indicator, achieve good results in many dimensions, which points to the importance of adopting a multidimensional approach in raising the level of network readiness where economies must take steps to address a wide range of issues - from trust issues through technological accessibility to the implementation of digital technologies in health - instead of focusing on narrow policy areas.

- Key Message No.2 – New forms of digital divide can also be a result of digital transformation.

While the NRI rankings show exceptional stability and progress of the top 25 economies in the last few years, on the other hand, certain regions still lag behind in terms of access and use of ICT, primarily Africa. Once the "ripple effect" of COVID starts to hit international trade and investment flows, such divergences between "network-ready economies" and "laggards" may be amplified.

- Key Message No.3 – The key components of a successful digital transformation are security and trust.

In almost all areas, whether it is electronic transactions (e-commerce) or, on the other hand, broader areas such as education (assessment, certification), trust (trusting behaviour and trusting environment) and security are an unavoidable factors of effective strategies of digital transformation and its full effects.

- Key Message No.4 – Additional acceleration of digital transformation has been generated by the COVID-19 crisis.

COVID-19 will remain present and will influence the way it cooperates, competes, learns and works.

- Key Message No.5 – Additional. unusually important and an invisible factor of sustainable and effective digital transformation is education and its connection to re-skilling.

The key to the future of national economies is to sustain ongoing efforts to continually retrain and improve their local workforce and talent. Economies with the highest NRI scores clearly point to education as a key lever of global competitiveness, which should be viewed through the prism of lifelong learning, which is of critical importance, especially in the field of AI.

➤ Key Message No.6 – With the help and thanks to the strengthening of the digital transformation process, a faster implementation of the goals of sustainable development - SDG is possible.

Proper use of the latest digital technologies can facilitate the realisation of each of the 17 UN Sustainable Development Goals adopted in 2015 (SDGs), especially in the domain of those dealing with tackling climate change and environmental degradation, ending poverty and inequality, and strengthening the pursuit of peace and justice.

➤ Key Message No.7 – Redefining globalization and its flows, and building and strengthening global cooperation can be facilitated exactly through digital transformation.

It concerns the avoidance of movements in the direction of protectionist policies and the erosion of multilateral cooperation in the process of digital transformation. It has been shown many times that the best innovators are just open national economies, which encourage the free flow of ideas and innovations. In other words, it is necessary to view digital technologies as vectors of openness, cooperation and association and not as means and instruments of intervention, interference, and even some kind of weapon.

Table 15 provides recommendations whose implementation in the medium term would significantly contribute to solving the major problem of digital inequality in the global context.



Table 15

*The Medium-Term Agenda for Action*

<b>MEDIUM TERM AGENDA</b>
Accelerating the implementation of digital policies and strategies that, as such, are calculated for greater security in the digital world, and the affirmation of stronger digital inclusion, as well as better digital readiness for future challenges yet to come.
Elevation to the G20 level of resilient broadband networks as a basic right.
In order to support the construction of a competitive and inclusive digital environment, the implementation of flexible and well-calculated regulatory measures is indispensable
Adoption of strategies aimed at promoting universal, affordable broadband connectivity by mobilising public and private funding and investment, especially in Least Developed Countries, Landlocked Developing Countries and Small Island Developing States.
Strengthening policies that would be calculated to empower broadband connectivity that would concern unconnected populations and communities that are still without adequate access to the latest digital solutions.
Strengthening educational capacities and the ability to access the latest information and empowering digital users through information and media literacy.

*Note.* State of Broadband Report 2020. Geneva: International Telecommunication Union and United Nations Educational, Scientific and Cultural Organization, License: CC BY-NC-SA 3.0 IGO.

Starting from the fact that adequate management of digital transformation is a real challenge because the "ship has to be built while being on the sea.", It is still possible to identify a set of relevant principles for such needs, and they relate to the following (see: TWI2050 - The World in 2050 (2019), p. 77-83):

(1) Between digitisation and the creation of new value (wealth), some kind of bond is needed (sustainability). Some mechanisms can be helpful for this purpose, as follows: 1. Extending the universal mission of digital sustainability, i.e. integrating sustainability requirements into digital research and innovation processes; 2. On the path of directing digital innovations towards sustainable solutions, one of the powerful options is tax reform; 3. The importance of all programs that would serve the purpose of digital modernisation of the state itself and strengthening, in this connection, digital skills and the sustainability of public institutions should be emphasised. Artificial intelligence could be imposed as a new link in the governance system; 4. Bearing in mind the fact that sustainability and digitisation researchers have so far worked in separate

silos, in the coming period, the challenge is to deepen cooperation and integrative processes in order to reach a holistic perspective on the roadmap to sustainable and efficient development and 5. In order to create a favourable normative framework for strengthening the digital sustainability of society, it is necessary to nurture and encourage all kinds of dialogue between business, government, civil society and scientific institutions;

(2) In the spirit of anticipation of the constitution of a kind of new era of humanity - the so-called Digital Anthropocene - the necessary affirmation of both institutional and normative innovations that would serve the sustainability of digital societies is needed. We are talking about expectations that automated decision-making or support systems based on big data analysis would be an integral part of parliaments, judicial and health systems, military organisations, police, private companies and universities - which imposes a new reality that insists on balancing digitalisation and social cohesion. As the interactions between people and technical systems deepen more and more, in the background of these fundamental turns and events, it is necessary to reconceptualise concepts such as integrity and human dignity. In the event that digital developments are not supported by strong systems of norms and values, then one can expect the predominance of dystopian tendencies in society. Only in the case of real institutional innovations and guardrails that would successfully anchor norms in societies themselves and protect them from abuse by powerful interest groups, and create institutions which would be the equipment for adequate routing of collective and individual action within the corridors around which there is a social consensus, and all with the goal of a sustainable digital future;

