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DIGITAL INEQUALITY AS FACTOR DETERMINING INTEGRITY AND DEVELOPMENT OF CIVILIZATION PROCESSES

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Abstract

The article discusses the issues of digital inequality as a civilization phenomenon, since the digital inequality is becoming a key factor determining the socio-economic development of countries in the global scale. This study aims to solve one of the identified problems, namely, modification and adaptation of the ICT Development Index (IDI) for Russian realities. The object of the research is the "digital inequality" as a civilization phenomenon and a key factor determining the socio-economic development of countries in the global scale. The study notes that digital transformations are rapidly gaining momentum in the global space, encompassing both developed and developing countries. The article analyzes in detail the theoretical and applied aspects of the digital inequality considering various levels and types of inequality that are reflecting this phenomenon. The authors define the digital inequality as a new kind of global inequality in the modern society, because it deals with the issues of access, receipt and use of Internet-based information in a dialogue between civilizations. From this point, the issues towards measuring and comparing various levels of the digital inequality in the global, national and regional context are of particular importance. The paper proposes a modified the ICT Development Index RF, the distinguishing features of which are: simplicity, flexibility in construction methodology applied, convergence in a national and regional digital profile, availability to use open data collected via monitoring Information Economy of the Russian Federation, and the possibility of further modifying the index methodology by means of correlation and regression analysis

1. Introduction

Digital transformations are rapidly gaining momentum in the global space, encompassing both developed and developing countries. Since the number of Internet users in 2016 amounted to 3.385 billion people, which is 45.28% of the population of our planet. At the same time, in 2016 compared to 2010, the growth of Internet users in the world amounted to 35.18% (International Telecommunication Union, 2019). The growth of Internet technologies is uneven between countries and regions, giving rise to a new kind of digital inequality as a civilization phenomenon.

Recently, the issues in studying the digital inequality affect all large fields of scientific knowledge, business and entrepreneur sectors, government and business management. The significance of the study targeted at the digital inequality is determined by the fact that it is a kind of key factor that determines the vector and development trend, and also a factor that determines the competitiveness towards the development of civilization processes running in the modern society.

Pavlenko (1998) notes that

the insight of the civilization movement in mankind development, considered with its integrity, implies its simultaneous vision in the aspects of phasing, polylinearness and socio-cultural discreteness. It is important, on the one hand, not to lose the general panorama sight of its historical movement, and, on the other hand, not to forget about the unique character of individual civilization systems. (para. 14)

We believe that the process of digitalization and development of the digital economy allow the modern state (region, business entity) to form a range of unique characteristics which will determine in future: on the one hand, the development stage of civilization processes in a society, and, on the other hand, competitive advantages and differences, through which the conquest of new market niches and potential consumers, i.e, the true level of socio-economic well-being, is becoming possible.

If for Russian scientists, the digital inequality issue is fairly new and poorly studied (Artemenko, Yalunina, Panfilova, Sinyuk, & Lobachina, 2018; Yevchenko, Voronina, Yatsenko, & Madiyarova, 2018; Asochakov, 2015), then, for foreign researchers (Lobaugh, Simpson, Ohr, Meagher, & Moskowitz, 2014; Ragnedda & Muschert, 2013; Pimienta, 2009; Piazolo, 2001; Joseph, 2001; Lloyd, Given, & Hellwig, 2000) this phenomenon is already a subject to be carefully studied and researched, in which the special attention is paid to the comparative analysis covered and targeted at inter-country digital inequality, methods and techniques in terms of assessing the digital inequality, and to what extent the digital inequality impacts on stakeholders.

Ragnedda and Muschert (2013) are examining the issues of the digital inequality from the point of: the Internet and social inequality in the international prospect, theories existing in the field of the digital inequality, what consequences of this phenomenon in the view of social-economic gap, and double digital gap. In addition, foreign authors explore the digital gap, both at the level of states or regions, and business as well (Lobaugh et al., 2014). The authors note that the modern development in digital technologies leads to the fact that many processes happening at enterprises are under fundamental or cardinal changes. Lobaugh et al. (2014) argue that the "digital influence factor" has a decisive impact on what decision will

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be taken by an end user, this affects consumers' expectations on the part of retailers and requires good adjustments in applied strategy and pin prognosis done on sales volumes.

The phasing aspect in civilization processes development is defined by sequences and progress in society evolution, where the latter is based on the social values along life cycle phases. One of the modern, rapidly developing and most demanded information and digital channels used in knowledge transfer is a digital technology. In this context the information availability is a compulsory condition to claim about successful society development because "the gap between the low income and the high income countries increases considerably with the state of technology of the communication and information equipment" (Piazolo, 2001, p. 31). That is why the issue of the digital inequality is so significant and relevant to be studied thoroughly.

