Interconnection between the level of people’s digital quality of life and investment attractiveness of Russian regions

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Abstract. Digital transformation influenced not only economic branches and markets, but also people’s quality of life in different regions of the country. The purpose of the research is to evaluate people’s digital quality of life and to define its interconnection with investment capabilities of Russian regions. The authors measure digital component of people’s quality of life with a regional index including six subindices (digital skills of people, availability of digital goods for people, digital quality of working life, social sphere and services, state electronic services and safety of people informational activities). These subindices based on data from the regions of the Russian Federation were used to define the level of people’s life digitalization and to estimate the digital inequality with the application of R/P ratios and variation ratios during 2015 – 2018. This period corresponds to available data on information society and digital economy in Russian statistics. For all years of the considered period the first position is taken by safety of people informational activities and the last place belongs to digital quality of working life, social sphere and services. Digital inequality, based on four subindices, increased during 2015 – 2018. Results of research obtained with the use of econometric methods show complete or partial confirmation of connection: it is positive for investment potential indicators and the Russian regional index of digital component of people’s quality of life and its subindices.

1. Introduction

Digital transformation of economy and society became one of prior directions of research by scientists from different fields. It assumes alteration of technological paradigm and institutional structure of society in which it is necessary to consider institutions interaction corresponding to digital and non-digital processes in current conditions of augmented reality which strengthens “complexity” of modern world, uncertainties and risks [1]. Digital transformation can both decrease and increase differentiation of regions and countries i.e. can influence the people’s quality life (PLQ). Everything depends on how would be defined and used property rights on digital platforms and ecosystems, how and by whom would be formed and used new institutions such as institutions of sourcing, peering, trust, safety and others.

Plenty of publications are devoted to people’s inequality. We mention here some of them. Intercountry and interregional analysis of incomes differentiation is presented in Belozyorov S. A. and Sokolovska O. V., Flach L. and Janeba E., Nolan B., Richiardi M. G. and Valenzuela L. [2, 3, 4]. Interconnection of financial aspects and people incomes inequality is shown in articles by Chiu Y. B. and Lee C.C., Velthoven A., Haan J. and Sturm J.-E. [5, 6]. Institutional factors of inequality are explored by Hartwell C. A., Horvath R., Horvathova E. and Popova O., Chong A. and Gradstein M. [7, 8]. Influence of social inequality and incomes inequality on economic growth as well as investment processes are studied by Karayev A. K., Yurevich M. A. [9, 10]. In the mentioned publications written by both foreign and Russian authors countries, economic branches and incomes are considered in a whole, without separation of digital sectors and their influence and quality of life. Although to be fair we have to note that the first articles have already appeared which are devoted to people’s inequality due to informatization and digitalization of economy [11, 12].
It seems to be objective to research not only the level of digital component and digital inequality of people’s quality of life but also to define its interconnection with investment capabilities of regions. National and foreign scientists study theoretical basics and problems of investment activity [13, 14], make empiric estimations of regions investment attractiveness [15-17], different methods and models are applied [18, 19]. In our research using the tools of econometric calculations it is assumed to check hypotheses on existence of interconnection between index and subindices of the Russian regional index of digital component of people’s quality of life (RRIDCPQL) and indices of investment potential, investment risk and investment attractiveness of the Russian Federation (the RF) regions for the considered period of 2015 – 2018.

2. Materials and Methods

Digital quality of people’s life is characterized by six components: digital quality of people, i.e. people having digital competences; availability of digital goods (computers, the Internet and so on) for people; digital quality of working life in conditions of digitalization (presence of computers, local networks, electronic document flow in organizations etc.); quality of social sphere and services in conditions of digitalization (presence of information and communication networks in education, health care, culture establishments, using the Internet to purchase goods and services); state electronic services for people (using the Internet for getting state and municipal services, assessment of their quality etc.); safety of people informational activities (using the tools of information protection by people, factors restraining use of the Internet by safety reasons). All these components were described by a number of indicators, total amount of which in the described series of computations is 34, including positive and negative indicators. The research uses the information on indicators of economy and society digital transformation from official data of the Federal State Statistics Service (Rosstat) on all 85 regions of Russia, eight federal districts (FD) for 2015 – 2018.

