

THE WORLD DEVELOPMENT OF THE DIGITAL ECONOMY: THE MAIN DEVELOPMENT STRATEGEMS

Olena Taranukha¹

Abstract. The digital economy allows to compose the new business models, digital platforms and services, which create new types of economic activity, as well as the transformation of traditional industries. Due to the industries transformation to the digital economy there is the transformation of the world economy, or rather the economy itself is being digitized. The purpose of the paper is to reveal the essence and features of the digital economy formation and to consider what significant transformations will take place in the world by the analysis of major trends in the near future. Accumulating all the concepts, we can say that the digital economy is the rather complex term, but we can assume that its development is based on the key components. According to forecast estimates, the most advanced retail companies will begin implementing the service of virtual and voice search of goods by 2022. This will require from the company the better understanding of the consumers wishes, their interests and intentions. Consider the main technological development trends for 2020–2025 based on the data of the major consulting agencies and the consulting company "Cartner". Figure 2 shows the forecast curve of the new technologies development. Innovative development triggers that will actively influence the technology development include the following: the Authenticated Provenance, Low-Cost Single Board Computers at the Edge, Self-Supervised Learning, BMI (Brain Machine Interface), active development of "Packaged Business Capabilities" services, Digital Twin of the Person and Composable Enterprises. The peak of disappointments will be Social Distancing Technologies and Secure Access Service. The source of expectations will be the development of Carbon-Based transistors technology and Human digital Ontologies. The formation of a productivity platform will be based on trends in Self-Development and Self-Education. Digital IT trends grow, evolve and acquire new properties of social technologies that can influence the structure of the community, form dependencies and demand. Therefore, companies, large corporations and government need to move to more flexible composite business architectures. The modular business model is based on four basic principles: modularity, efficiency, continuous improvement and adaptive innovation. This business model allows to move from rigid traditional planning to a flexible response to rapidly changing business needs. In general, it creates opportunities for innovative approaches, reduces costs and improves partnerships. It is important to pay attention to the other technologies in the new business model such as bundled business services, data factories, private 5G networks and embedded artificial intelligence. Thus, as a result of the research it is proved that the digital world is a completely new order of life, which requires to change our thinking. The person should be always focused on the new technologies and methods in order the enterprises remain competitive and constantly developed, it will promote the economy development and the growth of well-being of the society. So, taking into account the global trends in technology development, Ukraine has to adapt to the new standards quickly and implement innovative solutions for the economic development. The digitalization of the economy, on the one hand, is the key to economic success, on the other hand, it is the driving force in the conditions of the conceptual understanding of the digital economy essence. The growth of the quality and innovation level of domestic goods and services should provide not only sustainable economic growth, but also competitive advantages with further integration into the EU. At the same time, there is the relevant need of the scientific and technological research, the formation of a certain business ("digital") culture, the implementation of smart city ideas in Ukraine based on the development of local communities and the emergence of new initiatives and proposals for innovative solutions.

Key words: Digital economy, digital components, digital trends, Cloud Technology, IIoT, Augmented Reality, Big Data, Spectrum Technology Platform, Hype Cycle Technologies.

JEL Classification: E27, D40, F55

Corresponding author:

¹ National Transport University, Ukraine.

E-mail: e.taranukha@ukr.net

ORCID: <https://orcid.org/0000-0001-6787-0877>

1. Introduction

The digital economy is becoming an integral part of the world economy. The core of the digital economy are undoubtedly the digital technologies. The digital economy allows to compose the new business models, digital platforms and services, which create new types of economic activity, as well as the transformation of traditional industries. Due to the industries transformation to the digital economy there is the transformation of the world economy, or rather the economy itself is being digitized. Modern economic conditions stimulate the investment to digital transformation, as emerging markets try to increase their demand for technology in order to stimulate further growth. At the same time developed markets are looking for the new ways to reduce costs and to introduce the innovations.

