# Today's Digital Economy as Russia

**A V Savchenko[1], M Y Katalkina[1], S A Antonov[1]**

[1]FGBOU VO «State University of Management», Ryazanskiy Prospect 99, Moscow, Russia

E-mail: iso90002000@mail.ru, m_katalkina@mail.ru, sa_antonov@guu.ru

**Abstract.** Russia as a digital economy requires imperative analysis in the light of national security, especially given the pace at which China and the US advance their digital manufacturing technologies as well as the scale of using such technologies when oppressed by sanctions. The methodology of preventive crisis management, which is intended to enable sustainable development, is what requires identifying the 'red flags'. This paper dwells upon the contrast between the actual socioeconomic processes and the assessments that shape the public opinion on digital economy. This is a study into the symptoms indicating that Russia as a digital economy is at risk; the goal hereof is to tackle some of the challenges of digitalizing Russia's economy in the context of existing threats. Research uses qualitative and qualitative tools for statistical analysis; it also analyzes the meaning of the Russian Government's policy documents. The key finding is that the use of IT in today's Russia is limited by social (physical and mental health), economic (limited return on investment), and environmental (energy intensity) factors, which requires a duly responsible approach to managerial decision-making.

## 1. Introduction

Digitalization of economy is a diverse process, the outcomes of which are observable in statistics as well as by analyzing the meaning of policy documents. Some observations and facts draw attention to the current processes, which thus become the focus of this research.

## 2. Methodology and data

The methodology of this research is based on horizontal and vertical statistical analysis tools coupled with computing the arithmetic means, ranking, and grouping. The study makes extensive use of a problem-oriented approach, the essence of which lies in analyzing the meaning of the Russian Government-adopted regulatory documents and decisions regarding digital economy; the analysis seeks to reveal logical and functional contradictions (discrepancies). Decision-making is based on a mixed 'reactive-proactive' approach that handles the existing problems while also mitigating the identified risks.

Data for analysis is drawn from the following sources: official Rosstat statistics published in 2018; actual digital economy policy documents of the Russian Government; and proceedings of international research conferences on the topic that took place in 2018.

 

## 3. Research essentials

### *3.1. Technology as a barrier to cooperation*

Rosstat-reported statistics on the use of ICT in business over 2015 to 2017 might seem to show no significant changes. According to those reports, 92.3% of organizations used PCs, 47.7% used servers, 62.3% had LANs in place, 86.6% made use of email, and 89.4% employed global information networks (figures averaged over three years).

However, Intranet use rose as compared to Internet and Extranet, see Figure 1.

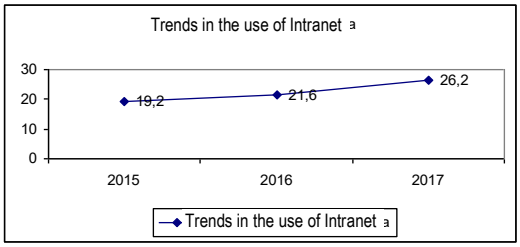


**Figure 1.** Trends in the use of Intranet, % *(Source: Rosstat data for 2018).*

On the one hand, technology enhances the information exchange processes thanks to paperless office technologies and various in-house information services; however, it also reduces socialization at work while prioritizing individual use of data in e-formats. Web presence increased as well, see Figure 2.

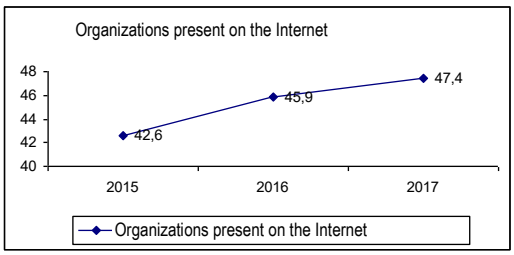


**Figure 2.** Organizations present on the Internet, *% (Source: Rosstat data for 2018).*

Web presence facilitates external communications: a company might use its website to present, advertise, and market itself; it also provides tools for communication with customers.

However, while being a business tool, web presence might also create barriers, e.g. when information search becomes prohibitively long. Company's focus diverts from product and service quality to marketing tools to gain more buyers or partners.

