The Role of the Digital Educational Environment in the Formation of Personnel for the Digital Economy

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Abstract

The article discusses the conditions of training for the digital economy. These issues are becoming relevant due to the fact that Russia's transition to a new technological structure - to a digital economy requires the training of competent personnel. Solving this problem is impossible without changing the approach to teaching citizens, which requires modernizing the modern education system and vocational training, bringing educational programs in line with the conditions and needs of the digital economy. Creating a digital educational environment (DEE) requires the widespread introduction and effective use of digital tools of training activities, their holistic inclusion in the information environment, ensuring the preparation and training of citizens on an individual curriculum throughout their lives, namely at any time and in any place. The Digital Economy of the Russian Federation program notes that cadres and education are one of the key institutions within which conditions for the development of the digital economy are created. Despite existing research by domestic and foreign authors on the formation of DEE, insufficient attention is paid to the issues of training personnel for the digital economy at the regional level. The study led to the conclusion about the need to change the quality requirements and ways of getting education, the existence of problems in training personnel for the digital economy at the regional level, due to inequality of access to IT-technologies, different levels of preparedness of higher education institutions of the North Caucasus Federal District, inconsistency of standards and other regulations realities.

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1 Introduction

Russia's transition to a new technological order, namely to the digital economy, requires a change in approaches to the training and education of personnel. Domestic and foreign practice shows that information technologies are implemented in almost all sectors of material and non-material production and are currently used everywhere. This led to both qualitative changes in production and changes in the economic structure of national economies. New needs of society in the availability and quality of information, and in connection with this ever-growing popularity of the Internet and the increase in the number of users of mobile devices and gadgets, led to changes in the demand for labor. If in 1995 the number of users of the global network was only 16 million people, that is, 0.4% of the world population, by 2018 their number increased to 4.021 billion people and made up more than half of the population of the whole world (53%), and the number of mobile device users exceeded 5 billion people in 2018, that is, 68% of the world's total population [Internet Statistics18; Digital economy18.

According to the forecast of the World Economic Forum (WEF), presented in the report "The Future of Jobs" by 2020, the number of jobs in the world could be reduced by 5 million. However, analysts believe, this is not about simply reducing the number of jobs due to automation, and a change in the structure of the labor market, as a result of which specialists with skills and professional education corresponding to the "new" information economy will be in demand [Monitoring12]. The solution to this problem requires the introduction of innovations in education and professional reorientation of personnel, which will provide motivation and the possibility of training specialists on new standards and their successful employment [Kapranova18].

In this regard, the Government of the Russian Federation approved the passport of the project "Modern Digital Educational Environment". The main vector of development of which will be the creation of conditions for the systematic improvement of quality and the expansion of opportunities for continuing education. The project will be implemented through a digital educational space, the availability of online learning [Nikulina18]. This project will allow to organize blended learning, use individual learning plans, engage in self-education throughout life, etc. Digitalization transforms the social paradigm of people's livelihoods, opening up opportunities for acquiring and improving knowledge, broadening the mind [Nikulina18].

2 Task

The problem of increasing the index of network readiness of Russia and the transition to the digital economy is now recog-nized as one of the key. It was widely discussed at the plenary session of the St. Petersburg international economic forum, at the meeting of the Council for strategic development and priority projects, and was named by the President of the Russian Federation Vladimir Putin as "an issue of national security and independence of Russia, competition of domestic companies", which emphasizes its relevance and importance for the national economy at present [Putin18].

In the report "Global Information Technologies", which was presented by the WEF in 2016, it was noted that the Russian Federation ranks 41st in the network readiness index, significantly lagging behind such countries as Singapore, Finland, Sweden, Norway, USA, Japan and a number of others [World economic forum16].

In 2017, the Government of the Russian Federation approved the program "Digital economy of the Russian Federation" (here-inafter – the Program), one of the main objectives of which was to enter the twenty of the world's leading States in terms of the index of network readiness by 2025. The action plan in the direc-tion of "Personnel and education" was approved in February 2018. It is one of the basic directions of the Program, along with such areas as regulation, formation of research competencies and technical foundations, information infrastructure and in-formation security [The program "Digital Economy"18].

It should be noted that the number of personnel training and the compliance of educational programs with the needs of the digital economy are currently insufficient in the Russian Federation. There is a serious shortage of personnel in the educational process both at the level of undergraduate and graduate programs, special advanced

training programs and professional retraining. In the procedures of final certification, digital tools of educational activities are not sufficiently applied, the process is not included integrally in the digital information environment.