Therefore, the digital economy research will not only develop the digital potential of industries, but will also bring the economy to the new level with the ability to avoid a global crisis in the future. However, as digital technologies become more sophisticated and integrated, causing the transformation of society and the global economy, the issues of the digital technologies impact on the development of national and global economies remain insufficiently studied.

The purpose of the paper is to reveal the essence and features of the digital economy formation and to consider what significant transformations will take place in the world by the analysis of major trends in the near future.

In order to achieve the goal and solve the tasks we have used the general and specific research methods: abstract-logical method and critical analysis – to identify the essence of the concept of digital economy and its components; methods of analysis and synthesis, graphical and tabular methods – to assess key trends, and determine the main strategies of the world digital economy development for the next 2021–2023. The

research results, conclusions and proposals have been substantiated by an integrated approach.

2. Methodology of research

The current wave of digital transformation unites the biological, material and digital worlds. The new concept has emerged – the digital economy. It is in our time that humanity on the base of accumulated knowledge of digital technologies during several decades, has approached the new qualitative leap: industry has become ready for the transition to fully automated production systems, the states has become ready and have the ability to provide services online (e-government), transport is preparing for the introduction of autonomous driving without drivers, the service sector is ready for the use of robots (Glaxo Smith Kline plc., 2019).

Analysis of recent publications. The issues of the digital economy impact have been researched in scientific works of the following researchers: B. Van Ark, R. Inclar, M. Timmer, D. Sifchlag, A. Krimes, R. Cleo, F. Stevens, T. Nibel, W. Isaacson, S. Brand, J. Wales, E. Williams, B. Gates, B. Elbrecht, D. Engelbart, J. Licklider, J. Von Neumann, E. Peters, S. Huntington, S. Haller. The problems of digital economy development and transformation processes were considered by Ukrainian and foreign scientists, in particular, V. Apalkova, S. Veretyuk, P. Drucker, S. Kolyadenko, I. Karcheva, B. King, R. Lipsi, L. Lyamin, I. Malik, V. Pilinsky, Y. Pivovarov, K. Skinner, E. Toffler, V. Fishchuk, K. Schwab and others.

Since the digital economy term has been appeared, many scholars and practitioners have made adjustments to the definition of this category. However, the definitions analysis (Karcheva, Ogorodnya, Openko, 2017; Deeva, Deleichuk, 2018; Kolyadenko, 2016; Skorobogatova, 2019) confirms our opinion that there are no significant differences between them. In most foreign sources, the emphasis

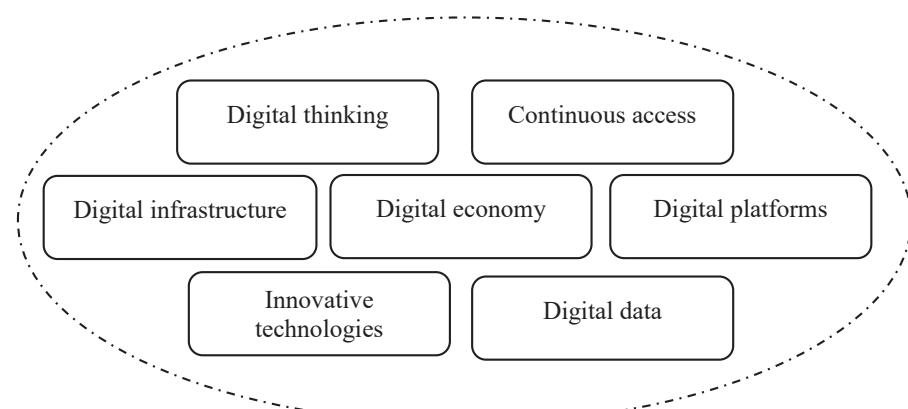


Figure 1. Key components that form the digital economy concept

Source: formed by the author

is made on the technologies and related changes in the ways in which economic agents interact (Miller, Claire, 2017; Readiness for the Future of Production Report, 2018; Glaxo Smith Kline plc., 2019). Specific types of technologies or some forms of changes in economic processes may be mentioned. The digital economy definition is often replaced by a list of areas of its impact on the economy and the social sphere.