At first, the Russian regional index of digital component of people’s quality of life was computed. Let’s describe briefly the stages of authors’ method to obtain Russian and regional indices, details of which are given in [20].

The indicators characterizing 6 blocks of people’s life digitalization for the period of 2015 – 2018 were selected. Correlation links between those selected indicators were analyzed and the indicators with high correlation ratios (equal to 0.7 and more) were excluded. Minimax normalization of indicator was performed. Normalized values of indicators were defined for each region and each year of the considered period. Minimum and maximum values of a given indicator were defined for all regions during 4 considered years. Such a normalization of indicators is an important part of authors’ approach and allows to compare computed indices and subindices values in dynamics. Subindices values and integrated indices for regions and years of the period were defined as arithmetical average of normalized values of the respective indicators set. Also values of regional indices and subindices within PLQ blocks were found. The RRIDCPQL value was defined as weighted average of subindices values. The values of weight ratios were taken equal to share of indicators number used for computation of each subindex in overall number of indicators selected. Also the regions were ranked in descending order by values of the integral index and subindices with rankings (positions) assignment for different years of the considered period. The changes in rankings of regions in subindices and the Russian index of people’s quality of life digitalization were estimated.

In order to analyze digital inequality of the Russian regions specific R/P ratios and variation ratios were computed. The R/P ratio reflects the ratio of the maximal regional index in a federal district to the minimal one, excluding the Central FD and Russia in a whole (for them computations were standard due to the number of regions). Variation ratio is the relation of mean-square deviation to arithmetical average value of an index in a federal district, subindex or the whole country.

Investment ranking of Russian regions is estimated by the investment potential index and investment risk index which are published by the “RAEKS-Analitika” rating agency. Using the statistical data processing package SPSS (Statistical Package for the Social Sciences) correlation and determination ratios were computed in order to reveal interconnection between investment attractiveness of regions on one side and six subindices and RRIDCPQL on another for 85 Russian regions and for separate years within the period from 2015 to 2018. Respective conclusions were formulated.
3. Results

3.1. Level of digital component of people’s quality of life and digital inequality in Russian regions

Level of digital component of people’s quality of life in Russia increased from 0.465 in 2015 to 0.516 in 2018 (table 1).

| Federal district       | The RRIDCPQL value in federal districts | Ranking of federal districts in the RF | The index growth rate (%) |
|------------------------|----------------------------------------|---------------------------------------|---------------------------|
|                        | 2015  | 2016  | 2017  | 2018  | 2015  | 2018  | 2018 to 2017 | 2018 to 2015 |
| Russian Federation     | 0.465 | 0.482 | 0.506 | 0.516 |        |        | 101.8        | 111.0        |
| 1. Central FD          | 0.487 | 0.514 | 0.533 | 0.545 | 2      | 2      | 102.2        | 112.0        |
| 2. North-Western FD    | 0.495 | 0.517 | 0.532 | 0.547 | 1      | 1      | 102.8        | 110.4        |
| 3. Southern FD         | 0.419 | 0.442 | 0.469 | 0.471 | 7      | 7      | 100.3        | 112.5        |
| 4. Northern Caucasus FD | 0.384 | 0.375 | 0.408 | 0.404 | 8      | 8      | 99.1         | 105.3        |
| 5. Volga FD            | 0.464 | 0.476 | 0.506 | 0.516 | 4      | 4      | 102.0        | 111.4        |
| 6. Ural FD             | 0.486 | 0.509 | 0.525 | 0.536 | 3      | 3      | 102.0        | 110.2        |
| 7. Siberian FD         | 0.455 | 0.465 | 0.494 | 0.514 | 5      | 5      | 103.9        | 112.8        |
| 8. Far Eastern FD      | 0.450 | 0.477 | 0.487 | 0.491 | 6      | 6      | 100.8        | 109.1        |