In 2018, educational programs on the profile (specialty) of "digital economy" were offered only in 7 higher educational institutions of the Russian Federation, none of which are located in the territory of the North Caucasus Federal District. At the same time, only 4 budget and 437 paid educational places were provided for the bachelor's level, and the cost of 1 year of study in these educational programs amounted to 300 thousand rubles [Digital Economy18]. This circumstance significantly reduces the opportunities for the development of the economy of the regions of the North Caucasus Federal District and causes their greater lag in the network readiness index not only in comparison with such countries as the USA, Japan or the Netherlands, but also at the all-Russian level. Ultimately, this also negatively affects the overall level of the network's network readiness index in the RF. This requires an assessment of the prospects for introducing innovations in the institutions of higher education in the North Caucasus Federal District, their readiness to restructure the training system to new standards, and to actively involve regional economies in the digitalization process of the Russian economy [Sidorov18]. The fields of education, science, research, culture, and the media are key areas for introducing new digital achievements, and are in themselves important factors and contributing to the further development of digital technologies. This means that all citizens can take advantage of the tremendous opportunities in the above areas for training, professional development, continuing education, development and participation in economic and social life.

The education system should better equip people with the skills and knowledge to meet the demands of the digital work environment and the knowledge society. It should also increase the level of literacy in the media. It is therefore necessary to promote the wider use of digital media in education throughout a person's life. Together with all interested parties in the field of education, we will strive to create a digital learning strategy that will systematically use, expand and integrate the capabilities of digital media to provide high-quality education. Nevertheless, there remain issues of social adaptation of the population to the challenges of the digital economy, related to the continuous improvement of skills and the development of new skills in the interactive space of the digital ecosystem. In this regard, active labor market policies, income support, lifelong learning, and more flexible educational systems are extremely important.

3 Development Of Methodology

3.1 Subtitle

The main part of the Program is the "Personnel and Education" direction, which includes the system of goals, which are subject to a number of specific tasks aimed at their achievement. Within each specific task, milestones and events are identified directly, allowing to realize the directions of the Program, specific dates for the commencement and completion of activities, responsible executives at the level of the executive bodies and at the level of subjects implementing the Program are defined. The main objectives of the field of personnel and education are: motivating the working contingent to acquire professions and competencies demanded by the digital economy to ensure that the education system meets the new challenges, which will be aimed at the comprehensive development of students, training competent professionals of professions demanded by IT business and providing the necessary conditions for their learning; organization of cooperation between employers, executive bodies and the employees themselves, with the aim of motivating the self-development of the working contingent; creating the necessary conditions for the implementation of the Program [The program "Digital Economy"18].

Example Currently, there are two main problems, namely: on the one hand, the confrontation of knowledge (humanitarian and natural science) and practice; on the other hand, the prestige of education and its real content.

Business and government should work hand in hand to figure out how the educational system of the 21st century should look like.

As a result of the implementation of the measures stipulated by the Program and the project in the field of education "Modern educational environment in the Russian Federation", the following specific results are planned to be achieved:

- distribution of personal digital certificates for educating the public (it is planned to train about 5 million people until 2021);

- ensuring the smooth operation of the system for assessing the level of competencies that will provide the relevant preferences for university entrants;

- development of 20 new training and testing programs in accordance with the competencies of the digital economy;

- the formation of standards of competence of the digital economy for all categories of the population;

- Provision of an individual education and development program for students. Educational organizations will have to begin to use and increase the number of students in the field of information technology from 60 thousand in 2017 to 120 thousand students by 2025;

- creation of a system of advanced training of teachers, taking into account the standards of Worldskills Russia according to the competencies in demand in the digital economy;

- adoption of legal and regulatory acts aimed at the development of online learning. In particular, fixing the status of online courses as equal parts of educational programs;

- creation of an information resource that provides access to online courses on the principle of "one window" and combines a number of existing online learning platforms through a single authentication system;

- introduction of online training, including mass open online courses (MOOK);

- the creation by 2020 of 3.5 thousand online courses on programs of secondary, higher and additional education with the involvement of leading developers, both from government agencies and the business community;

- formation of a system of expert and user assessment of the quality of the content of online courses;

- the creation of ten Regional Competence Centers in the field of online learning;

- training and education of at least 10,000 teachers and experts in the field of online education.

