Digital Economy or Manic Digitalization: the Choice of Russia[1]

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Abstract. What is the digital economy? The answer can be presented as a result of the development of the traditional economy, combining the realization of three directions. The first direction – all data are digitized, the second – ensuring transparency and transparency of data, the third – ensuring inclusiveness of the economy. In 2017, the Government of the Russian Federation developed and approved a Program to create conditions for the country's transition to a digital economy. The ecosystem of the digital economy is based on a number of areas of a cluster nature, expressed in the aggregate of the planned characteristics of the digital economy. In this paper, the data of analysis and compliance of the objectives and indicators of the Program to the three basic fairways of the digital economy are presented. The results of analyzing the proportions of clusters and the dynamics of the implemented activities form an idea of the actual priorities of the Strategy. This study provides an answer to the question of whether Russia is moving towards the creation and development of the digital economy or replacing this activity with maniacal and little-promising digitalization. A reference has been searched for verification of the digital economy projects specified in the Program for the conditions for the transformation of the economy into a digital one. For this purpose, data of official statistics, ICT Development Index, Digital Economy and Society Index, Networked Readiness Index were used. The results of the study do not confirm the trend towards manic digitization of data, but did not reveal significant changes that ensure the inclusiveness of the economy.

Keywords: Digital Economy, Digitalization, Government Program, Networked Readiness Index, ICT Development Index, Graph Method.

1 Introduction

What is a digital economy? This can be done as a result of the transformation of the traditional economy. The first condition is that all data is digitized (accumulation and processing of data according to the principle of man-machine interaction in the "C2C"

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format), the second is to ensure the transparency and security of data, the third is to ensure inclusiveness (accessibility) of the economy.
In 2017, the government of the Russian Federation developed a program for the transition to a digital economy - the Digital Economy Program. In 2019, it became invalid due to the continuity of the National Program "Digital Economy of the Russian Federation" (Order of February 12, 2019 No. 195-p). The National Program (hereinafter referred to as the Program) was adopted with the aim of avoiding duplication of program documents in the field of the development of the digital economy.
The program is designed to form a digital economy and includes a number of federal projects. Characteristics are not an abstractive expression, they are qualitative and quantitative indicators as of 2024.
Among the most common ambitious indicators, it should be noted that at least 10 successfully competing world leaders, as well as at least 500 successfully operating digital platforms and at least 500 successfully operating small and medium enterprises in the field of creating digital technologies and platforms and providing digital services .
The study presents data, goals and indicators that allow you to find out whether the selected trends can lead to results that transform the traditional economy into a digital one. The hypothesis is the statement that the results of the analysis of the proportions of clusters and total costs form an idea of real priority programs. This study answers the question of whether it is a question of the existence of economic and economic activity.

2 Materials and Methods

In Russia, until 2012, the IT industry developed under the usual market laws under the conditions of the compensatory mechanism of state regulation and control. Since 2012, the situation has changed dramatically, as experts note - the era of unprecedented attention to the IT industry from the state began [1, 2]. With the adoption of the Program, Russia became one of the countries that focused their policies on creating the conditions for the transition to a digital economy.
The starting point of the study is the position of the report of the Organization for Economic Cooperation and Development (hereinafter - the OECD), according to which "Digital economy is an economy in which value added is created using digital (information) technologies. It functions due to the connection and dependence of online economy and offline economy. At the same time, its development is determined by "smart data" [3]. Hence we formulate the thesis that the level and dynamics of the process of digitalization of the economy is determined by the level and dynamics of the value added indicator.
In the Program, digital economy is represented by 3 levels:

- markets and sectors of the economy (areas of activity) - in Russia the emphasis is on such areas as energy, transport, industry [4];
- platforms and technologies, where competencies are formed for the development of markets and sectors of the economy (fields of activity) - special

attention is paid to so-called cross-cutting digital technologies (technologies used in various fields of activity);
- an environment that creates the conditions for the development of platforms and technologies (covers regulations, information infrastructure, personnel, and information security).

The last two levels are recognized as the basis for the application of the regulatory mechanism of public administration, the program is focused on them. Although here lies a certain contradiction. After all, the most ambitious (equally-labor-intensive) indicators of the Program include indicators that cannot be formed without entrepreneurial initiative and outside entrepreneurial activity, using mainly the regulatory mechanism.