The North-Western federal district (NWFD) has maximal in the RF value of the index equal to 0.547. Central FD (CFD) competes to it. Northern Caucasus FD (NCFD) permanently takes the last position with index value lower by 0.143. Though federal districts tend to keep their positions in rankings, they show quite large difference in growth rates. In 2017 – 2018 all federal districts had positive growth rates of regional index of digital people’s quality of life, excluding only the Northern Caucasus FD (99.1%). During four years the highest growth rates were demonstrated by the Siberian FD (SFD). Its value of growth rate in 2018 comparing to 2015 is 112.8%. Volga FD (VFD) has 4th by ranking and by growth rate of the regional index. Growth rates rankings changed in different years for North-Western, Southern (SFD), Ural (UFD) and Far Eastern federal districts (FEFD). In 2018 five regions leading in digital quality of life included the Yamalo-Nenets autonomous okrug (AO) (0.711), the city of Moscow (0.655), the Khanty-Mansiysk AO – Yugra (0.622), the Belgorod region (0.596), the Chuvash Republic (0.590), which are followed by the Tyumen region (0.575) and the city of Saint-Petersburg (0.573).

Dynamics and change rates of parameters characterizing six components of people’s quality of life in Russia are also interesting. In all years of the considered period the first place has been taken by safety of people informational activities while availability of digital goods for people takes the second place. The last place is steadily taken by the index of social sphere and services quality in conditions of digitalization. By 2018 comparing to 2015 the index of state electronic services has increased from 0.366 to 0.693 and its ranking is equal to 3. The value index of digital quality of working life has been steadily increasing, though its ranking was equal to 4 or 5 in different years, which is explained by decrease in its absolute value and growth rates. The maximal growth was demonstrated by the index of state electronic services – 189.4% comparing to 2015. Growth rates of index of social sphere and services quality (113.3%) is higher than Russian average (111.0%). The rest 4 subindices has growth rates lower than the RRIDCPQL.

At first glance R/P and variation ratios computed for regional indices of digital component of people’s quality of life show not very high level of inequality between the regions of Russia. All ratios of digital inequality in the RF demonstrate decrease of their values from 2015 to 2017 and some increase in 2018 (table 2).

Variation ratio varies approximately from 4 to 15 among the regions during the four years period which tells about quite homogenous set of objects on relative scatter of regional indices. However let’s make a point that some specific features. In 2018 variation ratio for the RF was 10.724. Higher values were found for two federal districts: the North Caucasian FD – 13.583 and the Ural FD – almost 14 (figure 1).

And in the first of them relatively high variation coupled with low values of regional indices is observed, while in the second one relatively high variation is coupled with high values of regional indices, as the Ural FD includes the leaders of digitalization: the Yamalo-Nenets AO and the Khanty-Mansiysk AO – Yugra. The all-Russian type of variation ratio dynamics is typical for majority of regions. The biggest increase of variation ratio occurred in the Southern FD – 1.87 times to 2017 and 1.1 times to 2015. However in the
North-Western FD and Far Eastern FD variation ratio decreased 1.93 times in 2018 comparing to 2015. The similar changes happened in other differentiation ratios of regional indices.

Let’s consider inequality in six considered PLQ subindices (table 3).

Table 2. Differentiation of values of the Russian regional index of digital component of people’s quality of life in the regions of the Russian Federation in 2015–2018.

| Federal district             | R/P ratio 2015 | R/P ratio 2016 | R/P ratio 2017 | R/P ratio 2018 | Variation ratio 2015 | Variation ratio 2016 | Variation ratio 2017 | Variation ratio 2018 |
|------------------------------|----------------|----------------|----------------|----------------|----------------------|----------------------|----------------------|----------------------|
| Central FD                   | 1.429          | 1.391          | 1.339          | 1.373          | 11.856               | 10.532               | 8.911                | 9.786                |
| North-Western FD             | 1.328          | 1.227          | 1.256          | 1.160          | 8.664                | 5.375                | 6.551                | 4.489                |
| Southern FD                  | 1.225          | 1.242          | 1.116          | 1.249          | 6.991                | 6.911                | 4.112                | 7.697                |
| Northern Caucasus FD         | 1.608          | 1.394          | 1.471          | 1.603          | 14.465               | 12.779               | 12.146               | 13.583               |
| Volga FD                     | 1.241          | 1.295          | 1.246          | 1.246          | 6.357                | 6.774                | 5.658                | 5.769                |
| Ural FD                      | 1.464          | 1.460          | 1.367          | 1.503          | 11.598               | 12.026               | 10.386               | 13.978               |
| Siberian FD                  | 1.379          | 1.353          | 1.245          | 1.295          | 8.307                | 8.399                | 5.939                | 6.985                |
| Far Eastern FD               | 1.244          | 1.255          | 1.251          | 1.114          | 7.096                | 6.997                | 7.154                | 3.674                |
| Russian regional index of digital component of people’s quality of life | 1.543          | 1.531          | 1.406          | 1.471          | 11.935               | 11.726               | 9.753                | 10.724               |

Figure 1. Dynamics of digital variation ratio in federal districts and in the RF.