During the period of the Program implementation, up to 1000 commercially oriented scientific and technical projects in the field of promising "through" technologies of the digital economy will be selected. In addition, it is planned to master the practice of accounting for entrepreneurial achievements enrolled as graduate qualifying work ("start-up as a diploma").

Institutions of higher education in the NCFD now have a real chance by developing education programs in line with the requirements of the changing labor market and digitalization of the economy to become active participants in the new digital economy, increase their competitiveness and relevance in the education services market, attract new applicants, and withstand acute competition with leading universities in Russia. This task can be solved through systemic training of specialists, taking into account the most progressive phenomena that are at the forefront of technological development, trends in the development of world scientific and technological progress and the world economy, which are "ordered" to teach not what is today, but what will be in the nearest future. Humanity has entered the VI technological cycle, a feature of which must be taken into account in the education system. This requires a focus on high-tech professions located at the junction of the natural sciences, humanities and the arts - a new challenge to education, research competencies and teamwork. Therefore, in the process of personnel training it is necessary to adhere to the principle of social responsibility. This is justified by the fact that this principle is associated with the inculcation of social responsibility skills in solving environmental and technospheric security problems in the conditions of the development of the digital economy, as well as cyber defense of organizations, methods of preserving databases; in the implementation of automation and robotization programs leading to a reduction in the number of employees; with the development of a responsible attitude of employees to their duties as participants in information interaction, to the processing of various kinds of data, the preservation of digital sovereignty. Retraining and advanced training should, among other tasks, focus on practical measures to prevent information technology dependence, threats to national cybersecurity, gaps in infrastructure development, support for modern areas of human development in the digital economy.

A promising task facing universities is to improve the skills of teachers of digital literacy. At the same time, the orientation should be not only on the development of courses, but also on the use of DSP [Sobolev18]. So Alexander Sobolev, director of the State Policy Department for Higher Education at the Ministry of Education and Science of the Russian Federation, defines the role of a teacher as a teacher, guide to the digital world.

4 Results

The ongoing and projected changes in the economy in the context of entry into the digital economy primarily affect the education sector [Kuznetsov18]. Therefore, the following tasks will be faced by universities and other institutions of higher education. In parallel with the preparation of bachelors, masters in previously announced areas and specialties to expand the niche of programs and create the necessary conditions that will allow students to gain knowledge and master the skills required by the digital economy. Practice shows that the speed of propagation of digital effects in different industries is different. This will determine the need for a combination

of training for both the current analogue economy and the digital economy. Technology is changing education. Currently, colleges and universities offer online courses; Online teachers offer new methods for learning materials.

Let us analyze the possibilities and the degree of readiness of the institutions of higher education of the NCFD for training personnel for the digital economy. In the NCFD, currently there are 23 higher education institutions that have access to the Internet and present information on their official websites about their activities in accordance with government requirements. Normatively, technologically and informatively, they provided a course in computer science and information and communication technologies in programs of both general and special education, and training of personnel is being held in a number of specialties demanded by the IT business.

However, the existing training systems at all levels of the district are scattered, which hinders progress in this area and worsens the situation on the labor market.

It cannot be said that the NCFD does not pay attention to solving this problem. So, in March 2018 on the basis of North-Ossetian State University named after K.L. Khetagurov held a strategic session "Definition of development plans for the directions of STI and the digital economy in the constituent entities of the Russian Federation that are part of the North Caucasus Federal District." The event was organized by the Government of the Republic of North Ossetia-Alania, the Agency for Strategic Initiatives to Promote New Projects (ASI), the Russian Venture Company (RVC), the Foundation for Promoting Innovation, University 20.35 [Internet18]. The session addressed issues of training qualified personnel employed in the IT sphere, selected projects that are planned for implementation in the district, and also assessed the regional innovation ecosystem and the possibilities of its use in the country's transition to the digital economy.

However, it should be noted that higher education institutions in the North Caucasus Federal District have a different level of readiness for the preparation and training of personnel that meet (satisfy) the requirements of the digital economy. In this regard, we consider it expedient to conduct an analysis of the readiness and feasibility of the implementation of new curricula that meet the requirements of the digital economy in the higher education institutions of the North Caucasus Federal District. This analysis will be carried out on the basis of information provided on the official websites of these universities.