2. Problem Statement

Studies in the digital inequality domain are becoming increasingly important and relevant, since it brings not only new opportunities for development, but also a new source of competitive advantages, as for individual states, regions, organizations, and for individual categories of citizens as well. At the same time, the following questions remain poorly studied: reasons caused the digital inequality; determining influence of the digital inequality on the development of a stakeholder/entity; ways of measuring and evaluating the digital inequality; short and long term effects of the digital inequality. The key problems in the field of the digital inequality address defining comparison parameters and data mining, since the study result depends on the data quality and their comparability. These issues are raised by OECD in their research (Organisation for Economic Co-Operation and Development, 2001), but still remain insufficiently studied and tested. Asochakov (2015) notes that at present there is no single methodology for defining and assessing the prospects in overcoming new forms of inequality associated with "information society". This study aims to solve one of the identified problems, namely, modification and adaptation of the ICT Development Index (IDI) for Russian realities.

3. Research Questions

The object of the research is the "digital inequality" as a civilization phenomenon and a key factor determining the socio-economic development of countries in the global scale.

The subject of the research is to consider various forms, types and levels of the digital inequality; to define econometric tools to measure the digital inequality; to develop the ICT Development Index RF for assessing "digital inequality" in a country perspective.

The hypothesis of the study states that "digital inequality" as a civilization phenomenon has a different theoretical basis and uses various scientific approaches to justify its types, levels and components. Due to the heterogeneity in statistical bases, a single comprehensive indicator, able to assess the digital inequality, is difficult to define. In order to carry out an in-country comparison, the proposed methods for calculating the Development Index (IDI) are needed to adapt. In other words, the proposed ICT Development Index, which includes the IDI, is divided into the following three sub-indices, and a total of 11 indicators (International Telecommunication Union, 2017). It is defined as the weighted average value,

which a priori will be higher in a country where the data were mined along all indicators in the digital format; and the index value will be lower in those countries where part of the indicators is not calculated or not monitored. In this case a complex indicator is taken either equal to zero or excluded completely.

4. Purpose of the Study

The purpose of the study is to substantiate various types, levels and forms of the digital inequality as a civilization phenomenon and to propose the ICT Development Index RF to form on its base a conjugate national and regional digital profile.

5. Research Methods

The study uses a set of scientific methods: a method of comparative scientific analysis, economic and mathematical methods, graphic and visual aids methods. All these methods are needed to provide the required validity of the whole research, its results reliability and accuracy in conclusions.

6. Findings

Rodivilin (2017) defines the digital inequality as a threat to the Russian Federation, noting that in past the Government solved this problem through the development of broadband access to the Internet. At the same time, the task that was set in the document "The main activities of the Government of the Russian Federation until 2018" has not been fulfilled, and at present its importance and the necessity to be executed is documented in "The main activities of the Government of the Russian Federation until 2024". In the document there are some statistics directed to the figures defining the digital skills level among the population (26%) and underlining the gap in digital skills between different population groups. Whereas, the document applied aspect concludes in solving issues related to digital security and in providing a sustainable telecommunication infrastructure (Russian Government, 2018).

Rodivilin (2017) connects the digital inequality issue with crime in the field of digital information (computer-based), with careless attitude to digital information, with limitations in mass media broadcasting in the relation of 'country-to-country. At the same time, the author regards as synonymous the concepts 'digital inequality' and 'digital gap'.

The work of Acharya (2017) deserves a special attention. It reveals the evolution of the term 'digital inequality' making for it as ground the content analysis of 21 scientific papers. In his conclusions the author stated that commonly accepted definition for 'digital inequality' is absent.

 "The complexity of making up an explicit definition to 'digital inequality' lies in the fact that it has many aspects and components which inequality includes, among them are: technological, economic, social, psychological, gender, communicative, behavioral, psychological, legal and geopolitical, etc. In our opinion, the digital inequality reflects technological, economic, social, educational, political and legal inequality of stakeholders in access and use the information, where both will be based on the modern information technologies - Fig. 01 (Artemenko et al., 2018).
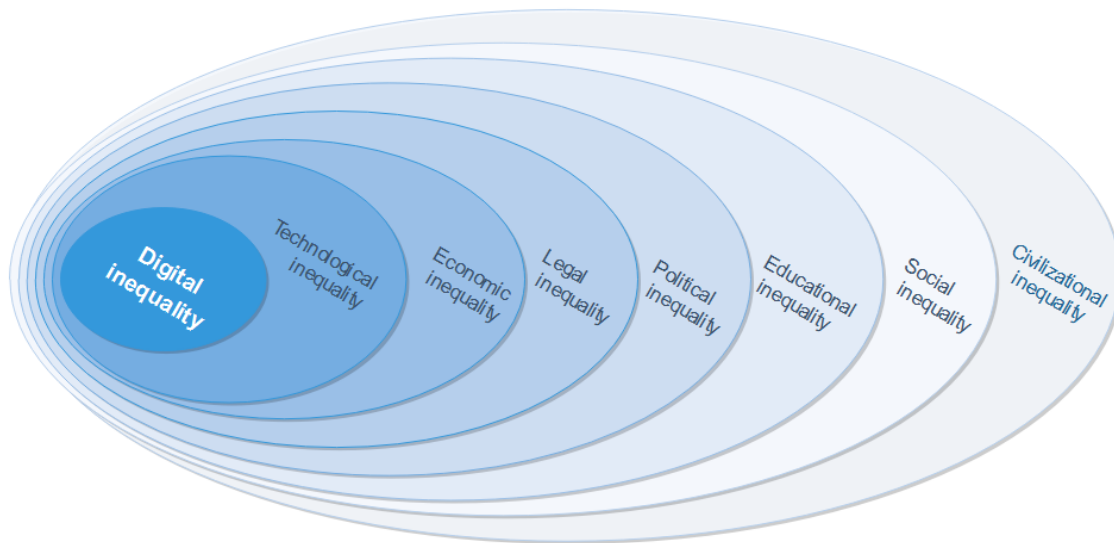
Figure 01. Various aspects reflecting 'digital inequality' (compiled by the authors)

