

Digital Transformation of the National Economy of the Republic of Belarus

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Abstract—The article is devoted to the research of transformation processes that are taking place today under the influence of digitalization in the Republic of Belarus. Effective economic development is impossible without the widespread introduction and widespread use of digital technologies. The introduced digital technologies contribute to the growth of digital innovations, change economic relations at the micro level, improve the activities of the government (forming an electronic and digital government), affect the competitiveness of the national economy as a whole and contribute to globalization. It is planned that thanks to development of digital technologies, in the country by 2035 to increase a possibility of Internet access by means of fiber-optic communication links not less than 85 percent of users of stationary broadband access. In the sphere of network infrastructure SDH will become a basis for development of public info communication networks. In health care electronic recipes will begin to be applied that will allow to carry out diagnostics at implementation of the digital technologies based on processing of big data and to treat patients remotely, applying intellectual systems to monitoring of health.

Keywords—digital economy, digitalization, digital technologies, internet of things, digital government.

I. INTRODUCTION

The Republic of Belarus, following global trends, has also taken a course towards digitalization since 2017. A number of national development programs and projects for digitalization and informatization of the national economy were adopted: Decree of the President of the Republic of Belarus no. 8 “On the development of the digital economy”, Resolution of the Council of Ministers of the Republic of Belarus no. 235 “On approval of the state program for the development of the digital economy and information society for 2016-2020 years”, “National Strategy for Sustainable Development of the Republic of Belarus until 2035”, Resolution of the Presidium of the Council of Ministers of the Republic of Belarus no. 26 “Strategy for the Development of Informatization in the Republic of Belarus for the Period 2016 – 2022”, Decision of the Presidium of the National Academy of Sciences of Belarus no. 17 “Strategy Science and Technology: 2018-2040”, etc.), which in the long term marked the exit of the domestic economy to a qualitatively new level of modern technological development.

The state keeps development of the Belarusian market of artificial intelligence. In 2005 the Park of High Technologies

(PHT) was created that allowed to attract more than 400 residents who are engaged in artificial intelligence and training of cars. In 2018 there was an open-end fund Bulba Ventures specializing in artificial intelligence and machine learning. Introduction and development of digital technologies demanded necessary competences and created new professions, such as, ML engineer, Data scientist, DL engineer.

The innovation products developed in Belarus both the health care, and agriculture, and automotive industry have a wide scope, it. For example, Flo startup (this appendix for control of health of women) based by our compatriots for 2 years attracted 18 million dollars of investments from Flint Capital fund and Mangrove Capital fund.

Most of all digital innovations in the banking sector which integrates activity of banks and large retail chain stores (“Halva”).

The national bank focuses on realization of the idea of use of open protocols of data exchange between the information systems belonging to various owners. Since 2018 in the country the system of interbank verification when the subject has enough to identify of himself in any bank or financial institution is implemented, and further it can use all services of bank remotely.

The modern digital technologies, the Internet and other digital innovations (the Big Data and Internet type of things) based on a computerization of our today's life led to the fact that we already speak about construction and use of smart houses and smart city. Digital technologies opened the road to new opportunities, opening and innovations which do our life much more conveniently. Rates of digital innovations grow every year. The number of end digital user's increases. Researchers of Hootsuite Global Digital considered that for the beginning of 2020 in the world the number of users the Internet exceeded a mark of 4.5 billion people that is 7 percent more than last year, and 3.8 billion people used social networks that made about 60 percent of all population [1], [2]. According to the same analysts, more than 5.19 billion people use mobile phones or in percent a ratio growth was 2.4 percent. Analysts predicted that users will spend to networks in a year more than 100 days or on average daily hours 43 minutes. Figures, of course, and so impressive that we spend ¼ part of days on the Internet, but a situation were “corrected” even more by a coronavirus pandemic when a considerable

part of the population of the globe was forced to work far off from a direct workplace. And, it is necessary to assume that the carried-out statistical calculations of the International agencies in the end of the year still will surprise us with statistics on these criteria (parameters).

The fact that, working in Homeoffice, employees gain experience of which, will make use also after the end of crisis in this situation is positive. Such situation resulted in freedom in the choice of an operating mode, filtration of formalities, and the self-discipline became a payment for such approach. The digital economy earned in many manifestations, in a number of branches of economy, having modernized a number of business processes (introduction of electronic document management, introduction of the digital signature, electronic record in policlinic, etc.).