Thus, according to the results of monitoring the activities of universities in the Russian Federation conducted in 2012, which included a survey of the activities of 502 universities in the country, including some of the schools of the North Caucasus Federal District were included in anti-rating of the Ministry of Education of the Russian Federation [Monitoring12]. They're universities like this:

- Dagestan State Medical Academy; Dagestan State Agrarian University. Dzhambulatova; Dagestan State Pedagogical University; Dagestan State Technical University; (The Republic of Dagestan);

- Pyatigorsk State Technological University (Stavropol Territory);

- Ingush State University (Republic of Ingushetia);

- Kabardino-Balkaria State Agricultural Academy. V.M. Kokova (Kabardino-Balkarian Republic);

- Karachay-Cherkess State University W.D. Aliyeva (Karachay-Cherkess Republic);

- Grozny State Oil Technical University. Md Millionshchikov; Chechen State Pedagogical Institute; Chechen State University (Chechen Republic).

Of the 13 universities of the North Caucasus Federal District that meet the criteria of the Ministry of Education of the Russian Federation, only a few universities implement educational programs for preparing specialties that are not in demand in the IT sphere, these are Gorsky State Agrarian University, Pyatigorsk State Linguistic University, North Caucasus Institute of Arts, North Ossetian State Medical Academy, Stavropol State Medical Academy. However, due to its specificity, the introduction of modern technologies and innovations in the educational process and ensuring compliance of the level of training of graduates with the standards and competencies of the digital economy. We also note that such specialties as genetics and bioengineering, IT-technologies in medicine and art are considered to be promising by the WEF.

Those higher education institutions of the North Caucasus Federal District, which, according to the Ministry of Education of the Russian Federation, are effective, are preparing specialists for the IT business now, in our opinion, have great opportunities to be involved in the Program and train personnel in the standards of the digital economy. The level of their readiness to implement new curricula, in our opinion, can be assessed according to such criteria as: 1) the availability of training programs that are in demand in the IT sphere; 2) the use of information technology in the educational process; 3) the presence of the development strategy of the university; 4) the level of innovation and commercialization of scientific research; 5) the presence of conditions for inclusive education (Figure 1). To obtain a specific ranking of ranked institutions used a scale from 0 to 5 points.

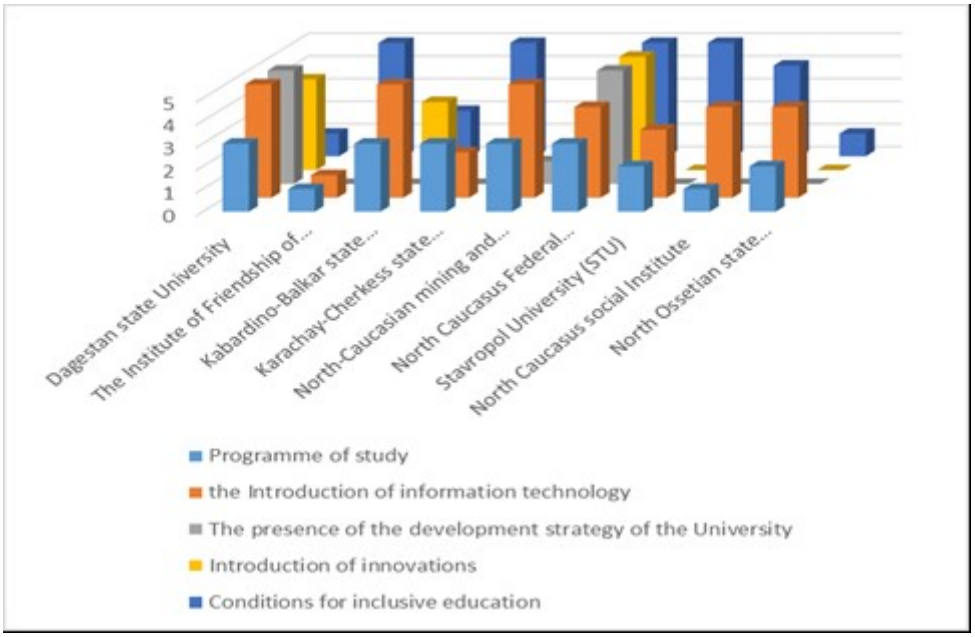

Figure 1: Scale for assessing the availability of new curricula in higher education institutions of the North Caucasus Federal District

The first indicator is the availability of educational programs demanded by the IT business. Currently, none of the universities considered is implementing programs according to new standards, which would allow universities to get the maximum score. If the university prepares specialists in several specialties that are in demand both now and in the future, it has more opportunities to switch to the requirements of the digital economy and, accordingly, receives a higher score and a final rating.

