

Investment Aspects of Overcoming the Digital Inequality of Constituent Entities of the Macro-Region

Kvon G.M.* Pozdeeva O.G. Titovets A.Yu.

Ural State Economic University, Yekaterinburg, Russia

**Corresponding author. E-mail:sung2002@mail.ru*

ABSTRACT

The relevance of the problem studied in the article is due to the fact that modern economic conditions are characterized by the active influence of the processes of Informatization and digitalization, which affect investment processes, but the issues of existing differentiation and inequality of regions in development, including digital, require more careful consideration. The main goal of implementing the concept of spatial development of Russia, approved in February 2019, is [1] to overcome inequality in the level of economic development of regions. Inequality in the economic development of regions is largely due to the territorial features formed under the influence of trends in the spatial development of the country. The presence of significant regional differentiation inevitably leads to the formation of digital inequality in regions.

The purpose of the article is to study the investment aspects of digital inequality of entities in the Ural-Siberian macro-region and their overcoming in the General context of regional differentiation. The leading method in the study is the method of comparative analysis, which characterizes the dynamics of the development of subjects based on comparative values.

The article presents the results of analysis and evaluation of a number of indicators that characterize the investment policy of regions in the field of ICT, as well as indicators that allow us to determine the differentiation of macroregion subjects, both in terms of their overall economic development and in the field of digital inequality. Based on the analysis of indicators reflecting regional development trends in the field of information, communication and digital technologies, it is concluded that in general the macroregion has a certain potential for development in the field under study.

Keywords: *macroregion, investment policy of the region, information and communication technologies, economic inequality, digital inequality, financing of informatization activities*

1. INTRODUCTION

The social and economic development of Russian regions, largely determined by the investment policy being implemented, actualizes the issues of increasing their investment activity. However, the current negative conditions of non-stationarity, slowing down the growth rate of the country's economy, make it difficult to form an investment environment. The existing differentiation of regions [2] causes different rates of their economic, social and other characteristics of development [3].

The problem of development inequality among territories has been studied for quite a long time, so A. Smith and D. Ricardo have justified inequality through absolute and comparative advantages, and in the works of H. Richardson it is determined that the distribution of benefits from the development advantage occurs unevenly between regions, increasing the existing inequality [4].

Studies of economic inequality have shown that there is a conflict between economic development (growth) and inequality, since the potential for increasing economic

inequality is a consequence of economic growth. In the long run, the above limits the prospects for development, since economic development does not necessarily reduce economic inequality and may even increase it [5].

The disintegration of Russian regions is largely due to the heterogeneity of the economic environment, which was most clearly manifested in the early 90s of the twentieth century in connection with the introduction of market relations in the country.

Russian scientists pay much attention to the issues of differentiation of territorial development. For the analysis of interregional inequality, domestic researchers use various indicators, such as the gross regional product and income of the population, noted in the work of Glazyrina I. P., Klevakina E. A [6]., Malkina M. Yu. [7], the level of poverty, unemployment, the distribution of investment (Zubarevich N. V., Safronov S. G.). [8]. The influence of industries and types of economic activity on interregional inequality was considered in the works of B. L. Lavrovsky and E. A. Shiltsin [9], D. S. Ivanov [10].

Regional differentiation is due to both subjective and objective reasons, so P. Krugman [11] identified two groups of factors that affect the development of regions: "the first nature" (natural resources, geographical location) and "the second nature" (the result of human activity). Given that regional differentiation in Russia significantly depends on the availability of natural resources in the regions, it is among the entities of the Ural-Siberian macroregion that this dependence is clearly evident.

The importance of the study of regional economic inequality is due to the influence of this aspect on the development and implementation of many projects required by the country, and in combination with digital inequality and digital development trajectories, leads to inefficiency of investment measures.