Table 3. Inequality of people in Russia by subindices of the Russian regional index of digital component of people’s quality of life in 2015–2018.

| Subindex                                  | R/P ratio for subindices and RRIDCPQL 2015 | R/P ratio for subindices and RRIDCPQL 2016 | R/P ratio for subindices and RRIDCPQL 2017 | R/P ratio for subindices and RRIDCPQL 2018 | Variation ratio for subindices and RRIDCPQL 2015 | Variation ratio for subindices and RRIDCPQL 2016 | Variation ratio for subindices and RRIDCPQL 2017 | Variation ratio for subindices and RRIDCPQL 2018 |
|-------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| 1. Index of digital quality of people     | 1.977                                      | 1.948                                      | 1.712                                      | 2.050                                      | 18.817                                        | 19.816                                        | 14.938                                        | 19.090                                        |
| 2. Index of availability of digital goods for people | 1.617                                      | 1.642                                      | 1.585                                      | 1.690                                      | 13.531                                        | 13.533                                        | 12.253                                        | 14.325                                        |
| 3. Index of digital quality of working life | 2.073                                      | 1.920                                      | 1.986                                      | 1.733                                      | 19.702                                        | 18.141                                        | 18.929                                        | 16.317                                        |
| 4. Index of digital quality of social sphere and services | 2.050                                      | 2.077                                      | 1.885                                      | 2.056                                      | 19.842                                        | 19.982                                        | 17.749                                        | 20.252                                        |
| 5. State electronic services for people   | 6.103                                      | 2.869                                      | 2.245                                      | 1.770                                      | 37.614                                        | 27.293                                        | 21.844                                        | 16.053                                        |
| 6. Safety of people informational activities | 1.316                                      | 1.357                                      | 1.468                                      | 1.364                                      | 7.409                                         | 8.476                                         | 11.150                                        | 9.163                                         |
| RRIDCPQL                                  | 1.543                                      | 1.531                                      | 1.406                                      | 1.471                                      | 11.935                                        | 11.726                                        | 9.753                                         | 10.724                                        |

The subindex of safety of people informational activities is the only one with variation ratio lower than the RRIDCPQL in almost all years in the considered period. However this very subindex showed the greatest increase by 1.24 times in the ratio value. Variation ratio decreased only for two subindices: most significantly – by 2.34 times – for the state electronic services for people and by 17.2% for the index of
digital quality of working life. Variation ratio of the RRIDCPQL also decreased by 10.2% during the
considered period. In 2018 the highest variation ratio was found for the index of digital quality of social
sphere and services (20.252) and the index of digital quality of people (19.09).

3.2. Interconnection between subindices of the RRIDCPQL in indices of investment potential, investment risk
and investment attractiveness of the Russian regions

Let’s analyze the investment opportunities in the digitalization of Russia and how it can be influenced by
investment attractiveness of regions.

The program “Digital economy of the Russian Federation” has passed through alterations in status and
financing volumes since 2017. In has changed from a program to a national program and then since the end
of 2018 to the national project “National program “Digital economy of the Russian Federation””. Along with
it other 12 national projects are implemented. The national project “National program “Digital economy of
the Russian Federation” includes 6 federal projects: “Normative regulation of digital environment”,
“Informational infrastructure”, “Staff for digital economy”, “Information security”, “Digital technologies”.
The terms of implementation of all projects are from 01.11.2018 to 31.12.2024. It was initially planned to
allocate 2791 billion rubles from the federal budget and extrabudgetary sources to the national program, but
in the last version of the national project the funds were cut by 42% to 1627 billion rubles (table 4), and
38.5% of them are directed to the federal project “Informational infrastructure”.