Accumulating all the concepts, we can say that the digital economy is the rather complex term, but we can assume that its development is based on the key components presented in Figure 1.

The digitalization results are the higher productivity of business and communications, customer satisfaction increase, and in modern conditions, the rapid increase of the development efficiency and competitiveness. This is the major factor in development, because it requires constant progress and innovation.

3. Results and discussion

The leading scholars research concludes that identifying of the digital economy trends makes it possible to predict global market shifts in real time. It is important that such forecasts should help the heads of government departments, companies, financial advisors and top management of corporations consider future changes in business, industry or global development, using the tools of scenario and forecast analysis.

Undoubtedly, it will lead to the rethinking of the format of large technology corporations. Well-known technology giants such as the American corporations "Facebook", "Apple", "Amazon" and "Google", and the Chinese "Alibaba", "Baidu" and "Tencent" will start changing the format of their activities on their own initiative. These companies influence will become so significant that it will be increasingly difficult to develop new profit scenarios. In order to be ahead of potential competitors, corporations will have to "undermine" their own markets and change the game rules to take into account all relevant risks (Chuprina, Orozonova, 2020).

According to forecast estimates, the most advanced retail companies will begin implementing the service of virtual and voice search of goods by 2022. This will require from the company the better understanding of the consumers wishes, their interests and intentions. According to analysts of the consulting company "Cartner", the result of the innovations introduction can be the revenue increase of e-commerce platforms by 30%, the increase of the attracting new customers rates, customer satisfaction and market share (Reputation Institute, 2019).

Consider the main technological development trends for 2020–2025 based on the data of the major consulting agencies and the consulting company "Cartner" (Global RepTrak 100, 2019). The

technological development features of the last decade allowed to define the following information trends of the modern world.

1. Active development of cloud services and technologies.

Cloud Technology provides the remote access, processing and storage of data on various devices. Their use eliminates the attachment to the workplace, which creates new opportunities in the labor market. They also provide a fundamentally new level of mobility and form the communities through the existence of private, public, hybrid "clouds".

2. The emergence of the Industrial Internet of Things – IIoT.

This is the concept of the computer network of physical objects ("things"), equipped with built-in technologies for interaction with each other or with the external environment. According to IDC more than 5.5 billion "smart devices" were used in the world in 2016. The contribution of the IIoT to the world economy could reach almost \$ 14 trillion by 2030. Currently, sensors and chips are used in home appliances, transport, industrial or commercial equipment, information systems (cloud technology), banking, public places (parking, entertainment, tourism), media and other areas. Unfortunately, IIoT is becoming a social technology capable of forming addictions and phobias (fear of implant chips, etc.).

3. "Swarm Intellect" use.

This is the collective behavior of different objects, each of which performs a number of simple functions, interacting with other objects. Like a swarm of insects, bees or flocks of birds, information systems developed on the basis of this principle provide decentralized process management through the collective work of all its elements, which are self-organizing in the process. Swarm intellect technology can be used in unmanned vehicles, power grids and during military and rescue operations (unmanned aerial vehicles, drones, military sappers, rescue workers, etc.).

4. Augmented Reality technologies active use (AR).

AR simplify and shorten the process of new product creating by replacing physical prototypes with virtual models compatible with real devices, you can see engineering errors or improvements effects in the early stages. These technologies can reduce the impact of the human factor and equipment repair costs, increase productivity and competitiveness in the market. AR technologies are also used to coordinate the activities of departments and employees and even to create work instructions and technical publications.

5. Rapid development of Big Data technology.

Big Data technology collect all possible information about individuals (users of social networks, shoppers, subscribers of telephone and telecommunications operators, survey and census data, etc.) and make the cluster analysis of this information, ie its "breakdown"

into generalized types of behavioral patterns in which some preferences (for example, in food or clothing) correlate with others (for example, political), which allows you to predict the behavior of relevant groups of people in the right field with the help of some information about them. Big Data analyzes the behavioral patterns and predictions of the preferences of each individual Internet user in order to provide him the information that is likely to be close and interesting to him.