### *3.2. Dangers of societal digitalization*

It is believed that digitalizing the economy by communication as well as by sharing ideas and experience forms an institutional environment and enhances the structure of social institutes [17, pp. 28–30]. 92.1% of organizations analyzed in 2017 across all sectors used ICT. Higher education held the record at 98.4%. Runners-up: telecommunications (97.5%); IT and communications (97.3%); public administration and military; social security (97.2%). While it seems logical that IT-related sectors such as telecommunications, communications, and IT per se took lead in their use of IT, the dependence of socially important sectors such as education, public administration, and social security on technology is worrying at best. These sectors certainly benefit from cutting-edge technology but not necessarily need it to function. Lesser socialization 'atomizes' the whole of the social organization; IT-mediated communication is rather 'least-evil'; it cannot and shall not become the basis of socialization. Gregory M. believes that within a decade, telecommunications will become central to our lives, to the way we interact with families and friends [23].

Another concern is that the same sectors also led in the use of paperless offices in 2017: 77.6% of organizations in higher education used that technology, and so did 76.2% of public administration, military, and social security offices; healthcare and services ran up at 75.7%. Interestingly, the total percentage of corporate paperless-office users was only 66.1%. This raises the question on how important a paperless office is for the internal and external performance in these sectors, where the sheer amount of information and documentation (the bureaucratic derivatives) is only getting larger while the process agents are ever more isolated from each other. It seems appropriate to generate less information while improving its quality.

Besides, A.A. Kokoshin notes in his paper that some specialists 'hypothesize that large-scale use of AI might trigger a revolution similar to the advent of military aviation or nuclear weapons." [18, p. 439] Although such hypotheses demand verification, attempts to use AI in control systems are numerous and easy to observe even today.

"Information and communication technology (ICT) become the key challenger to Russia as a society, as they alter everything: social management forms and methods; methods and timing of children's and teenagers' socialization; the labor market; decision-making methods and performance monitoring; socially constructive activities, etc. ICT upgrades present both benefits and risks or dangers. People and organizations gain unprecedented access to knowledge and information; however, this also makes the world more prone to misinformation and hacking. Accidents and disasters grow in numbers and scale. Therefore, social security is no less important today than access to information per se. It is the society's and the person's safety and security that becomes the primary social challenge." [19, p. 31]

*3.3. Digital economy: difference in priorities*

From 2015 to 2017, the percentage of organizations using special software barely changed and averaged 84.5%. Since the specific usage did not change significantly either, we could range organizations by the use of this or that specific software with the average triennial percentage of categorial usage:

1. 55.1% used software for electronic payments;
2. 52.5% used software to handle organizational, managerial, and economic tasks;
3. 51.7% used electronic legal reference systems;
4. 37.5% used software for the procurement of goods, works, and services;
5. 30.8% provided database access via global information networks;
6. 30.3% used other kinds of software (banking automation, trade automation, ordering automation, automated library systems, translation software, dictionaries, other specialized software);
7. 21.9% used software to manage the sales of goods, works, and services;
8. 16.2% used CRM, ERP, and SCM systems;
9. 14.9% used automated production/process control systems;
10. 14.2% used learning software;
11. 11% used design software;
12. 5.1% used editing and publishing systems;
13. 3.7% used special research software.

This ranking effectively categorizes software by use as follows:

- information and analysis software (used by 51.7 to 55.1 percent of organizations), the most popular software category that comprises management process toolkits, ## 1 to 3;
- service and commerce software (21.9% to 37.5%) that enables the organization's procurement and sales processes, ## 4 to 7;
- production and functional software (11% to 16.2%) that enables the organization's core processes, ## 8 to 11;
- innovation software (3.7% to 5.1%) that helps handle the organization's prospective development, ## 12 and 13.

Such categorization makes clear that ICT usage today now focuses on the managerial, procurement and sales processes (typology per [8]), while the core processes and innovation do not rely on software as much, which puts the national economy at risk. On the one hand, the situation should not be of par-

ticular concern; comparing the Internet usage statistics of Russia and China over 2015–2017, as shown in Table 1, reveals that China's industries are not specifically dependent on the use of Internet and IT. Internet access is limited in China, which does not hinder the productivity of its industries.