The key federal projects (hereinafter referred to as projects), within which the conditions for the development of the digital economy are created, are designated:

1. Ecosystem of the digital economy (regulatory regulation of the digital environment and digital public administration).
2. Personnel and education.
3. Digital technologies (formation of research competencies and technological groundwork).
4. Information infrastructure.
5. Information security.

All five of these projects are needed to create an economy in which data in digital form is a key factor in production. The program is calculated until 2024 and provides for specific indicators specified in the Program's passport.

It is required to solve the problem of verifying digital economy projects specified in the Program to the conditions for transforming an economy into a digital one. To do this, it is necessary to compare the planned indicators of the Program with a conditional benchmark, objectively reflecting on a global scale the level and dynamics of digitalization of the economy. To determine this benchmark, several statistical indicators and indices were studied. The data on the development of information and communication technologies (hereinafter referred to as ICT) were taken as the basis, since it is with this sector of the economy that all the elements of the Program are connected.

3 Results Of the Study

In Russia, data on the development of the ICT sector can be obtained from a variety of statistical indicators. The main sources of statistical data are the data of Rosstat [5] and HSE [6]. Let us illustrate, for example, significant statistical indicators - indicators of value added growth (Table 1), which is consistent with the previously advanced thesis that the level and dynamics of the digitalization process of the economy is determined by the level and dynamics of the value added indicator.

Table 1. Indicators of value added.

Data source	Name of the indicator	Year		
		201 5	201 6	201 7

Rosstat (Monitoring the development of the information society in the Russian Federation)	The share of high-tech and knowledge-intensive industries in GDP, in%	21,3	21,6	21,6
Rosstat (Information Society)	Share of domestic expenditures on research and development in GDP, in%	1,39	1,36	1,36
Rosstat (Science and Innovation)	Internal expenditures for research and development (information and telecommunication systems), million rubles	745 55,8	779 32,0	813 90,7
Statistical collections HSE (Science. Technology. Innovation)	The ratio of the growth rate of domestic spending on research and development to the growth rate of GDP, in%	-0,1	-0,2	2,6
Statistical collections of the HSE (Digital Economy)	Share of ICT sector in GDP,%	2,7	2,6	2,7

Using statistical data, it is necessary to take into account the difference in the calculation methodology - Rosstat data is based on the OKVED classifier, HSE data is based on the OECD standard [7]. To form a complete picture, you need to be patient and consistently look for indicators that are directly or indirectly related to the Program among a multitude of indicators calculated for the Russian Federation and the subjects of the Russian Federation; by types of economic activity; by industry; in priority areas; for socio-economic purposes and other classification criteria. Therefore, we conclude that it is inexpedient to use indicators of official statistics as a reference for verifying the digital economy projects specified in the Program for the conditions for transforming the economy into a digital one. The reasons for this conclusion are the following: excessively labor intensive work; the lack of a unified method of calculation; difference in the scale of statistical sampling.

The next option in defining the benchmark was the ICT Development Index (IDI). The ICT Development Index (IDI) is an index published by the International Telecommunication Union of the United Nations (ICT) based on combined ICT indicators [8]. It is a standard tool for benchmarking the most important indicators of the development of the information society and measuring the digital divide, comparing ICT indicators within and between countries. The ICT Development Index is based on 11 ICT indicators grouped into three subindexes: Access to ICT (Access subindex), Use of ICT (Use subindex), Practical skills to use ICT (Skills subindex). The rating data of the Russian Federation on the ICT Development Index (IDI) are presented in Table 2.

Table 2. The place of the Russian Federation in the ranking (ICT Development Index).

Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Position in rating *	41 (166)	42 (166)	–	45 (167)	43 (175)	45 (176)

* in parentheses are the number of countries participating in the ranking

The index is calculated according to a standardized method, which is reduced to a single criterion, is global in nature, and can be used for comparative analysis at the global, regional and national levels. These benefits are unconditional, however, the meaningful coverage of subindexes is limited to indicators related to access to ICT, the use of ICT, as well as practical knowledge of these technologies by the population of countries covered by the study. In the Program under study, only a part of the indicators can be correlated with the indices of the subindexes. This leads to the conclusion that it is inappropriate to use the ICT Development Index as the required standard for verifying the digital economy projects specified in the Program for the conditions for transforming the economy into a digital one.