(3) Investing in future-oriented science and education: In order for science to be able to achieve a sustainable digital transformation in the coming period, the following should be taken into account: 1. the overriding challenge is reflected in the strengthening of research in science, which would primarily be oriented towards digitisation. In connection with the previous, it would be useful to develop research communities that would deal with virtual reality and artificial intelligence, and automated decision-making that would have a strong impact on digital processes; 2. within the management of digital transformation, it is essential to extend an affirmative narrative due to the necessity of synergies of suitability for all; 3. the importance of interdisciplinary research and the need for research communities to closely cooperate and communicate with civil society, the private sector and public policymakers are also emphasised; 4. experimental research must be imposed as a kind of supplement to basic and fundamental research, which, as such, would be directly in the function of building more efficient educational, energy and urban systems, and sustainable

digital mobility; 5. in the coming period, knowledge and research hubs need to be established more intensively in the Global South, which would be a guarantee of sustainable transformation in this part of the world as well;

(4) The imposition of the so-called New Humanism for the 21st century, the backbone of which, among other things, consists of: (1) intense dynamics of social, cultural and political innovations; (2) strengthening of virtual spaces that serve to create transnational communities and networks and (3) strengthening of digital technologies that serve to spread transnational learning and communication. After three centuries of neglect, the New Humanism would once again reaffirm such ideas and fundamental values of the Enlightenment, such as democracy and the rule of law, and the affirmation of human dignity, freedom and equality.

## 5. CONCLUSION

The issue of digital inequality (as a complex, socially relevant and multifactorial phenomenon) is of paramount importance in debates on public policy discourse and has its political, economic and social dimensions, and, as such, is a major challenge for many academic researchers, policymakers and international organisations. The paper tries to shed light on the phenomenon of digital inequality from a theoretical aspect while providing certain recommendations and measures as part of the policy for bridging it.

At the global level, strong leadership will be needed to ensure more coordinated efforts between local authorities, actors on the ground and governments; the opposite maintenance of the status quo, in circumstances where digital technology is progressively permeating every sector of the economy, would critically deepen disparities between countries and within national territories. Instead of techno-utopianism, it is necessary to extend the concept of the so-called inclusive social mobility, which is nothing more than an effort to ensure a more even and wider distribution of technological dividends through proactive and flexible management of relevant public policies. The key areas for new adaptation are: competition policy, development of digital infrastructure and innovation ecosystems, the policy of adequate social protection, and retraining and additional training of the employed. And in the coming period, the digital revolution will continue with the radical transformation of the environment, business models and patterns of production and consumption. In this sense, in order to build a digital economy that delivers for all, the magic word - inclusiveness is of essential importance.

A key precondition for stronger engagement in the digital economy and thus a reduction of the digital divide on a global scale is reliable, adequate and

affordable connectivity, and therefore in developing countries in particular, work should be done to strengthen the dynamics in terms of building and maintaining digital infrastructure high-speed, high-coverage, as well as, affordable and reliable digital infrastructure as a priority (United Nations, 2017). In the coming period, on a global scale, it is inevitable to work on increasing the share of people who actively use the Internet, which will require certain interventions on the demand side, such as those: (a) provision of free public Internet access; (b) provision of direct subsidies to disadvantaged user groups for buying devices and lowering the costs of Internet use; (c) reducing value-added tax (VAT) and import duties on ICT equipment; (d) providing ICT skills training to different levels of user groups to improve their capabilities and facilitate greater use, not only in the work or school environment but also at home and (e) the creation of relevant online content, apps and services, coupled with public awareness campaigns (United Nations, 2017, p. 83-84).

At the global level, countries at all stages of development, all with the aim of providing an active contribution to the reduction of digital inequality, should take into account the following key requirements for fairer outcomes in the digital sphere, namely (United Nations, 2021, p. 97-102):

(1) effective national governance to guide technological change all in harmony and spirit with the goals of sustainable development - it is necessary for governments to primarily create a vision, mission and plan to actively support that part of the private sector that is moving towards sustainable digital transformation in line with the SDG. It is also recommended that governments invest heavily in physical and human resources, either through better reallocation of funds towards research and education or through the mobilisation of additional funds through tax instruments.

(2) strengthening the global framework in the function of STI development and affirmation support to developing countries through international cooperation - through the revitalisation of international cooperation and governance processes, the global community should actively support the digital transformation for sustainable development, which offers wider societal benefits and leaves no one behind, which is especially important for developing countries whose priorities and interests would be more visible on the global stage.

(3) in order to bring about technological changes in society towards a more inclusive and sustainable development, it is of fundamental importance vigorous civic activism - in order to more adequately identify inconsistencies between social reactions and technological innovations, it is necessary to accelerate institutional reform processes that will require strong social activism of all

people and organisations that should work together in the field of achieving social goals. This is all the more so if we keep in mind the indisputable fact that regulations, laws and behaviours adopted in connection with previous technology are unsuitable for new radical challenges and that institutional and social interventions are still present that slow down the pace of digital transformation. In order to align the effects of border technologies with relevant societal goals, proactive participation of all stakeholders, especially civil society organisations, will be necessary.

In order to prevent the deepening of the gap between hyper-digitalised countries and those that are outside digital flows and are insufficiently connected, it is first necessary to redefine digital strategies on a global level with a special focus on: stronger intellectual leadership, improved partnerships and smart adoption of new technologies (United Nations Conference on Trade and Development (UNCTAD), 2019). Although it is undoubtedly for now, the information age should not and must not be an age of increased polarization, social exclusion and inequality (Selwyn, 2004). Until it benefits everyone in every part of the world, it cannot be said that the greatest rise of information and communication in history is truly revolutionary in the true sense of the word.

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