Of course, at this juncture there are also negative sides of remote employment. For example, breaks between work and rest were transformed. Being at home, breaks for rest became much less. In a stream of “working day” and a number of objectives we do not watch time and sometimes, we solve the arising production problems in deeply evening. Workers, one may say, dropped out of the production environment and understood that Homeoffice does not allow instantly will be adjusted for work neither emotionally, nor functionally and to build the production environment to have independently.

On some social polls and on own experience it should be noted that there is not enough communication with colleagues as nevertheless it is easier to resolve some production issues at real-life communication, but not virtual. Besides many are not ready daily, and at times and hourly to look through e-mail, to modernize, to the level of office, a house workplace.

Work of personnel with clients, teachers with students as it is rather difficult to come into emotional contact which is come at personal contact by video conference became complicated. But despite all shortcomings of distant work, in general It should be noted that a number of the companies connected with activity on the Internet did not notice considerable decline in activity, and on some positions, on the contrary, growth was observed.

II. METHODOLOGY

Main objective of this research is justification and allocation of features of digital transformation in economy of Belarus. The author analyzes the valid state of the economy and what will lead headed for creation of digital economy, especially now to time of a pandemic and digital transformation.

By consideration of this problem we relied on a number of scientific research of both domestic, and foreign authors on this perspective, the regulating and legal documentation in the field of digital transformation of national economy.

When writing article both general scientific methods, and private were used (graphic, tabular) that allowed to make theoretically stated material more illustrative.

III. RESULTS AND DISCUSSION

Digital transformation – the multidimensional process including profound changes in technical, economic, social and even in a political field of activity.

Transition to digital economy by digitalization assumes stimulation of innovations, increase in efficiency and

improvement of services, at the same time promoting more inclusive and steady rise of national economy and a growth in prosperity of the population of this country. But the listed benefits are not always implemented, especially in 2020 when the governments of a number of the countries announced a quarantine and introduced restrictions as on movement of the population, and having limited the movement of goods (export import) to the world market. With respect thereto, analysts, estimating world state of the economy, predict by the end of 2020 reduction of key performance indicator – GDP.

Rather general state of the economy, it was planned that world growth in 2020 will be 4.9 percent [3] that can be tracked according to table 1.

TABLE I. FORECAST OF THE IMF OF “PROSPECT OF DEVELOPMENT OF WORLD ECONOMY”, %

Countries	2019	Forecast		IV quarter comparison with the IV quarter 2019.		
		2020	20 21	2019	Forecast	
					2020	2021
World GDP	2.9	- 4.9	5.4	2.8	- 3.5	4.6
The countries with developed economy	1.7	- 8.0	4.8	1.5	- 7.2	5.1
USA	2.3	- 8.0	4.5	2.3	- 8.2	5.4
Eurozone	1.3	- 10.2	6.0	1.0	- 8.6	5.8
Germany	0.6	- 7.8	5.4	0.4	- 6.7	5.5
France	1.5	- 12.5	7.3	0.9	- 8.9	4.2
Italy	0.3	- 12.8	6.3	0.1	- 10.9	5.5
Japan	0.7	- 5.8	2.4	- 0.7	- 1.8	0.0
UK	1.4	- 10.2	6.2	1.2	- 9.0	6.9
Canada	1.7	- 8.4	4.9	1.5	- 7.5	4.6
<i>The countries with emerging market and the developing countries</i>	3.7	- 3.0	5.9	3.9	- 0.5	4.2
<i>The countries with emerging market and the developing countries of Asia</i>	5.5	- 0.8	7.4	5.0	2.4	3.9
China	6.1	1.0	8.2	6.0	4.4	4.3
<i>The countries with emerging market and the developing countries of Europe</i>	2.1	- 5.8	4.3	3.4	- 7.0	6.6
Russia	1.3	- 6.6	4.1	2.2	- 7.5	5.6

Source: [4]

However, analysts speak about recession in the world and call to the GDP loudspeaker from minus 2 percent up to 2.7 percent, at the same time the median value is defined by them at the level of 1.6 percent [5]. The institute of the international finance (IIF), according to own researches, estimated growth of world economy at the level of 0.4 percent.

In Belarus in the current year the IPM Research center expected that there will be a decrease in growth rates of real GDP to 0.6 percent because of reduction of supply rate of oil from Russia (table 2).