Another index considered as a benchmark was the Digital Economy and Society Index (DESI). This is a composite index that summarizes the relevant indicators on the effectiveness of digital technologies in Europe and tracks the evolution of EU member states in the field of digital competitiveness. The Digital Economy and Society Index (DESI) is a composite index that summarizes about 30 relevant indicators of digital efficiency in Europe and tracks the evolution of EU member states in five main dimensions: communication, human capital, Internet use, digital integration, digital public services. Based on the DESI Index, the International Digital Economy and Society Index (I-DESI) is formed, which measures the performance of the digital economy of the EU-28 member states and the EU as a whole compared to 17 non-EU countries using a methodology similar to the DESI index The EU. In particular, the value of the index for Russia for the period 2013-2016 was 45.7 points on a scale (in the range from 39.7 to 75.2) [9].

Judging by the profile and components of the DESI Index, it is of interest for this study. However, the idea of using it as a reference for verifying digital economy projects had to be abandoned. The reason was that the Index's methodological tools are limited to an evaluative component of socio-economic indicators, which can be used to judge the rate of digitization of data and their use. It does not take into account other basic conditions for the formation of a digital economy - the inclusiveness of the economy and ensuring the transparency (security) of data. In addition, the DESI Index is not focused on a comprehensive assessment of the contribution of ICT to the country's gross domestic product structure. And this, in turn, contradicts the thesis that the level and dynamics of the digitalization process in the economy is determined by the level and dynamics of the value added indicator.

The final option for determining the benchmark was the Networked Readiness Index (NRI). The NRI is a comprehensive indicator reflecting the readiness of the world economy to use ICT to accelerate development.

The index is published as part of the annual Global Information Technology Development Report (Global Information Technology Report). The report for 2016, the year before the adoption of the Program in Russia, says the following: "We are at the dawn of the Fourth Industrial Revolution, which represents a transition to a new set of systems combining digital, biological and physical technologies in new and powerful combinations. These new systems are built on the infrastructure of the digital revolu-

tion." To assess the willingness of countries to reap the benefits of emerging technologies and benefit from the opportunities provided by the digital revolution and beyond, the NRI Index is used. The rating data of the Russian Federation on the NRI Index are presented in Table 3.

Table 3. The place of the Russian Federation in the rating (Index of Readiness for the Network Society).

Year	2012	2013	2014	2015	2016	2017
Position in rating *	56(142)	54(144)	50(148)	41(143)	41(139)	–

* in parentheses are the number of countries participating in the ranking

As a justification for the use of the methodology and data of the NRI Index as a reference for verifying digital economy projects specified in the Program, the conditions for the transformation of the economy into a digital one will proceed from the following provisions:

- indicators of subindexes take into account all the projects of the Program, which ensures the relevance of correlation of indicators of the Program and indicators of subindexes;
- the NRI index is formed and used to study the role of ICT in stimulating innovation;
- the NRI index measures the ability of countries to use ICT to increase competitiveness and well-being;
- the results of the global rating using the NRI Index show a correlation with the rating results on the Information and Communication Technology Development Index (ICT Development Index) and correspond to the trends recorded in the OECD report "Prospects for the Digital Economy" [7];
- the metadata that forms a number of indicators of subindexes are consistent with the indicators of value added (in particular, ROIC, EVA, IRR [10]), which makes it possible to use them to calculate and evaluate the dynamics using the B. Stewart formula [11].

The framework translates into various main categories (subindexes), 10 subcategories (pillars), and 53 individual indicators distributed across the different pillars.

To establish the correspondence between the NRI Index indicators and Program indicators, we use the graph construction method. Having labeled each of the 53 indicators with the vertices of the graph, we will connect them with the vertices corresponding to each of the 12 indicators of the Program, distributed over 5 projects. Since the number of vertices and edges of the graph is expressed by a finite set, the decision on the connection of the vertices was made on the basis of combinatorial estimation, analysis, and enumeration of variants [12].

To indicate on the graph of program indicators, we use the classification presented in the passport of the National Program "Digital Economy of the Russian Federation".

To designate the NRI Index indicators, we use the classification of the original data set methodology (The Networked Readiness Index Historical Dataset © 2012-2016 World Economic Forum).

The results are presented in Figures 1-5.

