Information and telecommunications technologies as one of the factors of Russia’s strategic development

O D Repinskiy

Irkutsk National Research Technical University, 83, Lermontov street, Irkutsk, 664047, Russia
E-mail: repin80@mail.ru

Abstract. Creation of an effective system for using information and telecommunication technologies (ICT) is one of the main factors to improve Russia's competitiveness in the global market. The country's leadership has developed a set of documents on strategic development in the field of information and telecommunication technologies (ITC) inter alia the "Strategy for development of information society of the Russian Federation for 2017-2030" dated 05/09/2017 No. 203. Russia currently is far from leading positions in the field of information and telecommunication technologies (ITC) in the world market [1]. To change the situation for the better, it is necessary to determine the factors impeded ITC development and take steps aimed to reduce the impact of such factors. Information and telecommunication technologies are developing according to certain market rules which have been formed for more than a decade in parallel with the development of society. The emergence of innovative products and services in the segment has formed modern society in developed countries [2]. First of all, the Internet creation has led to emergence of the new products: sites, portals, online stores, online games, social networks [3]. Second, many companies involved to that kind of activity were established: in the face of intense competition as a result of mergers, acquisitions, splits on the securities, market large players with rapidly growing capitalization appeared - Google, Microsoft Corporation, Facebook, AliExpress. Information and telecommunication technologies are a new stage in the development of modern civilization; its latest trend is based on the creation and using of innovative products in all aspects of its life [4]. Russia has no alternative. In order to improve competitiveness in the world market, it is necessary to efficiently and quickly produce and put into practice various information and telecommunication technologies.

1. Introduction

Digitalization is one of the main directions for strategic development of the Russian society. Russian president Vladimir Putin in June 2017 made a speech at the St. Petersburg economic forum which was attended by representatives of major Russian and global businesses as well as leaders of developed countries. The very idea that the country's future is behind the development of information and telecommunications technologies was the main theme of his speech. The President specifically indicated that Russia would master and independently develop the achievements of scientific and technological progress. The Council for strategic development and priority projects considered the program for digitalization development of the society at its meeting in July 2017. Chairman of the Board Vladimir Putin said, "ICT are not a separate industry; in fact they are a way of life, a new basis for the development of the state management system, economy, business, the social sphere and society in general. Obviously information and telecommunication technologies are a base for national security and independence of Russia, for competitiveness of domestic companies, for the country's position on the world stage for the long term, in fact, for decades to come".
To make digital culture familiar to people, much has been done in Russia. Russian households today (about 75%) have access to the Internet. Digital technologies save us time which is the most valuable resource of human life. Those issues that previously required significant time costs today take just a few minutes [5]. More than half of the services in Russia are already provided in the digital format and a significant part of purchases are made on the Internet.

All of the above - the president position, as well as the approved government program "Strategy for development of information society of the Russian Federation for 2017-2030" - means that the country's leadership is clearly aware that rapid digitalization of Russian society should be done.

2. Problem Statement

The transformation of Russian society into a digital one is a complex and multi-factor task.

One can divide, according to authors' opinion, factors constraining information and telecommunications technologies development into two groups. The first group contains general factors that hinder national economy development such as corruption, bureaucracy, monopoly in most sectors of economy. The second group includes certain factors directly related to society digitalization such as shortage of middle- and higher-level professionals, an insufficient number of world level research, software product import dependence, the inadequate level of the manufacture of domestic high-tech products [6]. The authors consider the second group of the factors in this article.