Piazolo (2001) indicates that the digital gap is determined by technological and economic factors. We believe that in this context it is fair to divide the digital gap into a digital technological gap and digital economic gap. The first one is due precisely to technological advancement and infrastructure support. The second one is determined by the most processes transition into online environment, by digital e-commerce (the enormous e- commerce) and on-line business development.

Over time, the digital gap between countries will decrease, as it is primarily due to technological factors and innovations, while its subsequent implementation by developing countries will not require significant costs to accomplish a similar task compared to the cost that developed countries paid before being the pioneers in it (Piazolo, 2001). The view of Piazolo is also supported by Zhang (2018), who believes that due to the speed at which innovations spread, there will be a reduction in the digital gap between developed and developing countries.

From our point of view, the reduction of the digital technological gap between developed and developing countries will not happen in the near future, despite the reduction in investments contributed to creating the information and telecommunications environment in developing countries, as developing countries and Third World countries risk to be a platform for past generation digital technologies to be used. At the same time, the situation in the field of the digital economic gap in the process of phase-based civilization development will only worsen, as progressive digital technologies of developed countries will create unique competitive advantages for enormous e-commerce and on-line business development, which in turn will redirect the cash flow and deepen socio-economic stratification of the society.

Asochakov (2015) singled out the first and second levels of the digital inequality, making as basis for his classification the heterogeneity of problems that cause the digital inequality. By such classification he notes that these problems are not always determined by development of technologies (Asochakov, 2015). Acharya (2017) also points out to the presence of different levels in the digital inequality, but the author identifies additionally the third level – 'digital outcome gap'.

Asochakov (2015) in his investigation of the digital inequality issue uses the term 'digital section', defining it as 'the division into those who have the Internet skills and, accordingly, have an access to it and

those who do not'. The author regards as synonymous 'digital inequality' and 'digital section' and notes that the Digital Opportunity Index (DOI) is proposed for monitoring the digital inequality, on the basis of which the International Telecommunication Union (ITU) rating is organized, consisting of 11 indicators and reflecting the level of information technology availability in a country.

Earlier in their studies Artemenko et al. (2018) considered the concept of many global and national ratings towards the development of digital economy and ICT sector, highlighting the similarities and differences in ratings and noting the contradiction between empirical studies of ICT, which is linked with the fact that on the other hand, the number of various rating systems depicting the dynamics in digital economy and digital inequality is going up, and, on the other hand, these data require systematization and comparability which reflect the uneven spatial development in digital economy and in ICT sector at different levels – global, national and regional.

The index is calculated with formula:

$$\text{ICT Development Index RF (IDI RF)} =$$

$$0{,}4 \text{ Access sub-index` } + 0{,}4 \text{ Use sub-index` } + 0{,}2 \text{ Skills sub-index`} \tag{1}$$