6. 3D printer technology use in various spheres of life.

This is a peripheral device that uses a layer-by-layer method of creating the physical object based on a digital 3D model. This technology makes it possible to build the complex technological facilities for various fields of activity from office to medicine cheaper and faster.

7. Spectrum Technology Platform active implementation.

The system of services provides on the constant basis the target block-message formation for an individual – at his request or adapting to his interests. This service not only greatly simplifies and facilitates the information search process and provides the quick access to the required resource, but it also meets the current socio-economic trends – getting the "full package of services", the so-called comprehensive service with all the necessary information at the right time, place, format, etc. Eventually, the consumer ceases to notice the extent to which his needs and choices belong to him.

8. Rapid development of an artificial intelligence technologies.

The property of intelligent systems to perform creative functions, which are traditionally considered as exclusively human ability.

9. Formation of the human information ecology format.

Due to the information amount increase, the issue of the information space pollution, information overload of the person becomes more and more actual. It becomes difficult to find the information you need in a huge stream. It is important not only to be able to operate with information and use the information resources, but also to be able to form an information worldview.

10. Formation of new standards of information security.

Today the individual and collective security demand is becoming a megatrend. The information security can be considered on several levels and in several manifestations, but the essence remains following: information is a dangerous weapon. Therefore, in the framework of this trend, researchers analyze the personal data access, technical means of data processing and transmission, computer systems, personal freedom protection and the right of personal information space.

The scientists also consider the information terrorism as a violent propaganda effect on the psyche, which unable the person to evaluate the received information

critically. In addition to the use of official media, information terrorism is based on the spread of certain types of rumors. They strengthen the atmosphere of fear and terror created by terrorists.

Another aspect of this trend is cyberterrorism, which is defined by the researchers as an attack on information resources, intrusion into computer systems or networks which result in a threat to human life and health or in the occurrence of other serious consequences – violation of public safety, intimidation of the population, provocation of military conflict.

To the threats also belong the information or cyber-attacks – as independent influences and as components of a hybrid or information war. It is important to mention not only the technical and technological component of such communication, but also the content, which is high-tech in terms of forms, methods of submission and the level of its thoughtfulness. Today, the fakes creation is very widespread that undermine the system of information regulation (the creation of "noise" does not allow to understand where are the facts and where are the fictions). (Robinson, 2007).

11. Development of the Blockchain and Bitcoin technologies.

This is a chain of formed blocks of transactions built according to the certain rules. Initially, the term meant the distributed database of the cryptocurrency "Bitcoin". The World Wide Web uses Blockchain technology in order to manage the database that records Bitcoin transactions. The system operates in a decentralized manner, which means that the network operates on a user-to-user basis.

Figure 2 shows the forecast curve of the new technologies development. Innovative development triggers that will actively influence the technology development include the following: the Authenticated Provenance, Low-Cost Single Board Computers at the Edge, Self-Supervised Learning, BMI (Brain Machine Interface), active development of "Packaged Business Capabilities" services, Digital Twin of the Person and Composable Enterprises. The peak of disappointments will be Social Distancing Technologies and Secure Access Service. The source of expectations will be the development of Carbon-Based transistors technology and Human digital Ontologies. The formation of a productivity platform will be based on trends in Self-Development and Self-Education.

Digital IT trends grow, evolve and acquire new properties of social technologies that can influence the structure of the community, form dependencies and demand. Therefore, companies, large corporations and government need to move to more flexible composite business architectures (Martyniuk, 2020).