Table 4. Funds volumes allocated to the program “Digital economy of the Russian Federation” (billion rubles).

| Funding source | The program “Digital economy of the Russian Federation” dated 28 July, 2017 | The national program “Digital economy of the Russian Federation” dated 07 May, 2018 | The national project “Digital economy of the Russian Federation” dated 24 December, 2018 | The national project “Digital economy of the Russian Federation” dated 04 June, 2019 |
|----------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Period of financing | Planned for 2018 – 2021                                                   | 2018 – 2024                                                             | 2018 – 2024                                                             | 2018 – 2024                                                             |
| Federal budget    | 170                                                                       | 1267                                                                    | 1099.589                                                                | 1099.583                                                                |
| Extrabudgetary sources | 350                                                                       | 1524                                                                    | 535.315                                                                 | 527.513                                                                 |
| Total             | 520                                                                       | 2791                                                                    | 1634.904                                                                | 1627.096                                                                |

According to the data of the Audit Chamber of the RF in 2019 108 billion rubles were planned to be spent
for the national project “Digital economy of the Russian Federation”, however it was implemented with the
worst budget performance of 53.6% among other national projects. For comparison, the budget of the
national project “Science” was performed at 98.3%, “Culture” – at 98.1%, “Health care” – at 96.3%. The
representative of the Ministry of Digital Development, Communications and Mass Media of the RF clarified
that after payment of all concluded contracts the budget performance would reach 92.2%. It is obvious that in
regions volumes of budgets, levels of investments drawdown and degrees of implementation of digital
economy development programs are even more differentiated.

Let’s try to answer the question how much is interconnection between investment attractiveness with
level of digitalization in the six spheres of people quality of life. The agency “RAEKS-Analitika” published
the rankings of investment attractiveness of the Russian regions in 2019. The city of Moscow, the Moscow
region, the city of Saint Petersburg have the higher investment potential. The Khanty-Mansiysk AO – Yugra,
the Belgorod region and the Yamalo-Nenets AO take 12th, 16th and 19th places, respectively. The last
positions belong to the Altai Republic and the Nenets AO. The regional potential ratios differ by 86 times in
the leading and retarding regions. The lowest investment risks are in the Moscow region, the city of Saint
Petersburg, the Belgorod region, the Lipetsk region, the highest ones are in the republics of North Caucasus
and the Republic of Tyva, with difference of 4.64 times.

The index of regions investment attractiveness was defined by us as multiplication of investment potential
ratio and investment risk value. For the purposes of comparability the analysis of interconnection between
the RRIDCPQL indices and subindices on one hand and the indices of investment potential, investment risk
and regions investment attractiveness was done for the period from 2015 to 2018. The authors computed
Pearson correlation ratio between RRIDCPQL indicators and investment attractiveness indicators with their
significance checking as well as found determination ratios for case of pair correlation model for
contemporary indicators basing on data for all 85 Russian regions. The results show full or partial
confirmation of connection between corresponding indicators (table 5).
Table 5. Interconnection of subindices of people’s digital quality of live and indices of investment attractiveness of Russian regions from 2015 to 2018.