**Table 1.** Internet users, % of total population, in Russia and China (averaged over 2015–2017 according to *year-end data of the International Telecommunication Union*).

| **Country** | **2015** | **2016** | **2017** |
|---|---|---|---|
| Russia | 70.1 | 73.1 | 76.0 |
| **China** | **50.3** | **54.0** | **54.3** |

Analysis of this data calls into question the meaning of the targets set forth in the Program for the Digital Advancement of the Russian Federation. The roadmap under this program specifies the following targets: by 2024, 97% of households must have broadband Internet access [3]. The Program Data Sheet specifies a minimum speed of 10 Mbps for households in settlements with a population of 250 people or more; 1 Mbps otherwise [4]. A question arises: how can that help Russia's economy?

Interestingly, ITU reports comparable statistics on cellular network usage (subscribers per 100 persons in population) over the same period of time, year-end, see Table 2.

**Table 2.** Ratio of cellular network subscribers in Russia and China over 2015–2017, % [2].

| **Country** | **2015** | **2016** | **2017** |
|---|---|---|---|
| Russia | 193.8 | 197.8 | 200.3 |
| **China** | **92.5** | **97.3** | **104.6** |

Notably, China is far ahead of Russia in terms of some indicators, see Table 3. These are ICT-related publications, patent applications, and exports [6].

**Table 3.** Chinese ICT dominance in 2016–2017.

| **Country** | **Web of Science-indexed ICT-related publications in 2017, units** | **Patent applications for ICT-related inventions in 2017, units** | **ICT-related exports in 2016, % of the world's total ICT exports** |
|---|---|---|---|
| Russia | 4,036 | 1,532 | 0.1 |
| **China** | **54,668** | **146,723** | **32.3** |

This data points to the basic factors of China's R&D superiority, exacerbating Russia's economic and geopolitical security issues. N.V. Naumenko in paper [9] notes "another interesting aspect of China as a digital economy. The Chinese Government wants to control and use the digital economy to its own political and economic ends. In particular, they plant to have electronic dossiers for each and every citizen. Most of the data will likely be provided by the digital economy. Some experts believe China will create a single state-corporate 'electronic umbrella' covering 1.5 billion people in ten years. They will do it well in advance of the Western economies." Given China's ever greater role in the global economy, propagating total control to the rest of the world becomes merely a technical issue. In Russia, commercial usage of the Internet is on the rise, see Figure 3.

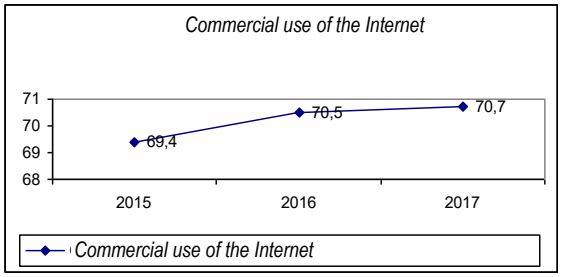


**Figure 3.** Commercial use of the Internet, % of organizations *(Source: Rosstat data for 2018).*

Sectoral distribution of corporate Internet users once again ranks higher education #1 at 88.3%, followed by process manufacturing (86.0%), with healthcare and social security providers running up at 84.6% [1]. Meanwhile, Ye.N. Klochkova notes that "today, most countries seek to create an information society, where e-government, IT in education, culture, and healthcare become top priorities" [11]; T.O. Dyukina believes that "a country's competitiveness is a function of the extent of its economic digitalization." [10] In our opinion, societal digitalization carries severe risks in the light of the above-mentioned prospects.

On the one hand, IT is undeniably appealing and convenient to use in many sectors; on the other hand, the society tends to turn the blind eye to the various issues arising from digitalization. In particular, S.V. Kurysheva points to the fact that "crime rates might skyrocket thanks to access to sensitive personal and corporate data. Identity theft, copyright breaches, bank card fraudulence, hacking, and information leaks are the most common and harmful cybercrimes on rampage in Europe. Interpol assesses Europe's losses to cybercriminals at 750 billion euros." [12] "Cybercrime threatens not only information, economic, or national security; it also jeopardizes the environment, thus crippling humanity's chance to survive." [16, p. 111 to 114].