Digital inequality as a research category appeared in the mid-90s, the greatest public interest in it was shown after the G8 summit in 2000. This is due to the fact that at first ICT was perceived as a factor that contributes to reducing inequality between territories, due to the possibility of including remote territories in the economic process, but later the uneven spread of ICT [12] led to an uneven impact on regional economic development [13]. That is, the existing economic imbalance between territories has formed the development of digital inequality, which in turn increases regional economic inequality, since digital dividends are deposited in a small number of regions, companies and individuals [14].

Accordingly, digital inequality is a gap that separates those who have access to new information technologies from those who do not have this access [15]. After all, moving any activity to the electronic field requires a certain level of development of information technologies and opportunities to use the advantages of these technologies. Thus, the problem of digital inequality has become extremely important for many international organizations, politicians and scientific organizations (Wyatt et al., 2000, Robins and Webster, 1999; Fuchs, 2008; Billon, Marco & Lera Lopez, 2009) [16,17,18,19,20]. In addition, the transition to a new technological order requires the development of information and digital technologies, which leads to the fact that digital inequality is more pronounced and will lead to additional regional disparities and problems. Therefore, it is necessary to direct investment flows to projects that may initially be economically unprofitable, but to create a popular and working infrastructure.

The difficulty in studying digital inequality and determining its relationship with economic processes lies in the current lack of a unified approach to understanding and calculating digital inequality in international and Russian practice. This is primarily due to the fact that researchers use different (contradictory) research objects, determinants, and factors, which is expressed in different research questions, approaches, and recommendations [21,22]. Therefore, digital inequality is considered and expressed in three levels [15,23]:

- availability of ICT – ability to connect and use ICT;

- literacy and skills-level of ICT proficiency;
- use or implementation of ICT.

It is important to note that, as well as the study of levels of digital inequality, and the impact on the territory, manifests itself in stages, so for the regions of the Russian Federation, it is important to study the availability of ICT. And it is important to look at the availability of information technologies, and not just the availability of infrastructure, because we wanted to consider digital inequality as an independent category, and based on existing digital inequalities to consider its relationship with the economic inequality of territories.

In market conditions, however, there are various strategies for the development and use of IT, which is associated with investing in this area. It should be noted that depending on the level of regions (and countries), these strategies provide for different use of information technologies, respectively, providing different amounts of funding.

In the article by Narcyz Roztocki and H. Roland Weistroffer [24], the authors consider the factors that, in their opinion, most likely affect the effect of investment in ICT, as well as the positive impact of ICT on socio-economic development. In the same connection, the authors talk about the need to develop entrepreneurial activities necessary for socio-economic development. These activities include e-Commerce, online and mobile social networks, navigation systems, E-government, online and mobile broadcasting, online learning, and communication networks such as email, text messages, tweets, and blogs. The development of ICT has a huge infrastructural significance, allowing the development of the social sphere (medicine, education), as well as the life support industry. However, according to Kowal J. and Roztocki N [25], which are referred to by the authors, in many developing regions there is no favorable business culture and legal framework for successful business activities, appropriate public policies, and the infrastructure necessary for the development of ICT is also missing.

The methodology of research on ICT investments and their relationship to macroeconomic results, which is consistent with the assumptions of the neoclassical growth accounting system, is presented in the work of authors Samoilenko, S., and Osei-Bryson, K.-M. [26] concerning countries with economies in transition. The authors conclude that investment in ICT can affect macroeconomic outcomes, and this applies not only to transition countries, but also to developed countries. Earlier, Samoilenko [27] identified 15 factors that affect the level of efficiency of investment in telecommunications. These factors reflect differences in the level of economic development, the level of investment in telecommunications, the level of accumulated telecommunications capital, as well as the level of use of telecommunications capital, the level of socio-technical development and the level of militarization. In a later paper published in collaboration with Kweku-Muata Osei-Bryson [28], he summarizes his research on transition economies and says that the existing

investment-income model works if a threshold level of ICT capital infrastructure has been developed; at the same time, the return on investment in ICT and its conversion into income directly depends on the quality of the full-time workforce in this area.