| Subindex | Correlation and determination ratios | Investment potential | Investment risk | Investment attractiveness |
|----------|-------------------------------------|-----------------------|----------------|--------------------------|
|          |                                     | 2015                  | 2016           | 2017                     | 2018                  | 2015          | 2016          | 2017          | 2018          |
| 1. Index of digital quality of people | Determination ratio R² | 0.333* | 0.320* | 0.349* | 0.249* | -0.192 | -0.122 | -0.172 | -0.239* | 0.319* | 0.319* | 0.307* | 0.209 |
|          |                                    | 0.111 | 0.102 | 0.122 | 0.062 | 0.037 | 0.015 | 0.030 | 0.057 | 0.102 | 0.101 | 0.094 | 0.044 |
| 2. Index of availability of digital goods for people | Determination ratio R² | 0.283* | 0.341* | 0.276* | 0.293* | -0.368* | -0.542* | -0.354* | -0.316* | 0.229* | 0.276* | 0.223* | 0.225* |
| 3. Index of digital quality of working life | Determination ratio R² | 0.382* | 0.370* | 0.409* | 0.436* | -0.217 | -0.244* | -0.337* | -0.510* | 0.361* | 0.333* | 0.326* | 0.319* |
| 4. Index of digital quality of social sphere and services | Determination ratio R² | 0.146 | 0.137 | 0.167 | 0.190 | 0.047 | 0.059 | 0.114 | 0.260 | 0.130 | 0.111 | 0.106 | 0.102 |
| 5. Index of state electronic services for people | Determination ratio R² | 0.112 | 0.133 | 0.098 | 0.061 | 0.215 | 0.172 | 0.155 | 0.098 | 0.089 | 0.111 | 0.070 | 0.039 |
| 6. Index of safety of people informational activities | Determination ratio R² | 0.152 | 0.081 | 0.060 | 0.027 | 0.322 | 0.240 | 0.140 | 0.052 | 0.114 | 0.051 | 0.029 | 0.010 |
| RRIDCPQL | Determination ratio R² | 0.007 | 0.009 | 0.070 | 0.038 | 0.017 | 0.131 | 0.034 | 0.008 | 0.007 | 0.016 | 0.074 | 0.030 |
| Number of observations |                          | 0.464* | 0.460* | 0.432* | 0.364* | -0.515* | -0.526* | -0.529* | -0.463* | 0.418* | 0.409* | 0.345* | 0.278* |
|                |                                    | 0.215 | 0.212 | 0.187 | 0.133 | 0.265 | 0.277 | 0.280 | 0.214 | 0.174 | 0.167 | 0.119 | 0.077 |

- * – statistical significance for p < 0.05.

- The index of digital quality of people has statistically significant connection with investment potential for the period 2015 – 2018 and with investment attractiveness for the period 2015 – 2017. However statistically significant connection with investment risk is found only for 2018.
- The index of availability of digital goods for people has statistically significant and positive connection with investment potential and investment attractiveness and statistically significant negative connection to investment risk for the period 2015 – 2018.
- The index of digital quality of working life also has statistically meaningful and positive connection with investment potential and investment attractiveness for the period 2015 – 2018. Statistically significant and negative connection is with investment risk for the period 2016 – 2018.
- The index of digital quality of social sphere and services has statistically meaningful and positive connection with investment potential and investment attractiveness while statistically significant and negative connection was found for investment risk for the period 2015 – 2018.
- The index of state electronic services for people has statistically meaningful and positive connection with investment potential and investment attractiveness for the period of 2015 – 2017 and with investment attractiveness for the period 2015 – 2016. Statistically significant and negative connection is found for investment risk for all considered years.
- The index of safety of people informational activities has statistically meaningful and positive connection with investment potential and investment attractiveness for 2017 while statistically significant and negative connection with investment risk was found only for 2016. In the whole statistically significant connection of this subindex with the investment attractiveness indices appears quite rarely and we could accept the hypothesis of the absence of such connection for the considered periods.
- The RRIDCPQL index has statistically meaningful and positive connection with investment potential and investment attractiveness while statistically significant and negative connection was found for investment risk for the period 2015 – 2018.
4. Discussion

Thus, the checked hypothesis showed that nearly all subindices and the RRIDCPQL index, except the index of safety of people informational activities, have statistically significant connection with the investment attractiveness indices. Correlation and determination ratios for the RRIDCPQL index with investment attractiveness indicators are every time higher than corresponding ratios for the separate subindices constituting it, i.e. the RRIDCPQL has tighter connection to the indicators of regions investment attractiveness. All determination ratios for the subindices, RRIDCPQL and indices of investment attractiveness of the Russian regions for the period 2015 – 2018 have values limited by 0.32, i.e. changes in the indicators of investment attractiveness explain up to 32% of changes in the RRIDCPQL index and its subindices.

Table 6 contains averaged correlation and determination ratios based on the corresponding data on 85 regions of Russia for 4 years.