Meanwhile, digital economies, being actually economies, are in the state of a continuous trade war. Some specialists believe that the healthy competition between national and international digital platforms has resulted in a general equilibrium, in which local developers might compete against international and global platforms on a smaller scale [20]. However, the recent sanctions against China's Huawei (2019), which was prohibited from using Android on its smartphones and tablets, have debunked the myth of a free digital market. International division of labor and free digital competition are eliminated for being unnecessary. As they say in England, "If you're losing the game, change the rules." The United States enjoy what is essentially a monopoly of the operating systems market—and they make use of it. Thus, the Russian Government has to be aware not only of cybercrime and cyberattacks, but also of the West's abuse of its digital advantages.

*3.4. Government initiatives*

There has been much academic discussion of digitalization ever since the Government adopted the Digital Economy of the Russian Federation Program [3] and its Data Sheet[4], This is only welcome. However, thorough analysis draws attention to the following IT-related facts posted on the Russian Government's website [5].

Over a quarter of 2019, they did not adopt any crucial resolution; they only held one meeting and published two documents on the matter. Over the course of 2018, only one crucial resolution was made, and that was to approve the Research Competence and Technological Foundations Plan. The Government Commission for IT had a meeting and published their resolutions; they amended the state program Information Society for 2011–2020 and approved the plan to eliminate administrative barriers. There was also signed the Federal Law to Expand the Subject Matter of Public-Private Partnerships; the Government also adopted the directive on the preferential use of domestic software in any joint-stock company with governmental shareholding. Notable are the Government-published *Some Important IT Facts of Six Years*, the most definite one being cited below:

- ...about 500 thousand programmers;

- ...the Government recruits ever more IT specialists;
- Russian Software Register lists about four thousand domestic software products;
- Register-listed software is increasingly popular;
- this has granted right to preferences and benefits to numerous IT companies;
- as of summer 2017, more than 8 thousand IT companies enjoyed preferences and benefits;
- ...the Government wants to train ever more IT specialists. From 2014 to 2016, the quota for state-funded higher education in IT rose from 25 thousand to 48 thousand students, which boosted the industry;
- programming and IT is increasingly popular thanks to the comprehensive Technology Parks Program. It took over 7 years to unfold and inaugurated 12 technoparks in 10 regions of the Federation;
- technology parks provide ever more jobs and produce ever more [7].

The term 'clarity' only applies to three points of these report: benefits and preferences; state-funding quota for universities; and technology parks. The rest is some vague rhetoric, 'positive dynamic', etc.

In 2017, the Government adopted three crucial resolutions: one was a decree to set forth additional requirements to domestic office software; another one was a decree to amend the Information Society for 2011–2020 program; the last one was the Federal Law to Retain Reduced Pension Fund Insurance Premia for IT Companies. The documents and events posted on the Government's website in 2017 have the following highlights: decree on the establishment of the Russian IT Fund; and order to approve the Supervisory Board of the same fund. A government commission had a meeting to discuss how IT could help raise living standards and improve the business environment. They adopted a resolution to alter the procedure of public and municipal procurement of non-Russian software.

It would be an overstatement to say Russia's leaders ignore IT issues; however, such issues require more attention. While the Government adopted the Digital Economy of the Russian Federation Program dated July 28, 2017 No. 1632-p [3] and approved its Data Sheet dated December 24, 2018 [4], some of the objectives set forth therein are questionable at best.

The roadmap under the Program highlights five priority aspects of Russia's development as a digital economy: regulation, HR, research competence and technological foundations, infrastructure infrastructure, and security; the Data Sheet under the Program lists six federal projects, see Figure 5. Undoubtedly, the Russian Government had managed to clarify and state more specifically what need to be done over those sixteen months; however, a data sheet has to be even clearer and more specific by definition.