2. METHOD OF DATA ANALYSIS

The methodology of the research is presented by a number of procedures that are reflected in this work. The methods used include:

- methods for collecting and summarizing statistical information;
- comparative and retrospective methods;
- method of comparative analysis based on average indicators;
- methods of analysis and synthesis;
- methods for tabular and graphical visualization of the presented data.

The subjects of the Ural-Siberian macroregion that coincide in their component composition with the subjects of the Ural Federal district are accepted as the object of research.

3. RESULTS

To assess the differentiation of regions, the authors used a method of comparative analysis based on average indicators that characterize the economic development of the subjects of the Russian Federation. The calculation was based on 11 basic economic indicators.

To determine the degree of differentiation the ranking in ascending order of the achieved level was used. The lowest rank was assigned to the higher value for each indicator and then the integral index of regional economic development was calculated. The results of the assessment showed that the regions of the Ural-Siberian macroregion are characterized by significant differentiation in the level of economic development. In 2018, the Yamalo-Nenets and Khanty-Mansi Autonomous okrugs had the highest level of economic development, which significantly outperformed other regions. The authors found that the integral index was 15 for Yamalo-Nenets Autonomous district and 21 for Khanty-Mansi Autonomous district. High values for the main economic indicators in these regions of the Russian Federation are due to the fact that they are resource regions and high prices, as well as constantly increasing demand for oil and natural gas in the world economy, provided investment attractiveness and economic growth in these regions. A strong middle position is occupied by regions with a predominant development of manufacturing industries-Tyumen, Sverdlovsk and Chelyabinsk regions (integral index, respectively, 32, 41 and 51).

The most lagging region in terms of economic development is the Kurgan region (integral index-66). According to absolutely all indicators used in the

calculation, it takes the last place. The low level of economic development is due to the fact that the Kurgan region is an industrial and agricultural territory and a relatively high share in the creation of GRP belongs to agricultural production, which does not bring a high rate of profit.

The study also showed that in comparison with 2015, inequality in the level of economic development of the subjects of the Ural-Siberian macroregion has increased. Yamalo-Nenets, Khanty-Mansi Autonomous okrugs and the Tyumen region improved their economic situation, while other regions decreased their positions. As a result, the gap between regions has widened (figure 1).

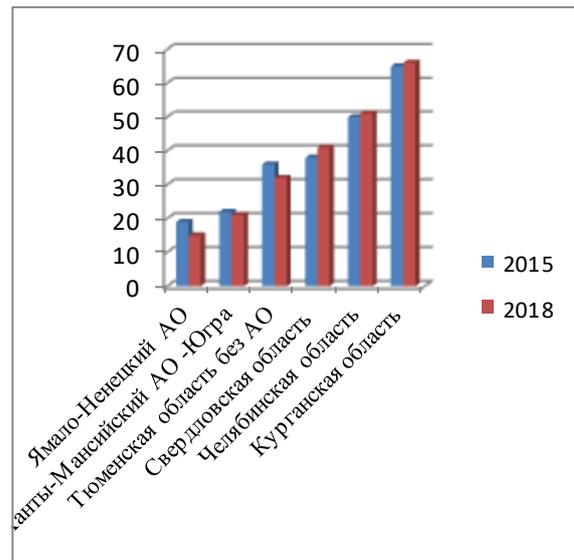


Figure 1 Integrated index of economic development of the subjects of the Ural-Siberian macroregion for 2015 and 2018

The rating of the socio-economic status of the subjects of the Russian Federation conducted by RIA [29] generally confirms the results of the research. Thus, the rating of the regions of the Ural-Siberian macroregion (UrFO), conducted by the Agency according to such criteria as socio-economic status, shows the following positions of the subjects of the macroregion in 2018 (table 1).