Table 6. Interconnection of subindices of people’s digital quality of life and indices of investment attractiveness of the Russian regions on average for the period 2015 – 2018.

| Subindex                                      | Correlation ratio | Determination ratio |
|-----------------------------------------------|-------------------|---------------------|
|                                              | Investment        | Investment          | Investment | Investment | Investment |
|                                              | potential         | risk                | attractiveness | potential | risk | attractiveness |
| 1. Index of digital quality of people         | 0.313*            | –0.181              | 0.289*       | 0.099*     | 0.035 | 0.085*          |
| 2. Index of availability of digital goods for| 0.298*            | –0.395*             | 0.238*       | 0.090*     | 0.164* | 0.058*          |
| people                                        |                   |                     |              |           |       |                 |
| 3. Index of digital quality of working life   | 0.399*            | –0.327*             | 0.335*       | 0.160*     | 0.120* | 0.112*          |
| 4. Index of digital quality of social sphere  | 0.315*            | –0.396*             | 0.273*       | 0.101*     | 0.160* | 0.077*          |
| and services                                  |                   |                     |              |           |       |                 |
| 5. Index of state electronic services for     | 0.271*            | –0.416*             | 0.209        | 0.080*     | 0.189* | 0.051           |
| people                                        |                   |                     |              |           |       |                 |
| 6. Index of safety of people informational    | –0.160            | –0.191              | –0.165       | 0.031      | 0.048  | 0.032           |
| activities                                     |                   |                     |              |           |       |                 |
| RRIDCPQL                                      | 0.430*            | –0.508*             | 0.363*       | 0.187*     | 0.259* | 0.134*          |
| Number of observations                        | 340               | 340                 | 340          | 340        | 340    | 340              |

* – statistical significance for \( p < 0.05 \).

It is confirmed in the whole significance of positive influence of investment potential indicators on the RRIDCPQL index and its subindices for the period 2015 – 2018. The maximum share of explained changes of PQL due to changes in investment potential reaches 19%. It was managed to confirm statistically significant negative influence of investment risks index on the RRIDCPQL index and four of its subindices, i.e. higher investment risks cause lower values of indicators of people’s digital quality of life.

5. Conclusion

Digital transformation touched all areas of people life activities. Growth of the Russian regional index of digital component of people’s quality of life was equal to 0.051 during 2015 – 2018. The North-Western and the Central FD have the highest rankings, the North Caucasian FD takes the last position. In 2018 the leaders in digital quality of life are the Yamalo-Nenets autonomous okrug, the city of Moscow, the Khanty-Mansiysk AO – Yugra, the Belgorod region, i.e. regions are rich with energetic resources, regions with quite large share of mining industry and the capital city. For all years of the considered period the first place is taken by safety of people informational activities, the second one is by availability of digital goods for people and the last place is steadily taken by the index of digital quality of social sphere and services.

In 2018 higher than Russian average values of digital variation ratios were found for 2 federal districts: the North Caucasian FD and the Ural FD. In the North Western FD and the Far Eastern FD variation ratio decreased by almost 2 times in the year 2018 comparing to 2015. Variation ratios for the RRIDCPQL,
The subindices of digital quality of working life and state electronic services for people decreased while for other four subindices increased in 2015 – 2018.

The degree of government investments drawdown in Russia and its regions according to programs of digital economy leaves much to be desired. However, changes in regional investment attractiveness explain 8.5% of change in the index of people’s digital quality, approximately 6% of variation in the index of working life digitalization, almost 8% of variation in the index of social sphere digitalization, more than 13% of changes in the RRIDCPQL.

In the whole, improvement of digital component of people’s quality of life will take place in relatively wealthy regions while less wealthy ones will not be able to create digital environment at proper level without government support and institutional investors. It is important but clearly not enough just to perform the annual budgets of the national project “National program “Digital economy of the Russian Federation”. As the experience of digital leaders shows, besides of government investments essential influence is also exerted by digital expenditures of households and investments of firms. It is desirable to conduct systematic control of financing and outcome of economy digitalization programs especially in retarding regions of Russia.