| Country                  | ICT Development Index | Inter alia the sub-indexes |
|--------------------------|-----------------------|----------------------------|
|                          | Rate position         | Access sub-index           | Use sub-index | Skills sub-index |
|                          | (compared to 2016)    | Rank (compared to 2016)    | Value Rank    | Value           |
|                          | Value of the index    | Value of the index         | Rank (compared to 2016) | Value of the index | Rank (compared to 2016) | Value of the index |
| Iceland                  | 1(+1)                 | 2(0)                       | 9.38          | 5(0)            | 8.70             | 9(+11)                | 8.75             |
| South Korea              | 2(-1)                 | 7(0)                       | 8.85          | 4(0)            | 8.71             | 2(+1)                 | 9.15             |
| Switzerland              | 3(+1)                 | 8(0)                       | 8.85          | 2(+1)           | 8.88             | 31(0)                 | 8.21             |
| Denmark                  | 4(-1)                 | 14(0)                      | 8.39          | 1(0)            | 8.94             | 6(0)                  | 8.87             |
| Great Britain            | 5(0)                  | 4(0)                       | 9.15          | 7(+1)           | 8.38             | 33(-4)                | 8.17             |
| Hong Kong (China)        | 6(0)                  | 3(0)                       | 9.22          | 10(+4)          | 8.21             | 32(+1)                | 8.19             |
| Netherlands              | 7(+3)                 | 10(0)                      | 8.65          | 9(0)            | 8.28             | 14(-2)                | 8.59             |
| Norway                   | 8(-1)                 | 27(-1)                     | 8.00          | 3(+1)           | 8.82             | 11(-2)                | 8.71             |
| Luxembourg               | 9(0)                  | 1(0)                       | 9.54          | 8(-1)           | 8.30             | 74(-3)                | 6.65             |
| Japan                    | 10(+1)                | 9(0)                       | 8.80          | 11(-1)          | 8.15             | 30(+5)                | 8.22             |
| Czech Republic           | 43(-4)                | 55(0)                      | 7.14          | 39(-4)          | 6.62             | 28(-1)                | 8.27             |
| Portugal                 | 44(0)                 | 31(+3)                     | 7.91          | 50(+4)          | 6.15             | 53(-6)                | 7.50             |
| Russia                   | **45(-2)**            | **50(+4)**                 | **7.23**      | **51(-4)**      | **6.13**         | **13(+1)**            | **8.62**         |
| Slovakia                 | 46(+1)                | 51(-1)                     | 7.22          | 36(+4)          | 6.67             | 50(-5)                | 7.54             |
| Italy                    | 47(-1)                | 47(+1)                     | 7.33          | 42(+1)          | 6.35             | 43(-2)                | 7.86             |
3. Materials and methods

The subject of the study is factors influencing information and telecommunications technologies development, as well as competitiveness of Russia in the area on the world market.

Authors are going to consider the position of Russian information and telecommunication technologies on the world market. According to the analytical report "Measuring the Information Society 2017" (Table 1) Russia ranked 45th in the ICT Development Index in 2017 (minus 2 positions as compared to 2016). The sub-indices compared to the same period provide the following picture: access to ICT - 50th rank (plus 4 positions), use of ICT - 51st rank (minus 4 positions), practical ICT skills - 13th rank (plus 1 position) [7].

Table 2 presents the index of e-Government development in Russia. Russia ranked 35th in the index in 2016 (minus 8 positions compared to 2014). The sub-indexes as compared to the same period were: development of online public services - 37th place (minus 10 positions), ICT telecommunication infrastructure - 37th place (unchanged), human capital development - 38th place (minus 5 positions) [7].