Table 1 Integral rating of socio-economic status of the Ural-Siberian macro-region subjects for 2018 [29]

The subject of the macro-region	2018		Rating by macro region
	Place in the Russian Federation, para.	Integral rating, points	
Sverdlovsk region	7	67,91	3
Kurgan region	76	23,948	6
Chelyabinsk region	15	57,264	5
Tyumen region	8	64,934	4
KhMAO	3	78,398	1
YANAO	6	69,388	2

The data from the table indicates a fairly stable position of subjects in the overall rating of the Russian Federation with the exception of the Kurgan region. 4 out of 6 regions are in the top 10 regions in terms of their socio-economic status.

The dynamics of the rating compiled according to RIA data for the period 2015-2018 [29] is shown in figure 2.

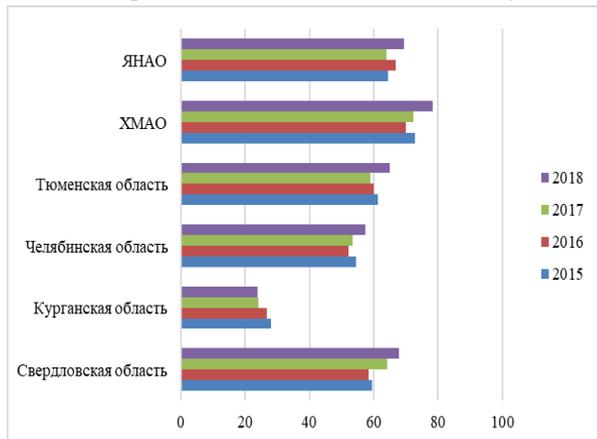


Figure 2 Dynamics of the integrated rating of socio-economic status of the subjects of the Ural-Siberian macroregion for 2015-2018 [29]

The dynamics of the indicator for the study period shows an improvement in the positions of subjects, with the

exception of the Kurgan region, which in principle confirms the hypothesis of increasing differentiation of subjects for the worse, which were already in the last positions (or close to them) compared to other regions.

For Russia the digital inequality as well as the economic one manifests itself by a strong contrast between center and periphery, since the availability of information technology in major centres is much higher (information luxury), while in the periphery there are only minimum conditions for the development and use of IT. Therefore, for Russian regions, digital inequality is formed not from the unavailability or inability to use information technologies, but from the lack of availability of information technologies. If a subject does not have the Internet or its cost is high, they will not be able and will not use information technologies. At the same time, it is necessary to understand accessibility not only as a technical possibility, but also as a cost one, since it may be cheaper for many citizens and organizations to operate without using information technology.

Therefore, to calculate availability, you need to evaluate two main parameters: speed and cost of the Internet. For calculations, data from open sources of information were selected: speed – data from Rostelecom (the largest player in the Russian market and with representation in all regions of the Russian Federation) and the Speedtest website (the largest organization that measures data around the world) were considered; cost-package offers from Rostelecom (table 2).

Table 2 Data on Internet speed and cost for the Ural-Siberian macroregion, 2018 [30,31]

	Rostelecom		Speedtest	
	Speed Mbit / s	Cost, rubles	Speed (broadband), Mbit / s	Speed (Mobile access), Mbit / s
Kurgan region	100	400	30,47	12,14
Sverdlovsk region	110	400	37,44	14,33
KhMAO	90	650	57,27	11,55
YANAO	90	1500	49,44	9,43
Tyumen region	100	500	41,24	14,66
Chelyabinsk region	130	250	47,44	16,37
Max. value for the Russian Federation	200	-	57,27	29,02

To form a single indicator for evaluating digital inequality, all values on a scale from 0 to 1 were normalized based on the maximum necessary and possible level of achievement for these values: speed-calculated as the average value among all speed indicators; the cost calculations have been made on the installation, which in modern terms spending

on the Internet is becoming mandatory for life and therefore needs to understand what is the share of the subsistence level, the calculation is in the inverse, since it is necessary to strive not to the maximum, but to the minimum (table 3).

