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THE EFFECTIVENESS OF DIGITAL TECHNOLOGIES AND ECONOMIC GROWTH

TINATIN MSHVIDOBADZE

Associate Professor

Gori State University, Georgia

tinikomshvidobadze@gmail.com

Abstract. The article describes the impact of digital technologies on the level of social and economic development of the society, provides a rating of the largest IT companies in terms of the volume of business capitalization. The necessity of digital transformation of the management of the socio-economic development of society and organizations is substantiated. The research used groupings of economic activities that directly influence the development of the digital economy. Using the data of regression models, the coefficients of GDP elasticity from the development of the studied sectors were calculated and used to forecast GDP under the development influence of the studied sectors while maintaining the existing trends. A forecast of GDP growth in Ukraine has been constructed, taking into account the processes of digitalization of the economy in accordance with certain trends. The forecast dynamics of changes in GDP under the influence of the IT sector development until 2023 was also illustrated. The results showed that stimulating the development of information and communication technologies has significant prospects for activating digitalization processes in all spheres of the economy and society and increasing GDP.

KEYWORDS: DIGITAL TECHNOLOGIES, DIGITALIZATION, ECONOMIC GROWTH, MODELLING, GDP.

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INTRODUCTION

A theoretical understanding of the impact of increasing information flows on the current socio-economic system can be revealed in post-industrial and information concepts.

Changes in manufacturing processes, the reorientation of production from the formation of material goods to the delivery of services, the globalization of economics are pointed out by the theorists of the digital society as the more fundamental features of the latest type of society caused by informatization (Kluver, 2015).

The digital economy is not a separate industry, but simply acts as a virtual addition to the real traditional economy. Digitalization of the society ensures the establishment of relations between the government, business and the public using the latest information technologies, includes socio-economic events on the Internet platform, mobile and touch networks. The digital economy is based on ability

The introduction of the digital economy makes it possible to increase labor productivity, business competitiveness and the well-being of citizens. To realize the digital economy, first of all, it is necessary to expand access to the Internet, because today the Internet is the most important element of economic development.

The processes of digitalization of the economy and social relations contribute to the deepening of interaction between all subjects of the market environment, which transcends national borders, creates the preconditions for GDP

growth, increases labor productivity, innovates and spreads in all walks of life.

Materials and methods

The basis of the technological concept was a large number technological innovations in the field of information and communication technologies that have become available to a wide range of consumers. The latest technologies are considered to be the most important indicators of the change of economic concepts and they are often referred to as the driving force behind the formation of the economy. (Ilin, 2020).

The digital economy is based on the introduction and widespread use of large amounts of information storage and processing technologies (big data, cloud computing), Internet of Things, information technology, cybersecurity technologies, robotics, and comprehensive automation. Most of the processes and industries and other areas of development of innovative technologies that change the human role in the economic system.

Without the ability to model socio-economic phenomena and processes, it is impossible to imagine a modern management system at its various levels. Modeling is used to diagnose the current state and development prospects of management facilities, to identify cause-and-effect relationships, to study development trends and mechanisms for the formation of socio-economic phenomena and variability in

$$GDP_f^t = GDP_e^t + (K_c * T_c^t * GDP_e^t) \tag{1}$$

formula 1.

where GDP_f^t - forecast value of GDP in year t under the influence of sector development;

GDP_e^t - extrapolation forecast value of GDP in period t;

K_c - elasticity coefficient of GDP from the development of a particular IT sector;

T_c^t - forecast growth rate of the sector in the year t, %.

processes, to identify areas for improvement life.

Using the data of regression models to calculate the elasticity coefficients of GDP studied sectors that can be used to forecast GDP while maintaining trends under the influence of the development of the sectors studied.

GDP growth forecast under the influence of forecast growth (Yakubiv, 2015) of certain sectors of the digitalization of the economy implemented according to the formula 1.

In particular, according to a Chinese market study, in just one month of quarantine, e-commerce platforms reported more than 200% increase in demand for more food and more than 75% increase in demand for non-food products. Certain businesses that worked primarily with customer contact also increased their sales through established and improved internet platforms for this purpose. The most successful e-businesses whose online commerce volume has increased in China during the quarantine period include: selling cars on electronic platforms, delivering ready-to-eat food and beverages.