Table 2. E-Government development index by countries in 2016

| Country     | E-Government Development Index | Inter alia the sub-indexes |          |          |          |          |
|-------------|--------------------------------|----------------------------|----------|----------|----------|----------|
|             | Rate position (compared to 2016) | Value of the index         | Online Service Index | Rank (compared to 2016) | Value of the index | Telecommunication Infrastructure Index | Rank (compared to 2016) | Value of the index | Human Capital Component | Rank (compared to 2016) | Value of the index |
| Great Britain | 1(+0)                          | 0.9193                     | 1(+10)   | 1.00     | 6(+22)   | 0.9402   | 7(+3)   | 0.8177 |
| Australia   | 2(0)                           | 0.9143                     | 2(+6)    | 0.9783   | 1(+1)    | 1.00     | 12(+2)  | 0.7646 |
| South Korea | 3(-2)                          | 0.8915                     | 5(-2)    | 0.9420   | 18(-12)  | 0.8795   | 2(0)    | 0.8530 |
| Singapore   | 4(-1)                          | 0.8828                     | 3(-1)    | 0.9710   | 34(0)    | 0.8360   | 3(+1)   | 0.8414 |
| Finland     | 5(+5)                          | 0.8817                     | 5(+13)   | 0.9420   | 4(+8)    | 0.9440   | 13(-6)  | 0.7590 |
| Sweden      | 6(+8)                          | 0.8704                     | 15(+13)  | 0.8768   | 8(+12)   | 0.9210   | 8(-5)   | 0.8134 |
| Netherlands | 7(-2)                          | 0.8659                     | 9(-1)    | 0.9275   | 9(-2)    | 0.9183   | 14(-2)  | 0.7517 |
| New Zealand | 8(+1)                          | 0.8653                     | 5(+10)   | 0.9420   | 5(-4)    | 0.9402   | 22(-1)  | 0.7136 |
| Denmark     | 9(+7)                          | 0.8510                     | 28(+7)   | 0.7745   | 3(+7)    | 0.9530   | 5(0)    | 0.8247 |
| France      | 10(-6)                         | 0.8456                     | 5(-4)    | 0.9420   | 30(-11)  | 0.8445   | 15(+1)  | 0.7502 |
| Kazakhstan  | 33(-4)                         | 0.7250                     | 31(-8)   | 0.7681   | 31(-5)   | 0.8401   | 48(-1)  | 0.5668 |
| Uruguay     | 34(-8)                         | 0.7237                     | 28(-14)  | 0.7754   | 53(-5)   | 0.7820   | 36(+15) | 0.6137 |
| Russia      | 35(-8)                         | **0.7215**                 | **37(-10)** | **0.7319** | **37(0)** | **0.8234** | **38(-5)** | **0.6091** |
| Poland      | 36(+6)                         | 0.7211                     | 45(+12)  | 0.7029   | 22(+14)  | 0.8747   | 44(+6)  | 0.5857 |
| Croatia     | 37(10)                         | 0.7162                     | 33(+38)  | 0.7464   | 44(+10)  | 0.8050   | 41(-5)  | 0.5974 |

Statistics above shows that Russia does not occupy the best positions in the sector of information and telecommunication technologies on the world market and has a negative dynamics of development in comparison with the past periods. The country's competitiveness in the sector in question without professional staff is impossible to increase, but the staffing situation is not optimistic. Let us pay attention to the statistic data presented in Table 3 [7].
Table 3. Distribution of ICT professionals by the skill level and across countries in 2017 (as a percentage of total employment).

| Country       | Rate position | ICT specialists with university degree | ICT specialists with diplomas in the secondary education |
|---------------|---------------|----------------------------------------|-------------------------------------------------------|
| Sweden        | 1             | 3.4                                    | 1.2                                                   |
| Finland       | 2             | 3.4                                    | 0.9                                                   |
| Netherlands   | 3             | 3.3                                    | 0.7                                                   |
| Denmark       | 4             | 2.7                                    | 1.3                                                   |
| Great Britain | 5             | 3.0                                    | 0.8                                                   |
| Switzerland   | 6             | 3.0                                    | 0.6                                                   |
| Iceland       | 7             | 2.0                                    | 1.6                                                   |
| Canada        | 8             | 2.5                                    | 1.0                                                   |
| Luxembourg    | 9             | 2.8                                    | 0.6                                                   |
| Ireland       | 10            | 2.5                                    | 0.8                                                   |
| Latvia        | 26            | 1.0                                    | 0.8                                                   |
| Poland        | 27            | 1.3                                    | 0.4                                                   |
| **Russia**    | **28**        | **1.2**                                | **0.3**                                               |
| Lithuania     | 29            | 0.8                                    | 0.1                                                   |
| Greece        | 30            | 0.4                                    | 0.6                                                   |

Table 4. Number of publications in the field of ICT in edition indexed in Web of Science across countries.