Table 3 Calculation of the digital inequality indicator based on the speed and cost of Internet access for the Ural-Siberian macroregion, 2018 [30,31]

	The calculation of the cost index			Cost index	Index
	Min cost of living, RUB.	Share, %	Cost index		
Kurgan region	9387	4,26	0,57	0,48	0,53
Sverdlovsk region	10217	3,92	0,61	0,57	0,59
KhMAO	14471	4,49	0,55	0,62	0,58
YANAO	15538	9,65	0,03	0,55	0,29
Tyumen region	10450	4,78	0,52	0,58	0,55
Chelyabinsk region	9330	2,68	0,73	0,68	0,71
Max. value for the Russian Federation	-	10	-	-	-

The obtained values show how heterogeneous the regions are according to these indicators, the Chelyabinsk region is in the best position, the YANAO has the worst indicator, and the gap within one macroregion is 40%. At the same time, it can be noted that the obtained data on speed and availability do not always depend on the overall economic state of the regions. Thus, despite the fact that

according to many ratings, the position of the YANAO is rated as one of the highest positions in the region, in this case the region demonstrates low availability of it (figure 3).

	От	До
	0,00	0,40
	0,641	0,70
	0,71	1,00



Figure 3 Indicator of digital inequality in the Ural-Siberian macroregion

When forming investment decisions and evaluating the direction of investment flows, it is necessary to understand that economic inequality is manifested in material resources and material disadvantage (poverty), digital inequality is manifested in the availability of information resources (information technologies) and the price possibility of their use.

Therefore, taking into account all the existing opportunities and prospects for development due to information technologies, the main barrier to all processes is the availability of information technologies.

In this regard, we consider it necessary to examine investment aspects of regional development that also affect the development of the IT sector.

Let's consider the main indicator of investment activity in the macroregion in the context of its constituent entities, considering such an indicator as investment in fixed capital by region.

The dynamics of investment in fixed assets for the subjects of the macroregion, compiled according to official statistics [32], is shown in figure 4.

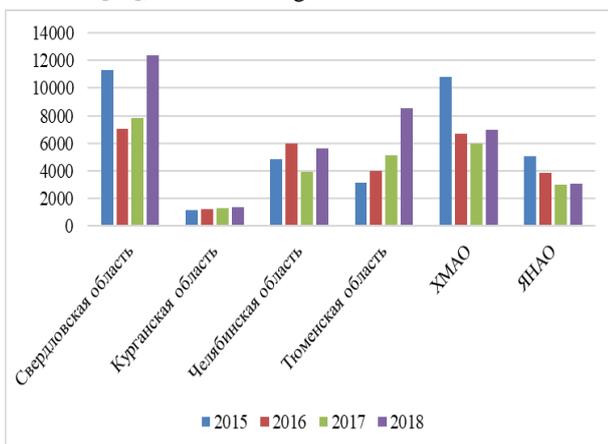


Figure 4 Dynamics of investment in fixed assets in the Ural-Siberian macro-region for 2015-2018, million rubles [32]

Despite the fact that the total amount of investment over the years has a positive trend (a slight decrease was observed in 2015 as a consequence of the negative crisis events in 2014), the overall situation in the macroregion is positive.

According to the analytical data reflecting the situation with Informatization of regions [33], we have compiled a summary chart showing the dynamics of regional expenditures for these purposes for the period 2015-2018. (figure 5) and dynamics of specific indicators (per 1000 people) for the subjects for the same period (figure 6).