*Digital Program Data Sheet Approved by Virtue of Minutes No. 16 dd. December 24, 2018*
*Federal Projects for the Development of Digital Economy*
*1. Legal Regulation of Digital Environment*
*2. Information Infrastructure*
*3. HR for Digital Economy*
*4. Information Security*
*5. Digital Technologies*
*6. Digital Public Administration*

**Figure 4.** Priority aspects of digital economy and corresponding federal projects *(data: documents of the Russian Government [3, 4]).*

Greater numbers of high-tech graduates and use of personal skill profiles are indeed welcome. Another favorable change comes in the form of the newly emerging Accelerated Digital Training Centers and the intention to train 270 thousand professionals, leaders, and local self-government officers in digital skills; a venture capital fund will support 200 educational projects and provide 1,350 grants to support commercial R&D projects in 'end-to-end' digital technologies [4]. On the other hand, what

does the Government want to accomplish by providing 'digital economy training' to 270 thousand persons involved in the digital economy under at little as 1,350 grants (200 persons per grant)? What needs to be done for all those students to be successful in digital economy? Who is going to manage them? And most importantly, how is the Russian digital Big League going to emerge?

With regard to the latter, it seems appropriate to create another aspect or another federal project under the Program: Development of Digital Entrepreneurship in Russia. The idea is to set up digital business incubators on the grounds of Russian universities. Digital entrepreneurship has some distinctive features and needs special human and tangible resources to emerge. This is an 'easy to start, hard to master' activity; few can boast considerable success in the field. What it takes to be successful in digital business is not only professional and economic skills and knowledge; it also requires enthusiasm. Such enthusiasm can only be instilled in a favorable ecosystem, in which digital data is not merely a production factor but the core feature of the product. Today, the Russian Government seeks to create a digital economic environment and provides some support to digital business, albeit limited; however, Russia will only become a cutting-edge digital economy if it gets a mechanism and a set of procedures in place to help the digital Big League to emerge domestically and to be competitive internationally.

Let us consider how the Silicon Valley appeared in the United States. Standorf University's Frederick Terman merged what seemed incompatible at the time. He effectively brought together high-quality education, research laboratories and fellows, and public funding through military orders. There was another aspect to it: local benefits in the form of cheap rent. The final part was entirely Terman's achievement: he managed to create a special social and psychological cooperative environment involving Stanford students and alumni; thanks to this, the University's business focus shifted from economic targets to R&D. Terman thus was able to give rise to a new generation of entrepreneurial scientists by bringing together public, private, and social interests. The USSR tried to reproduce the Standford experience in Zelenograd and did have moderate success, but it didn't live up to the expectations.

The first business incubator was founded in 1959 in Batavia, United States; it was the prototype that many tried to reproduce—not without success. There appeared a mechanism that could generate businesses and businesspeople on a large scale. Russia did not stay aside; Moscow alone now has 35 technoparks and business incubators to apply this experience to digital economy. If that is done, the Digital Economy of the Russian Federation Program will not only be a success, it will also become a booster to the country's digital business.

Of course, there are numerous other ways to stimulate businesses. As V.V. Karginova says, "Sustainable and enhanced reproduction of regional economic systems requires pooling the resources and capabilities of all regions... Public-private partnership is one tool that could bring different interests in line." [14, p. 59]. Indeed, implementing such forms of cooperation is necessary to fully implement the strategy; however, the authors hereof believe that focus should be made on business incubators and technology parks.

On a side note, it should be noted that support for digital entrepreneurship must be part of the Digital Economy of the Russian Federation Program and is not to be provided under the *Small and Medium-Sized Business and Support for Individual Entrepreneurial Initiative* (a separate national project), as helping this kind of business flourish is on the digital economy agenda. Besides, digital entrepreneurship per se requires other means, technologies, and equipment. As noted by A.S. Aksyonova, *foreign specialists* estimate Russia's GDP could gain 4.1 to 8.9 trillion rubles by 2025 from digitalization, an 19% to 34% increase. Of interest is McKinsey & Company's report on how digitalization will boost Russia's GDP by 2025, see Table 4.

Notably, digital products are not specified as a source of GRP growth, i.e. foreign specialists *do not highlight the advancements in national digital manufacturing as such source for Russia.* Although A.S. Akesyonova argues that "digital economy will help the nation become competitive, raise the living standards, and take the economy further", she's quick to notice that "the pursuit of virtual economy shall not overshadow the real economy that is and must be fundamental to Russia. It is the cooperative development of real and digital economy that will produce great effects."