From the provided data it is visible that economic growth in 2019 was reduced in comparison with a previous period by

1.9 p.p. percentage-point and made 1.2 percent. But according to National statistical committee of Belarus the largest specific weight in a gain of real GDP in 2019 was provided by such type of activity as “information and communication” that in percent the ratio made 0.53 percentage-point at a share in GDP of 6.2 percent.

Growth in this sector for the considered period was 9.3 percent provided that in other economy – 0.7 percent.

TABLE II. DYNAMICS OF THE MAIN MACRO INDICATORS OF BELARUS

Indicators	2018	2019	Succession of events in February, 2020			Succession of events in December, 2020	
			2020	2021	2022	2020	2021
GDP							
Rate of a gain of GDP, %	3.1	1.2	0.6	1.5	1.1	1.0	0.8
Rupture of release, %	0.1	0.1	- 0.6	- 0.2	- 0.3	- 0.4	- 0.5
CPI, 4 quarter to 4 quarter last years, %	5.6	5.0	5.3	4.5	3.9	5.1	4.4
Refunding rate, %	10.3	9.8	8.9	8.2	7.4	9.8	10.2
Average salary							
BYN / month	958.1	1090.9	1165	1225.6	1285.7	1257.8	1367.3
Gain of a nominal wage, % in comparison with the previous year	17.1	12.3	6.8	5.2	4.9	12.7	8.7
Nominal exchange rate							
Belarusian ruble/ Dollar US	2.04	2.09	2,312,36	2.42	2.1	2.2	2.4
Belarusian ruble /Euro	2.4	2.33	2.49	2.62	2.68	2.5	2.8

Source: [6]

The fact that the country “suspended” rates of development in 2019 is confirmed by calculations of the Belarusian analysts Mironchik N. and Levikhinoy A. (figure 1).

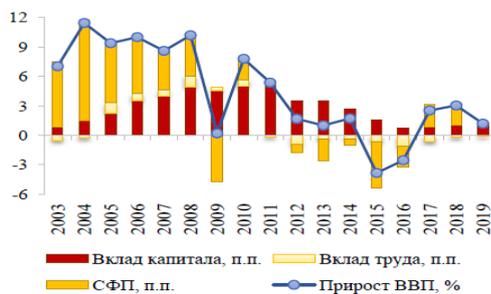


Fig. 1. Dynamics of GDP growth [7]

From the provided data in figure 1 it is visible that also the contribution of work and the capital in a gain of GDP. Capital in the country was reduced, especially it concerns the enterprises and the organizations, was financed, as occurs in the current year generally at the expense of the loan capital, but not as at the expense of own means (what confirms a settlement indicator of leverage which since 2016 steadily is more than unit). Such provision of the enterprises and organizations in national economy led to the fact that the external debt to which growth also promoted limitation of crediting of legal entities, lack of long-term savings and insufficiency of means of financial market began to collect the accelerated rates.

To correct this situation sees possible, first of all, in creation of conditions for inflow of investments, in particular, for the domestic significant enterprises. For increase in return

from investment injections it is important to stimulate accumulation of intangible assets. Mironchik N. and Levikhina A. [7] claim that one of the reasons of a low performance of national economy and decrease in growth is the small stock of the intangible assets reflecting intellectual property rights, promoting forming of “knowledge base” in the country and promoting digitalization. Besides intangible assets (the software, the organizational capital, patents, etc.) stimulate digital innovations.

Digital innovations are the main driving force of digital transformation which leads to significant changes and modification of the economic relations, changes a production process, transforms interaction of people, stimulates their creative thinking; changes quality and consumption level. The benefit of digital innovations consists as in emergence of new products and digital services, in an opportunity and forming of the environment for the new markets and business models, and in increase in efficiency in public sector and forming of the digital government.

In the rating of readiness for the digital government Belarus has positive dynamics. The republic moved from the 49th place in 2016 to the 38th place in 2018 (figure 2).