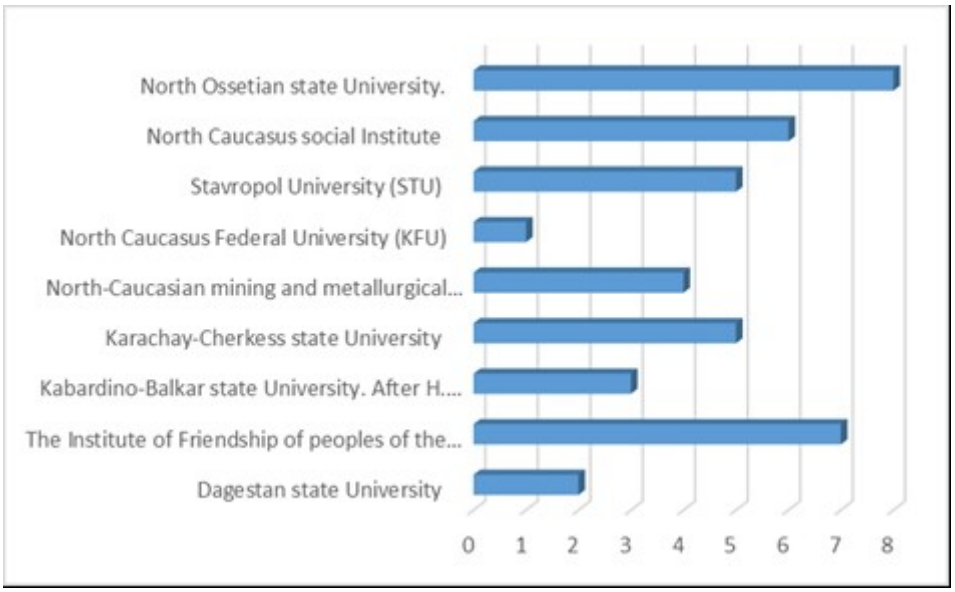

Figure 2: The place of the university on readiness to implement new curricula

5 Discussion

The use of information technologies in the educational process is an indispensable condition for the implementation of the Program, and accordingly a higher rating [Tarasenko18]. Universities with a developed information and educational environment are rated with the maximum number of points.

The presence of the university development strategy and the introduction of innovations and the commercialization of scientific research are necessary for its systematic involvement in the transition of modern education to education in the digital economy.

The presence of conditions for inclusive education was assessed on the basis of the site https: //inclusive education. RF / universities, and is one of the most important criteria for high school readiness to work in the new conditions [Index of readiness18].

The analysis carried out (Fig. 1, Fig. 2) made it possible to note that the North Caucasus Federal University is the most prepared among the universities of the North Caucasus Federal District, winning first place with 22 points according to the analyzed criteria. The following universities have good opportunities for training specialists in the digital economy: Dagestan State University (2nd place in the ranking); Kabardino-Balkar State University (3rd place in the ranking), as well as the North Caucasus Mining and Metallurgical Institute (State Technological University. It should be noted that in these universities, the digital aspect is gradually becoming part of both the scientific and educational areas: new educational programs are being developed aimed at training specialists for the digital economy, is actively used in the educational process digital educational environment/

6 Conclusion

At present, information and knowledge are the basis of economic progress, to which traditional concepts, technologies and models do not apply. In the process of training and educational programs for the digital economy, an important aspect is the content side, in which the main vector of change should be humanization aimed at uniting the potential of humanitarian and technical areas for developing joint educational programs. Such an association can occur both at the external level (between higher education institutions of the North Caucasus Federal District) and at the internal level (between institutes / faculties of the university). This will allow creating a new cluster of professionals for the digital economy who will have the opportunity to work both on digitizing projects and as managers in various companies that own modern IT technologies.

Transformations occurring in the international space affect all areas of activity, including education. In a digital economy, the requirements for quality and ways of obtaining education are changing. At the same time, there are still quite a lot of problems caused by the inequality of access to IT-technologies, different levels of preparedness of universities, inconsistency of standards and other regulatory documents with modern realities. Therefore, modern IT-technologies should be used to improve the quality and increase the level of educational efficiency, as well as promote equality of educational opportunities. This will allow to realize the goals of the digital economy.