**Table 3.** Sources of Russia's digitalization-induced GDP growth by 2025.

| **Sources of Russia's GDP growth by 2025** | **Projected growth, trillion rubles** | **Including** |
|---|---|---|
| 1. Optimization of manufacturing, production, and logistics | 1.4 to 4.0 | – real-time monitoring of production lines;<br>– optimization of logistics and prioritization of shipments. |
| 2. More efficient labor market | 2.1 to 2.9 | – efficient and quick job search and filling;<br>– remote work, new professions and jobs. |
| 3. Higher machinery performance | 0.4 to 1.4 | – less machinery downtime, lower repair costs;<br>– higher machinery utilization rate. |
| 4. More efficient R&D | 0.2 to 0.5 | – rapid prototyping and quality control;<br>– big data to help design and improve the product. |
| 5. Less costs and production losses | up to 0.1 | – lower electricity and fuel costs;<br>– less raw materials lost in production. |

On the other hand, a popular belief in Russia, championed by such specialists as V.N. Yembulayev [15, p. 48] is that during a transition, sustainable development might get a strong foundation if focus is made on commodity industries, as investments in them have the highest yield. 'Some time' later, economy could be diversified as soon as commodity producers have sufficiently replenished the budget. This strategy effectively removes Russia from the list of digital manufacturers, as the gap between it and the leading digital economies will only grow exponentially wider every year. Promoting digital entrepreneurship is intended to give a procreative impetus to higher living standards and to the nation's economic security alike.

## 4. Conclusions

Use of ICT in Russia has been rising moderately over the past three years. This research identifies the symptoms indicating that Russia as a digital economy is at risk (societal digitalization, technological barrier to business cooperation, prioritization of digital economy) as well as the weakpoints of state policies and plans.

This research effectively proposes a seventh project to the Program «Digital Economy of the Russian Federation» named «Development of Digital Entrepreneurship», which should at least cover the following points:

- gradual establishment of new business incubators and transforming the existing ones to boost digital entrepreneurship in Russia;
- engaging universities already covered by the Digital Economy of the Russian Federation Program in business incubation;
- funding such business incubators by reallocating the funds initially intended for other federal projects under the Program or for *Small and Medium-Sized Business and Support for Individual Entrepreneurial Initiative;* project goals and targets are thereby subject to possible readjustment;
- public and local self-government authorities should provide digital business incubators with space and infrastructures;
- providing governmental orders and grants in place to stimulate digital business incubators;
- a system to monitor the digital business incubators.

The Government must focus more on the digital technologies while bearing in mind that "digital protectionism might indeed boost the national businesses' success domestically without necessarily making the competitive globally." [21 Some foreign experts note that public policies must seek to create such market conditions, where new competitors with their innovative thinking and business models are encouraged [22, 24]. One way or another, one thing is obvious: lagging behind in this sector compromises the national security, as indicated by the intensity and focus of development in China and the US. Interestingly, the US continues to invoke more and more sanctions regarding production technologies while also inducing a transition to services and technologies by US-based companies; as they say, "who owns the information, he owns the world."

Thus, the use of IT in today's Russia is limited by social (physical and mental health), economic (limited return on investment), and environmental (energy intensity) factors, which requires a duly responsible approach to managerial decision-making.

## 5. Acknowledgments

The authors hereof would like to acknowledge the Corporate Management Department of the FSBEI HE State University of Management for their assistance in getting this paper published; the Organizing Committee of Step to the Future: Artificial Intelligence and Digital Economy, an international research forum which took place on December 6 and 7 at the State University of Management; and the participants of the roundtable hosted by the Civic Chamber of the Russian Federation (19 oct. 2018) to discuss the Digital Economy of the Russian Federation Program, its prospects and aspects, which helped the authors fully delve into this research area.