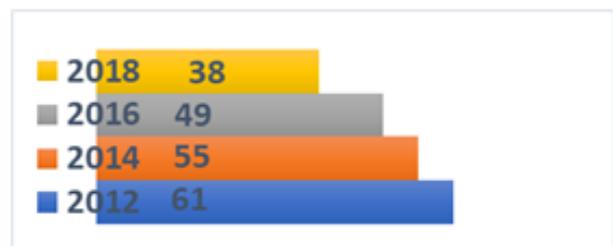


Fig. 2. Rating of readiness of Belarus for the digital government of 2012-2018 [authors researches]

Following the results of 2020 the country receded a little and took the 40th place in rating, but the index of readiness for the electronic government of Belarus in comparison with 2018 grew by 5.8 percent in 2020 [8].



Fig. 3. Rating of readiness of Belarus for the digital government 2020 [9]

Let's note that the way of any state to the digital government lies through a stage of the electronic government.

Thus, the country passed from High-EGDI in 2016 to Very-High-EGDI in 2020. It is explained by start of the centralized project to the digital government which was mortgaged in the National strategy of sustainable social and economic development until 2030, including several initiatives connected with development of ICT in various sectors of the economy. Also the fact that the purposes "Strategies of development of informatization in Republic of Belarus for 2016 – 2022" began to be implemented in 2015 for the purpose of the ICT expansion in the service industry of the electronic government is positive. In this strategy it is noted that the share of ministerial procedures and public services which will be rendered in electronic form has to make not less than 75 percent by 2020. One more initiative – "The state program of development of digital economy and an informational society for 2016 – 2020" defines the concept of "digital transformation" of economy and is directed to effective introduction of digital tools.

Assessment of accomplishment of summary target indicators of this state program within households showed the following dynamics - figure 4.

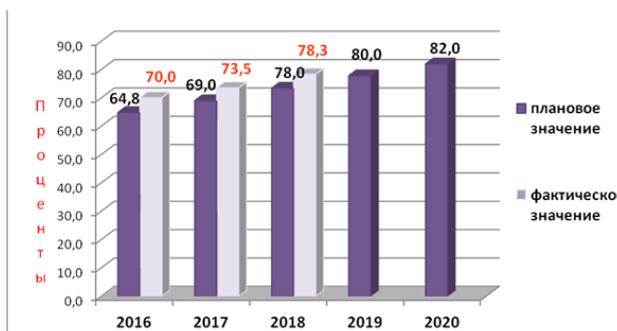


Fig. 4. A share of the households having access to Internet network, % [10]

Within the specified program of the Government the following directions of development were allocated:

1. stimulation and development of information and communication infrastructure;
2. stimulation of infrastructure of informatization;
3. digital transformation.

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In all three directions calculations of efficiency of program implementation in 2019 were carried out.

At the initial stage of implementation of the State program extent of accomplishment of the directions was determined by formula 1:

$$E_t = \frac{\left(\frac{V_{fi}}{V_{pi}} + \left(1 - \frac{V_{fi}}{V_{pi}}\right) \times K_i\right)}{n} \quad (1)$$

where E_t is efficiency of accomplishment of direction no. 1 of the program in the analyzed reporting period;

n – quantity of target indicators in direction no. 1 of the program;

V_{fi} – the fact of accomplishment i-go of a target indicator of direction no. 1 of the program in the analyzed reporting period;

V_{pi} – the plan of i-go of a target indicator of direction no. 1 of the program in the analyzed reporting period;

K_i – the coefficient considering extent of influence of all risk factors on achievement of planned value of a target indicator.

For direction no. 1 the settlement indicator "Development of information and communication infrastructure" was equal to 1:

$$E_{2019-1} = \frac{\frac{34,2}{34,2} + \left(1 - \frac{34,2}{34,2}\right) + \frac{89,8}{88,0}}{2} = 1$$

For direction no. 2 the indicator "Implementation of technologies of the electronic government and development of infrastructure of informatization" made 0.98:

$$E_{2019-2} = \frac{\left(\frac{27,9}{50,0} + \left(1 - \frac{27,9}{50,0}\right) \cdot 0,91\right) + \frac{70,0}{60,0} + \left(1 - \frac{70,0}{60,0}\right)}{2} = 0,98$$

$$K_1 = \frac{1559000 - 151000}{1559000,0} = 0,91$$

For direction no. 3 the indicator "Transformation of business processes by means of ICT in all spheres of society" was 0.88 and paid off as follows:

$$E_{2019-3} = \frac{\left(\frac{59,0}{55,0} + \left(1 - \frac{59,0}{55,0}\right) + \frac{95,3}{90,0} + \left(1 - \frac{95,3}{90,0}\right) + \frac{3,0}{7,0} + \left(1 - \frac{3,0}{7,0}\right) \cdot 0,09 + \frac{99,98}{96,0} + \left(1 - \frac{99,98}{96,0}\right)\right)}{4} = 0,88$$

$$K_1 = \frac{3719959,36 - 3403054,69}{3719959,36} = 0,09;$$

At the second stage efficiency evaluation of accomplishment of the directions on a formula is carried out:

$$E_{pp} = \frac{\sum_{j=1}^m E_{tj}}{m}, \quad (2)$$

where E_{pp} is efficiency of accomplishment of the directions of the program in reporting year;

m – quantity of tasks in the direction;

E_{t_j} – efficiency of accomplishment of j -y of a problem of the directions of the program in reporting year.

As a result of the analysis were obtained the following data (table 3):

TABLE III. IMPLEMENTATION OF THE STATE PROGRAM

Directions	Name of the directions	Indicator	Value
no. 1	Information and communication infrastructure	E1	1.0
no. 2	Informatization infrastructure	E2	0.98
no. 3	Digital transformation	E3	0.88

^a Source: [10]

At the third stage the efficiency of program execution in general for 2019, proceeding from efficiency of accomplishment of the directions and summary target indicators was determined by formula (3):

$$E_p = \frac{\sum_{i=1}^k E_{pp_i} + \sum_{h=1}^d \frac{C_{f_h}}{C_{p_h}}}{k + d} \quad (3)$$

where E_p is efficiency of program execution;

k – quantity of the directions of the Program;

d – quantity of summary target indicators of the Program;

E_{pp1} – efficiency of accomplishment of the directions of the Program in the reporting analyzed period;

C_{f_h} – the actual value of a summary target indicator of the Program in the analyzed reporting period;

C_{p_h} – planned value of a summary target indicator of the Program in the analyzed reporting period.

The indicator of ER of efficiency of program execution calculated by a formula (3) yielded the following results [10]:

$$E_{2019} = \frac{1 + 0,98 + 0,88 + \left(\frac{80,0}{80,0} + \frac{82,8}{81,0} + \frac{21,3}{20,0} \right)}{3 + 3} = 0,99$$

In general, the performance indicator of program implementation to aspire to unit that allows to speak about success of its accomplishment and efficiency of the government in 2019.

Labor market will become the further direction of digital transformation in the nearest future. A number of experts in the field claim that automation and robotics will significantly affect work arrangements and human capital managements in the near future. It will be necessary to create qualitatively new jobs with high-performance work and skills of the maximum use of the last technology achievements.

IV. CONCLUSIONS

Summarizing the aforesaid, it is necessary to emphasize that Belarus, has potential in the field of digital technologies, potential in the field of forming of the digital government, however so far the economy works below the digital

opportunities. The measures and tools provided by national concepts and state programs lay the foundation of the digital transformation directed to creation of full-fledged digital economy. For example, in the Resolution of Council of Ministers of Belarus no. 438 “About the list of state programs of scientific research for 2021-2025” (28.07.2020, 5/48239) the following purposes are allocated:

- to reach indicators within digital transformation at the level of the world countries in the field of economy, the social sphere and a state administration, robotics and artificial intelligence, use of digital technologies in space researches;
- cross-branch and digital transformation of the branches of economy, digital transformation of commodity markets, services, capital and labor power, development of digital infrastructure and ensuring security of digital processes; transfer of the rendered services and ministerial procedures to an electronic form;
- applied use of scientific results and digital technologies for creation of hi-tech and competitive products, decrease in import, material and power consumption of production, optimum use of natural resources, increase in level of health service and health of the nation, reliability assurance and reliability of digital information, increase in efficiency of public administration and the social sphere;
- creation and development of the digital information ecosystem constructed based on the digital platforms of the branches of economy and “the smart cities” interacting among themselves in the automated mode [11].

Introducing digital technologies and carrying out the planned purposes, the government and business can not only stimulate and accelerate digitalization in economy of Belarus, but also increase indicators of economic growth in the country that in turn, will stimulate inflow of the foreign investments and improving competitiveness in the world market. It is also worth noting that it is necessary to forget about the fact that implementation of digital technologies is inevitable also digital transformation to stop any more. If to delay with this process, then the country will be in outsiders for a long time and to carry out a role of catching up.

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