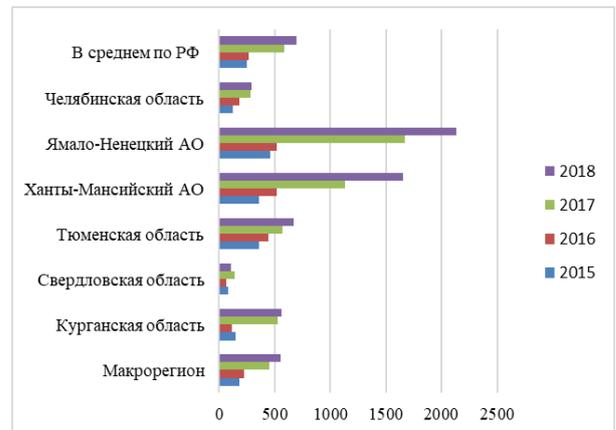
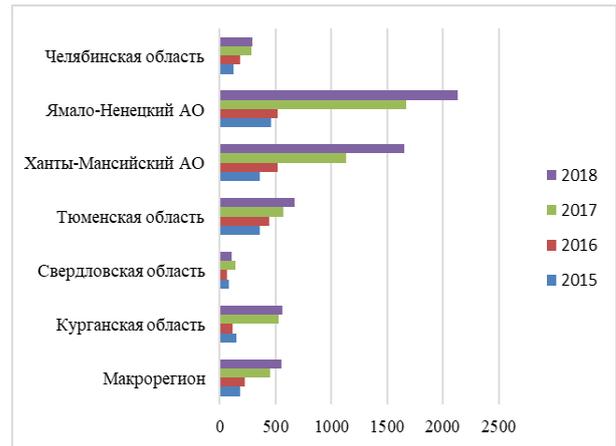


Figure 5 Dynamics of the volume of financing per 1000 people for 2015-2018 for the macroregion and on average for the Russian Federation, thousand rubles

As can be seen from figure 6, the specific amount of funding for Informatization activities is uneven across regions, but the average values for the macroregion and the Russian Federation as a whole are very close. The macroregion as a whole and its subjects repeat the trend of the Russian Federation, which is characterized by a sharp increase in investment per 1000 people in 2017 and 2018. It is difficult to identify the trend of deviation in the dynamics of the average values of the studied indicator for the Sverdlovsk region in 2018 (the specific value is lower than in 2017), but in General, the region is characterized by extremely positive dynamics in terms of the total

amount of investment in fixed assets (see figure 4). In General, the results shown in Fig.6 indicate a favorable trend that characterizes the processes of overcoming digital inequality identified earlier. The lag of the Yamal-Nenets Autonomous district in terms of speed and cost of Internet access has the opportunity to be overcome.

When considering investment flows, it should be noted that it is important to take into account not only the General values, but also the direction of investment flows in the territory, since investment in the process of Informatization should take place not only in large enterprises-leaders and state institutions. The imbalance in flows and volumes between elements of the Informatization process leads to the fact that economically and investment-strong regions underinvest important areas and do not get the necessary digital development.

4. CONCLUSION

Digital inequality, which, like economic inequality, manifests itself in the availability and accessibility of information technologies and demonstrates the different availability and possibility of using them between the center and the periphery. Often, there is a minimal "set of services" in this area in the peripheries, which characterizes a low level of its use, while in large centers availability is high. In our opinion, the existing differentiation of regions that leads to digital inequality was formed more from the lack of availability of information technologies, rather than from lack of readiness or the inability to use them. At the same time, we understand accessibility as a technical and cost-based possibility of using IT.

The results of the study confirm that in the Ural-Siberian macroregion, the subjects included in it are clearly divided into two groups, depending on the factors of "first nature" and "second nature" according to Krugman. Moreover, regions whose economic development primarily depends on the availability of natural fuel resources are significantly superior to those regions whose economic development depends on the state of manufacturing.

The development of information technologies requires certain investments for the development of information infrastructure and overcoming digital inequality. The relevance of the development of this sphere is one of the drivers that provides both information security of the regions of the Russian Federation and contributes to the development of innovations in all areas of the economy.

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