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References
[1] Litvintseva G P, and Petrov S P 2019 Theoretical Foundations of Digital Transformation of Economy and People’s Quality of Life, Journal of Economic Theory, 16, 3, pp 414-427. DOI: 10.31063/2073-6517/2019.16-3.10
[2] Belozyvorov S A, and Sokolovska O V 2018 Personal income taxation and income inequality in Asia-Pacific: a cross-country analysis, Journal of Tax Reform, 4, 3, pp 236-249. DOI: 10.15826/jtr.2018.4.3.054
[3] Flach L, and Janeba E 2017 Income inequality and export prices across countries, Canadian Journal of Economics, 50, 1, pp 162–200. DOI: 10.1111/caje.12254
[4] Nolan B, Richiardi M G, and Valenzuela L 2019 The drivers of income inequality in rich countries, Journal of Economic Surveys, 33, iss. 4, pp 1-40. DOI: 10.1111/joes.12328
[5] Chiu Y B, and C.C. Lee C C 2019 Financial development, income inequality, and country risk, Journal of International Money and Finance, 93, pp 1-18. DOI: 10.1016/j.jimonfin.2019.01.001
[6] Velthoven A, Haan J, and Sturm J E 2018 Finance, income inequality and income redistribution, Applied Economics Letters, 26, iss. 14, pp 1-8. DOI: 10.1080/13504851.2018.1542483
[7] Hartwell C A, Horvath R, Horvathova E 2019 and O. Popova, Democratic institutions, natural resources, and income inequality, Comparative Economic Studies, 61, 4, pp 531-550. DOI: 10.1057/s41294-019-00102-2
[8] Chong A, and Gradstein M 2019 Institutional persistence, income inequality, and individual attitudes, Journal of Economic Inequality, 17, 3, pp 401-413. DOI: 10.1007/s10888-019-09414-w
[9] Karayev A K 2018 The impact of financialization and income inequality on economic growth, investment processes and innovation, Economics, taxes & law, 11, 6, pp 57-68. DOI: 10.26794/1999-849X 2018-11-6-57-68
[10] Yurevich M A 2019 Social inequality, investment, and economic growth, Journal of economic regulation, 10, 4, pp 35-46. DOI: 10.17835/2078-5429.2019.10.4.035-046
[11] OECD, How's Life in the Digital Age?: Opportunities and Risks of the Digital Transformation for People's Well-being, OECD Publishing, Paris OECD, 172 p. DOI: 10.1787/9789264311800-en
[12] Osipova O S, and Kapitainov V A 2018 Dynamics of Social Inequality in the Digital Economy: A Look from the Past to the Future, Economics, taxes & law, 11, 2, pp 27-40. DOI: 10.26794/1999-849X-2018-11-2-27-40
[13] Trynov A V 2020 Theoretical Aspects of the Analysis of the Investment Potential of the Region in the Context of Institutional Sectors, Journal of Economic Theory, 17, 1, pp 238-244. DOI: 10.31063/2073-6517/2020.17-1.20
[14] Novikov A V, and Novikova I Ya 2019 Economic Growth and Investment Activity in Russia: Forecasts and Reality, ECO journal, 49, 2, pp 104-122. DOI: 10.30680/ECC00131-7652-2019-2-104-122
[15] Petrova S V, Aleksandrov M V, V.V. Ashmarin V V 2019 *Comparative analysis of investment attractiveness of regions*, Fundamental research, 12-1, pp 160-164. DOI: 10.17513/fr.42640

[16] Litvintseva G, and Goldobina A 2019 *Factors and Ways of Enhancing the Investment Attractiveness of the Region*, Ideas and Ideals, 11, iss. 4, pt. 2, pp 243-266. DOI: 10.17212/2075-0862-2019-11.4.2-243-266

[17] Dorożyński T, Świerkocki J 2018 *Determinants of Investment Attractiveness of Polish Special Economic Zones*, Entrepreneurial Business and Economics Review, 6, 4, pp 161-180. DOI: 10.15678/EBER.2018.060409

[18] Yakimova V A, and Khmura S V 2020 *A Methodology of integrated assessment of the investment attractiveness of the priority social and economic development areas*, Regional Economics: Theory and Practice, 18, iss. 4, pp 780-806. DOI: 10.24891/re.18.4.780

[19] Makarova S D, Markina M V 2020 *Economic and mathematical assessment of science and innovation in regions to increase their investment appeal*, Economic Analysis: Theory and Practice, 19, iss. 1, pp 25-45. DOI: 10.24891/ea.19.1.25

[20] Litvintseva G P, Shmakov A V, Stukalenko E A 2019 *Digital component of people’s quality of life assessment in the regions of the Russian Federation*, Terra Economicus, 17, 3, pp 107-127. DOI: 10.23683/2073-6606-2019-17-3-107-127