In the framework of the current research we propose to do the ICT Development Index modification and its adaptation to RF – Fig. 02.
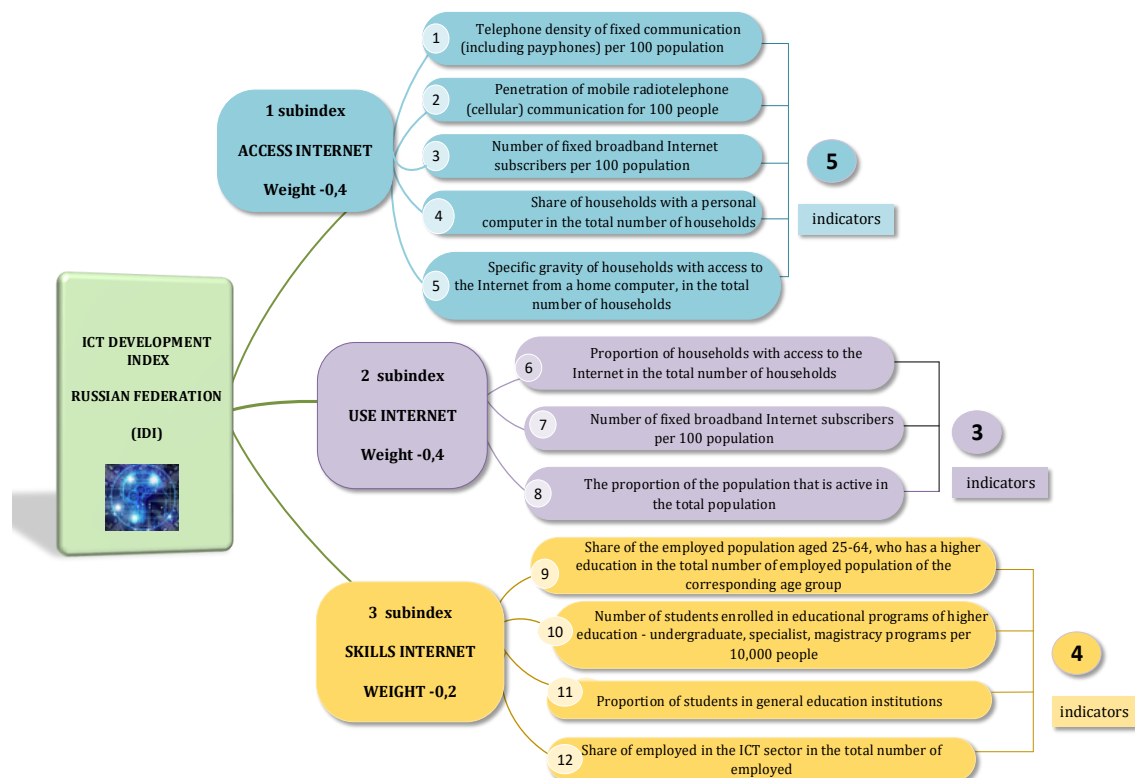
Figure 02. ICT Development Index RF (compiled by the authors)

The calculation is based on the modification principle of the ICT Development Index (IDI). ICT Development Index RF interpretation is a composite index that combines 12 indicators into one benchmark measure. The difference lies in the fact that in the author's interpretation the structure of the indicators is changed. This is justified by the fact that at RF level there are no reliable statistical data in the open access,

while those indicators that coincided were taken as a constant. Substantive changes affected the Skills sub-index, since for this index 4 new indicators were selected, which required a redistribution of weighing coefficients, a new weighing coefficient of 0.25 points was introduced. The data normalization was carried out in accordance with the methodology of the ICT Development Index (IDI). When developing IDI for RF, we made the following changes:

- a set of indicators similar in context was made, which are subject to statistical monitoring among the region of the Russian Federation;
- the indicators for the Skills Index block were replaced, which determined the need to provide the structural and substantive adjustment.

The initial data massive is the indicators from the official statistical monitoring among the entities of the Russian Federation, open monitoring data collected on the information economy of the Russian Federation that allows solving the problem towards the interaction that is in the national and regional digital profile.

7. Conclusion

To sum up we can conclude that the external plan of the civilization process reflects the integrity, continuity and consistency of human development. From our point of view, accessibility to information, its dissemination and use reflects the population level of accessibility to: knowledge, means able to influence a consumer and attract additional income sources, tools assisting in personal, company, region and country development. In other words, digitalization reflects the level of civilization development of the modern society and the degree of its stratification.

According to the authors, the digital inequality as a civilization phenomenon reflects – social, educational, political, legal, economic and technological inequality among entities and stakeholders, which is associated with restrictions in access and use the Internet information.

The digital inequality is a criterion of social discrimination, expressed through restricting access to modern information and communication technologies and to the Internet, i.e. for modern civilization, the digital inequality is becoming a key factor determining its socio-economic development.

The digital inequality is a multifaceted and multidimensional concept, encompassing:

- inequality expressed in accessibility to information, depending on the socio-economic status of a user (availability of infrastructure support – a first level digital gap);
- inequality expressed in users' accessibility to ICT;
- inequality as restriction to users' possibilities to develop that influences much in future the quality of life;
- inequality expressed in unequal skills and user knowledge in ICT application (a second level digital gap);
- inequality expressed in possibilities to use ICT tools and their influence on the subsequent results among users (a third level digital gap – digital results gap).

The further authors' efforts in the area of research will be focused on such issues as:

- identification of levels and classification of types existing in the digital inequality;

- testing the proposed ICT Development Index for RF, with the aim at building up an integrated national and regional digital profile.

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