## 6. References

[1] Surinov A E Russian Statistical Yearbook *Rosstat* (Moscow)
[2] The Commonwealth of Independent States in 2017 CIS Interstate Statistical Committee (Russia)
[3] The Government of Russia http://government.ru Document: The Digital Economy of the Russian Federation program, approved by order of the Government of the Russian Federation of July 28, 2017 No 1632-p Http://government.ru/projects/selection/743/28653/
[4] The Government of Russia http://government.ru Document: Passport of the national program "Digital Economy of the Russian Federation" No 16 dated December 24, 2018 http://government.ru/projects/selection/743/ 35568 /
[5] The Government of Russia http://government.ru The work of the Government. > Industry and technology The military-industrial complex. > Information technology industry, http://government.ru/rugovclassifier/665/main/
[6] Abdrakhmanova G I, Vishnevsky K O, and Volkov G L 2018 Indicators of the Digital Economy 2018 National Research University Higher School of Economics
[7] The Government of Russia http://government.ru Information technology industry: some important facts for 6 years http://government.ru/info/32158/
[8] Rumyantseva Z P 2007 General management of the organization: theory and practice INFRA-M (Moscow)
[9] Naumenko N V 2018 Building a "digital economy" on the example of China Statistics in the digital economy: training and use: materials of the international scientific-practical conference, St. Petersburg State University (St. Petersburg) 235 p
[10] Dyukina T O 2018 On the development of ICT in Russia at the present stage Statistics in the digital economy: training and use: materials of the international scientific-practical conference of St. Petersburg State University (St. Petersburg) 235 p
[11] Klochkova E N 2018 Global trends in the development of digital technologies in Russia Statistics in the digital economy: training and use: materials of the international scientific-practical conference of St. Petersburg State University (St. Petersburg) 235
[12] Kurysheva S V 2018 Indicators of the digital economy Statistics in the digital economy: training and use: materials of the international scientific-practical conference of St. Petersburg State

University (St. Petersburg) 235 p
[13] Aksenova A S 2018 Digital economy in the socio-economic development of Russia Digital economy in the socio-economic development of Russia: a collection of scientific papers based on the results of the All-Russian scientific and practical conference of young scientists of St. Petersburg State University of Economics (St. Petersburg State University, St. Petersburg) 332 p
[14] Karginova V V 2017 Institute of public-private partnership: challenges and directions for improvement (Vladivostok) *Bulletin of the Far Eastern Federal University. Economics and Management* **1(81)** 51-62
[15] Embulaev V N 2017 Features of the development of the Russian economy in liberalism (Vladivostok) *Bulletin of the Far Eastern Federal University. Economics and Management* **4(84)** 41-51
[16] Nadtochy Yu V 2018 Cybercrime as a threat to environmental security (Vladivostok) Asia (Pacific: economics, politics law) **3** 108–116
[17] Simchenko N, Nesterenko E 2018 Structural features of social institutions for the development of the digital economy (Vladivostok) *Bulletin of the Far Eastern Federal University. Economics and Management* **3** 24-33
[18] Kokoshin A A 2019 Artificial intelligence and some issues of ensuring the security of Russia *Bulletin of the Russian Academy of Sciences* vol 89 **5** 437-439
[19] Yanitsky O N 2019 Challenges and risks of globalization *Seven Abstracts, Sociological Studies* **1** 29-39
[20] Eferin Y, Hohlov Y, Rossotto C 2019 Digital platforms in Russia: competition between national and foreign multi-sided platforms stimulates growth and innovation *Digital Policy, Regulation and Governance* 21 **2** 129-145 https: / /doi.org/10.1108/DPRG-11-2018-0065
[21] Mueller M, Grindal K 2019 Data flows and the digital economy: information as a mobile factor of production *Digital Policy, Regulation and Governance* 21 **1** 71-87 https://doi.org/10.1108/DPRG -08-2018-0044
[22] Oughton E J, Frias Z, Dohler M, Whalley J, Sicker D, Hall J W, Crowcroft J, Cleevely D D 2018 The strategic national infrastructure assessment of digital communications *Digital Policy, Regulation and Governance* 20 **3** 197-210 https://doi.org/10.1108/DPRG-02-2018-0004
[23] Gregory M 2017 Telecommunications is an Essential Service *Journal of Telecommunications and the Digital Economy* **5(4)** https://doi.org/10.18080/jtde.v5n4.136
[24] Kutsenko M, Ovcharuk V, Solovev D B 2019 Application of Singular Value Decomposition Method for Acoustic Emission Data Analysis *2019 International Science and Technology Conference "EastConf", International Conference on.* [Online]. Available: http://dx.doi.org/10.1109/EastConf.2019.8725314