| Country      | Rate position | 2010  | 2017  |
|--------------|---------------|-------|-------|
| China        | 1             | 32521 | 54668 |
| USA          | 2             | 33603 | 35337 |
| India        | 3             | 4106  | 16365 |
| Great Britain| 4             | 8676  | 10426 |
| Germany      | 5             | 10540 | 10026 |
| Japan        | 6             | 8019  | 8370  |
| France       | 7             | 7936  | 8273  |
| Canada       | 8             | 6902  | 7619  |
| Italy        | 9             | 6279  | 7262  |
| South Korea  | 10            | 5533  | 6719  |
| Spain        | 11            | 6040  | 5663  |
| Australia    | 12            | 3955  | 5376  |
| **Russia**   | **13**        | **1197** | **4036** |
| Taiwan       | 14            | 4833  | 3748  |
| Brazil       | 15            | 2012  | 3652  |

Russian scientific research in ICT field shows a positive dynamic; however, compared to the leading world powers, the situation leaves much to be desired (Table 04) [7].
Table 5. Export and import of ICT-related goods and services (in millions of United States dollars).

| ICT-related goods - in total | 2010 | 2015 | 2017 |
|-----------------------------|------|------|------|
| Export                      | 1034 | 19520| 2767 |
| Import                      | 146  | 6660 | 1630 |
| Computers and peripherals   |      | 6101 | 363  | 7423 |
| Communication equipment     |      | 238  | 6328 | 8433 |
| Consumer electronic equipment | 119 | 6681 | 3283 | 1471 |
| Other ICT-related components and goods | 303  | 385  | 1471 | 446  | 1995 |
| ICT-related services in total | 2624 | 3955 | 3972 | 5521 | 4789 | 5315 |
| Computer services           | 1273 | 1644 | 2455 |
| Telecom services            | 1265 | 2065 | 2388 |
| Information services        | 86   | 246  | 99   |

Further, we have compared exports and imports of ICT-related goods and services; one can realize that Russia has heavy import dependence (Table 5) [7].

4. Conclusion
To achieve successful development of Russian society and improve Russia's competitiveness in the world market, large-scale implementation of information and communication technologies is required at all levels of national economy: microlevel, mesolevel and macrolevel. To reach the goal, one should take the following actions:

1. To increase in the number of ICT specialists with varying levels of qualification.
2. To develop and to produce domestic goods and services up to quantity required to reduce significantly the imported product share on the Russian market.
3. To build the information and telecommunication infrastructure across the country.
4. To have free access to Wi-Fi in schools, vocational school, universities, libraries, etc.
5. To provide state grants in the field of ICT.

The state leadership has emphasized neediness of society digitalization in Russia as it is necessary to improve the country's competitiveness in the global market. The issue is complex. To reach the goal according to the authors, one should overcome number of limiting factors mentioned in the article. The authors have analyzed a great deal of statistic information and showed the rank of Russia on the global ICT market.

References
[1] Konyukhov V Yu, Nepomniashchaia E S, Zott R S and Konovalov P N 2019 Adv. in Soc. Innov. Dev. the Coun. 333 860-864
[2] Nechaev A S, Zakharov S V and Trochina A O 2017 IT and QM and IS. Innov. Risk Min. Inf and Neut. Met. 5552-555
[3] Zingerman B V, Kobelyatsky V F and Gorodetsky V M 2007 Hem. and Transf. Inf. Techn. in Transf. 52(3) 36-42
[4] Isatayeva G B, Tastanova A S, Aripbaeva A A, Kaipova A Sh and Barakova A Sh 2016 Int. J. of Appl. and Fund. Res. Inf. Tech. in the Def. 5(1) 14-16
[5] Repinskiy O D 2019 Adv. in Soc. Educ. Syst. Impr. 333 534-537
[6] Zhukov D O 2015 Bull. of Mst. Mir. Rev. of Mod. 2(9) 21-27
[7] Institute of Statistics and Knowledge Economy 2020 Statistical indicators and reports Retrieved from: issek.hse.ru