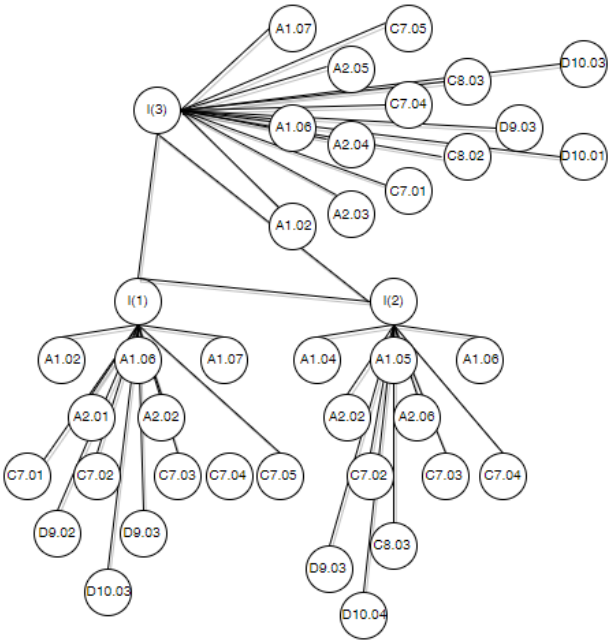

Fig. 1. Graph for the project of the Program "Ecosystem of the digital economy"

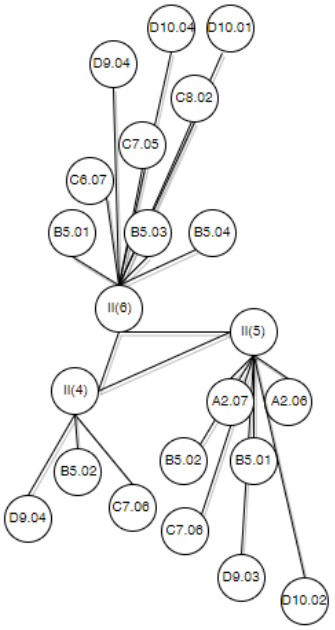

Fig. 2. Graph for the project of the Program "Personnel and Education"

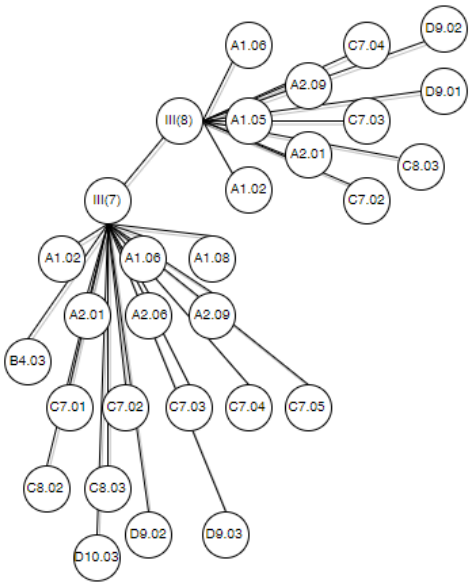

Fig. 3. Graph for the project of the Program "Digital Technologies"

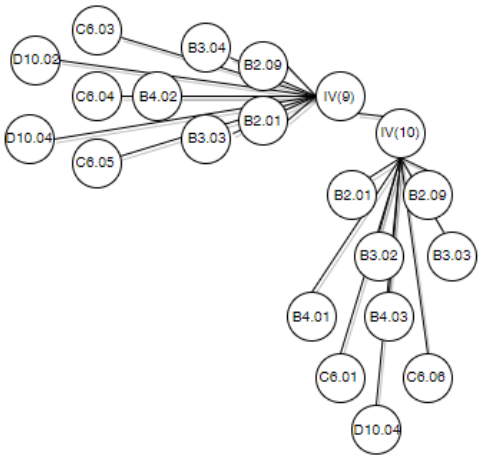

Fig. 4. Graph for the project of the Program "Information Infrastructure"

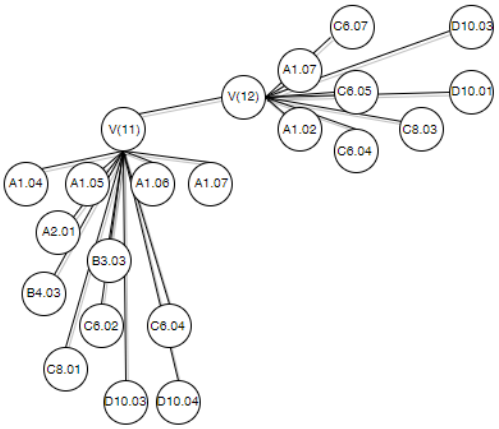

Fig. 5. Graph for the project of the Program "Information Security"

Construction of the graph performs the following tasks:

- reveals a qualitative relationship between the NRI Index indicators and the Program indicators, verifying the contribution of each Program indicator to the change in the values of the indicators and the final values of the NRI sub-indexes;
- defines "growth points", "gap" and "bottlenecks" in the implementation of the Program to find the optimal solution for combining regulatory measures affecting the decision making and execution process;
- makes it possible to organize the vertices of the graph by checking the options for decomposition or aggregation of the graph with the prospect of clustering of Program indicators.