According to McKinsey's analysts, in order to develop the digital economy, it is necessary to invest in human capital, to facilitate access to financing for Internet-based innovations, to develop the infrastructure of Internet access, including platforms, to develop the business environment as an ecosystem of relations between state and non-state service providers, regulated on the basis of effective legislation, so that the country becomes attractive for foreign investments, in particular, in the IT sector. The regulation of the digital economy should be the result of a broad dialogue between commercial and public players in the country's digital markets [McKinsey11]. Deloitte's analysts recommend that companies create a digital ecosystem for their customers by improving their relationships at all stages of interaction. Deloitte's understanding of the digital ecosystem is not only to create new digital services and provide multi-channel access to them, but also to create joint products and services based on a common platform with other companies, which have additional value for the customer of other opportunities [Deloitte16].

In this way the following aspects of the development of the digital economy in Russia can be highlighted:

- the high potential of the Russian education system for training specialists in the digital economy;
- availability of original organizational and technological solutions for creating an effective infrastructure of the digital economy;
- integration and development of specific cases based on modern principles of the digital economy will create a synergistic effect and lead to a general growth of the Russian economy.

References

[Int18] Internet Statistics. - https://vawilon.ru/statistika-interneta. 2019/04/02

[Dig18] Digital economy: global trends and practices of Russian business M.: National Research University Higher School of Economics, 2018.

[Mon12] Monitoring of the activities of federal educational institutions of higher professional education: Russian Federation. M., 2012. - https:// Ministry of Education and Science. 2019/13/02.

[Kap18] Kapranova L.Y. Digital economy in Russia: state and prospects of development// Economy and management.-2018.-. 2.p 58-69.

[Nik18] Nikulina T.V., Starichenko E.B. Informatization and digitalization of education: concepts, technologies, management // Pedagogical education in Russia. 2018.8. p. 107 - 113

[Put18] Putin V.: the formation of a digital economy - a question of national security of the Russian Federation // Economics and business. - http://tass.ru/ekonomika/4389411.2019/04/03

[Wor16] World economic forum/ - https://www.weforum.org/reports/the-future-of-jobs. 2019.01.03

[The18] The program "Digital Economy". - http://government.ru/rugovclassifier/614/events/ (application 02.02.2019)

[Dig18] Digital Economy: Profile of Bachelor's Degree in Russian Universities. - https://postupi.online/programma/5164.2019/02/02 (in Russian).

[Sid18] Sidorov G. Digital University: Application of Digital Technologies in Modern Educational Institutions. -https://www.itweek.ru/idea/article/detail.php?ID=192831. 2019/14/02.

[Sob18] Sobolev A. Change or leave. Digital education challenges teachers [Electronic resource]. - http://www.poisknews.ru/archive/2018/329/. 2019/14/02.

[Kuz18] Kuznetsov N.I., Ukolova N.V., S.V. Monakhov Trends in the development of digital economy of modern Russia [Electronic resource]. - http://srtv.gks.ru/wps/wcm/connect/rosstat_ts/srtv/resources.2019/25/06.

[Int18] Internet 2017-2018 in the world and in Russia:statistics and trends. -https://www.web-canape.ru/business/internet-2017-2018.

[Mon12] Monitoring of the activities of federal educational institutions of higher professional education: Russian Federation. M., 2012. - https:// Ministry of Education and Science

[Tar18] Tarasenko S. V., Kudrevich V. V.Digitalization of the economy: the basis of the future civilization of society Economic systems managemen. - http://uecs.ru/index.php?option=com_flexicontentview=itemsid=5167 2018 10.2019/25/02.

[Ind18] Index of readiness of higher education institutions for inclusive education. -: https:// Inclusive education. RF/university services, which have additional value for the client of other opportunities.

[McK11] McKinsey (2011) Sizing the Internet Economy. Internet Matters: The Net's Sweeping Impact on Growth, Jobs and Prosperity. New York: McKinsey Global Institute.

[Del16] Deloitte, How to Thrive in the Digital Economy. - http://deloitte.wsj.com/cio/2016/06/21/how-to-thrive- in-thedigital-economy/. 2019/02/02.