Work, online learning services, online travel platforms, and also, the spread of COVID-19 have led to advances in artificial intelligence technology that helps brands improve customer data platforms and data capabilities with a combination of online and offline data. Besides, the spread of the coronavirus has accelerated the use of 5G to facilitate online shopping and has had an impact on the accelerated construction of "smart cities". The online direction and the entertainment industry have been strengthened to retain customers.

Data collection

According to Hlinenko and Daynovskyy, E-commerce also has many advantages in emergencies, the device of which

can be quarantined in connection with the rapid spread of the coronavirus epidemic (Hlinenko and Daynovskyy, 2018).

According to studies conducted in China, the Ukrainian market may also be extrapolated, as the number of Internet users and related services has also increased significantly during the quarantine period in Ukraine (NVB. 2020).

Although Ukraine has not created a proper regulatory framework for the development of the IT sector the Impact of globalization processes as a response to new demands in the market environment the information and telecommunications industry is evolving quite rapidly. This is confirmed by statistics, showing rapid growth ales volume of value-added services by enterprises working in the field of IT technoligises. Table 1 shows the current trends in the main components of the Ukrainian economy and society digitalization industry Classification of Economic Activities (CTEA) (State Statistics ..., 2020).

In 2015-2020, there is a rapid increase in sales of products and services of enterprises. Working in the field of information and communication, as well as the share of the sector in the GDP of Ukraine. The fastest growing (five times more than in the studied period) is the growth of IT products, in particular the development and introduction of software, consulting in the field of IT technologies and related activities. At the same time, share this type of activity in GDP increased by 3.5% during the study period, indicating a rather significant innovative shift.

In the development of the economy and society the IT sector currently employs almost 180,000 specialists and the number of employees is constantly growing. According to experts, the main factor in the development of the IT industry in Ukraine is a sufficient number of qualified specialists, state non-interference in the development of IT business and a favorable taxation mechanism that allows to develop IT in small businesses and not pay extra profit tax.

Table 1. Dynamics of production volumes of products (services) of the economy in Ukraine.

| Types of economic activities | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Growth 2020/2015 |
|-----------------------------------|---------|---------|---------|---------|----------|----------|------------------|
| Telecommunications | 43833.3 | 45927.7 | 48639.7 | 52080.3 | 55775.3 | 64034.8 | 46.1 |
| Specific weight in GDP, % | 3.0 | 2.9 | 2.4 | 2.2 | 1.9 | 1.8 | -1.2 |
| Computer programming | 21432.3 | 32007.4 | 52304.1 | 79149.2 | 107748.4 | 143163.5 | 568.0 |
| Specific weight in GDP, % | 1.5 | 2.0 | 2.6 | 3.3 | 3.6 | 4.0 | 2.6 |
| Provision of information services | 7381.3 | 8581.7 | 12662.4 | 16753.7 | 23528.6 | 31668.9 | 329.0 |
| Specific weight in GDP, % | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.4 |

Table 2 Forecast indicators of digital transformation of the economy and society in Ukraine:

| Indicators | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|------|------|------|------|------|------|------|------|------|------|
| Domestic market (ICT), USD billion | 2.0 | 2.5 | 3.0 | 4.5 | 6.0 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 |
| GDP growth in terms of digital transformation | 0.5 | 1 | 2.0 | 3.5 | 4.5 | 6.0 | 7.5 | 9.0 | 11.0 | 14.0 |
| Share of the digital economy in total GDP, % | 3% | 5% | 8% | 11% | 15% | 20% | 28% | 40% | 52% | 65% |

According to experts from the Institute for the Future of Ukraine, "Ukraine now has significant funding for the economy in the context of its technology consumption, ie the pace and scale of modernization of economic sectors and the field of life is much lower than its neighbors. Overall, according to the level of consumption of ICT products and services, one can make a conclusion about the level of modernization of the country and its level of productivity and efficiency, which means competitiveness. To achieve \$ 1 trillion in GDP by 2030, the level of consumption of ICT products will increase significantly in the coming years, primarily due to the implementation of large-scale national projects (Semjachkov, 2017).

According to Institute for the Future of Ukraine for digital transformation – "from priority sectors of the economy to areas of life such as medicine, education, transport, ecology, tourism, etc." (Ukrainian Institute for..., 2020).

Considering the impact of digital transformation of the economy on GDP in developed countries is also major IT development trends in Ukraine, the "Digital Agenda of Ukraine" experts have developed a forecast.

The possible development of the national economy and the digital transformation of society is shown in Table 2.