Conducting a correlation and regression analysis to confirm and determine the nature of the relationship between the vertices of the graph is a natural continuation of the course of the study, but is not presented in this paper.

4 Findings

The tree structure of the graph demonstrates the multiplicity of links for Program indicators that ensure the growth of NRI Index indicators. The presence of a connection from one indicator to several indicators of the Program (which is one of the characteristics of the constructed graph) indicates a possible synergistic effect achieved through the implementation of the indicators of the Program. From the perspective of long-term planning, this effect can be considered as a justification for the implementa-

tion schedule of the Program's activities. The absence of null-graphs indicates that the effect of the implementation of each indicator of the Program can be transposed into a positive trend of the corresponding subindex.

All the presented conclusions lead to the conclusion that the projects of the Program implemented as a whole can lead to results that transform the traditional economy into a digital one. Thus, we can say that the content of the Program corresponds to its purpose.

However, besides the content of the Program, there is also a context that, ultimately, will determine which of the three conditions for the transformation of the economy will become a driving force for Russia. The scale of the Program's indicators suggests that an inclusive economy has been chosen as the locomotive. At the same time, the activities of the Program in the period 2017-2018 were mainly aimed at the formation of a legal field and information infrastructure. This corresponds to another condition - ensuring transparency and data security - reflected by the IDI and NRI indicators, which to a large extent ensure Russia's place in the ratings even today. And since the installation basis created in this way cannot lead to a noticeable increase in the position of the state in the NRI rating, changes in the rating can be expected after 2019. Then the structure of the formed graph can answer the question, at the expense of which context of the Program the changes were made.

The trend to manic digitization of data does not confirm the results of the study, but did not reveal any significant changes that ensure the inclusiveness of the economy. World practice shows that the IT industry itself is self-sufficient and independent. Therefore, it is important for the state to maintain the regulatory trend in the "supporting" and "stimulating" regimes. The change in the regulatory trend to "total control over the national zone" in the context of the cross-border nature of the digital economy will lead to the fact that such directions of development as import substitution and support for IT exports cannot be implemented in principle. Government control over the development of the digital economy should function within the framework of ensuring national legislation and to ensure national security without violating the principle of inclusiveness of the economy.

References

1. Dneprovskaya, N.: Requirements for an innovative environment in the transition to a digital economy. Statistics and Economics 15 (6), 58-68 (2018). https://doi.org/10.21686/2500-3925-2018-6-58-68.
2. Pavlekovskaya I., Staroverova O. Urintsov A.: The influence of scientific and technical progress on the development of the information society. Journal of Economic Security, 3, 212-217 (2017).
3. OECD, Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, https://doi.org/10.1787/9789264221796-en, (2014).
4. The Roadmap of the National Technology Initiative (NTI) for the development of the cross-sectoral direction "Advanced Production Technologies" (PPT), http://www.nti2035.ru/technology/technet, last accessed 2019/04/01.

5. Monitoring the development of the information society in the Russian Federation, http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/ed821e8043600761a7cea7fa17e1e317, last accessed 2019/03/30.
6. Statistical collections HSE, https://www.hse.ru/org/hse/primarydata/, last accessed 2019/03/30.
7. OECD, Digital Economy Outlook 2017, Access and connectivity, DOI: http://dx.doi.org/10.1787/9789264276284-6-en (2017).
8. Rating of the countries of the world in terms of the development of information and communication technologies, https://gtmarket.ru/ratings/ict-development-index/ict-development-index-info, last accessed 2019/04/01.
9. I-DESI 2018: How is digital is Europe compared to other major world economies? https://ec.europa.eu/digital-single-market/en/news/how-digital-europe-compared-other-major-world-economies, last accessed 2019/04/01.
10. Corporate Finance Resources. Technical Knowledge. Finance Articles, https://corporatefinanceinstitute.com/resources/knowledge/finance/, last accessed 2019/04/01.
11. EVA & Strategy II: Portfolio Management. Stern Stewart & Co Research, The Americas, (2001).
12. Karelin, V.: Models and methods of graph theory in decision support systems. Herald of the Taganrog Institute of Management and Economics, 2 (20), 69-73 (2014).