These forecasts are relative and can be implemented in the field of digitalization in the context of the formation and implementation of targeted state policies in the country, as

well as the development of an effective mechanism for its implementation in all areas of management and economic activity.

Using Formula 1, GDP forecast values were calculated under the influence of information development trends.

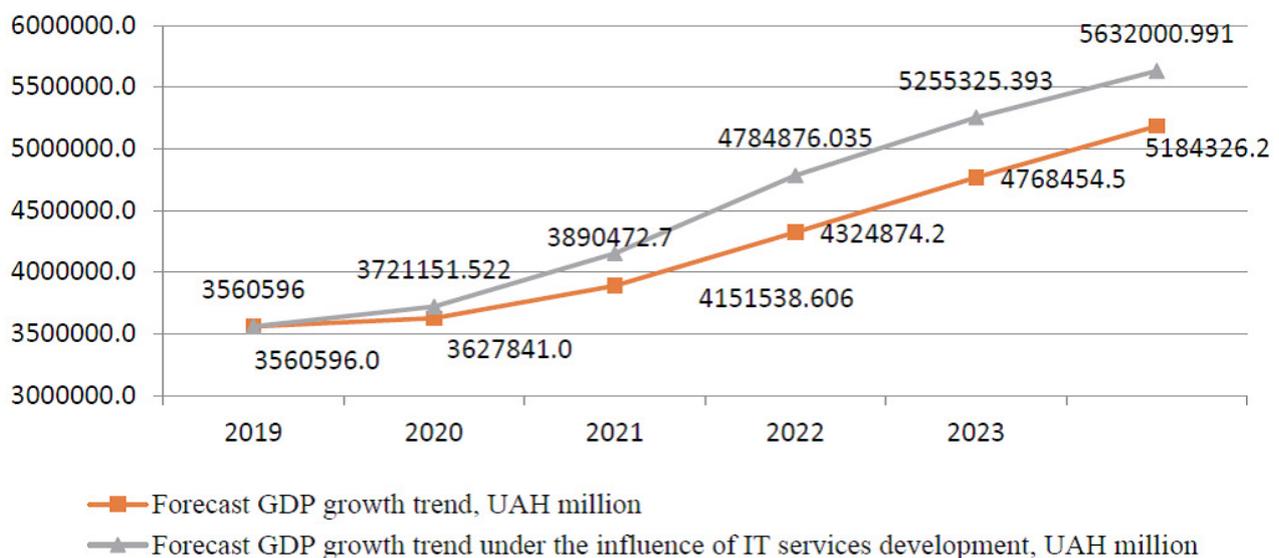
Results

According to the results of forecasting the development of the information services sector using computer technologies, it was found that in the forecast period (2019-2023), in case of a 25% growth of this sector, GDP growth will be 47.3% forecast growth of 45.6%, excluding the impact of these sectors.

Consequently, while maintaining the constant influence of existing trends and external factors, increase the volume Information services using computer technology will be 25% by 2023, which, from 2022, will have a significant impact on GDP growth. This is primarily due to the intensification of information processes in all areas of production, management, market and social activities, of which the development of e-marketing and commerce is an essential part.

Calculations using Formula 1 show that by 2023, despite significant growth in the IT market.

Taking into account past trends, its impact on GDP is

Fig. 1. Forecast of Ukraine's GDP growth under the influence of the IT sector development in accordance with certain trends.

lower than in developed countries, i.e. it will only lead to an increase in its GDP 5.7% of gross domestic product (GDP) forecast. This condition is primarily related to insufficient levels of consumption past IT services in the Ukrainian economy. Fig. 1 reflects the forecast dynamics of GDP change under the influence of IT sector development until 2023.

Thus, the results of the modeling of the impact on the economic growth of digital technology development show the possibility of accelerating the growth rate of Ukraine's GDP by influencing the development of the IT sector in line with certain trends.

CONCLUSION

Applying the proposed approaches to modeling the impact of digital technology development on economic growth

makes it possible at the regional and individual territorial levels.

Improve the process of developing regional digital transformation programs with the main implementation of mechanisms to eliminate digital gaps between areas, types of economic activities and social institutions.

Analysis of the impact of digital technology development on economic growth has also shown that despite sufficient terms of strong scientific base and human potential, Ukraine lags far behind developed countries the level of development of industrial production in information and communication technologies and equipment, as well as entirely depends on imports in this field.

Stimulating the development of industrial production of information and communication technologies has important prospects for deepening digitalization processes in all sectors of the economy and society and increasing GDP.

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