The modular business model is based on four basic principles: modularity, efficiency, continuous improvement and adaptive innovation. This business model allows to move from rigid traditional planning

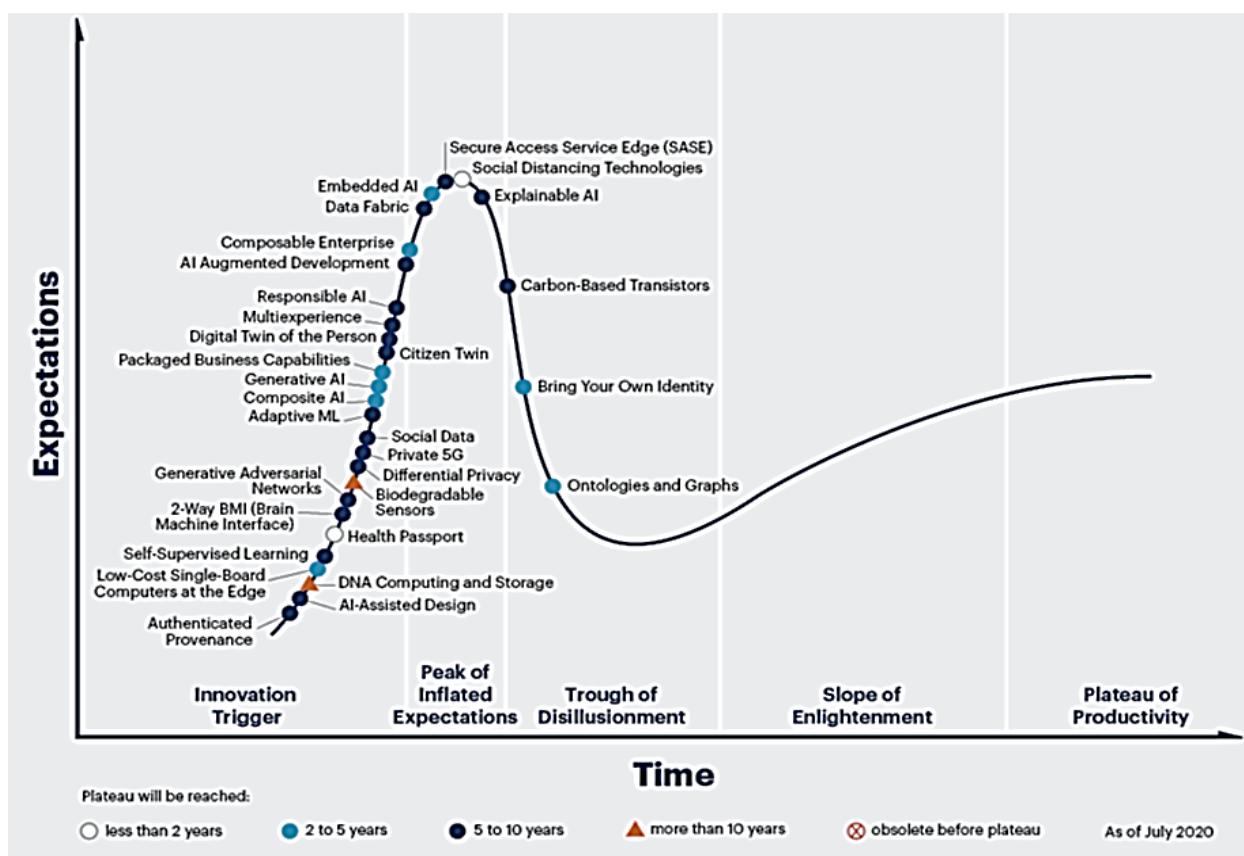


Figure 2. Hype Cycle for Emerging Technologies (2020)

Source: formed on the basis of (Chuprina, Oronozova, 2020)

to a flexible response to rapidly changing business needs. In general, it creates opportunities for innovative approaches, reduces costs and improves partnerships. It is important to pay attention to the other technologies in the new business model such as bundled business services, data factories, private 5G networks and embedded artificial intelligence.

4. Conclusions

Thus, as a result of the research it is proved that the digital world is a completely new order of life, which requires to change our thinking. The person should be always focused on the new technologies and methods in order the enterprises remain competitive and constantly developed, it will promote the economy development and the growth of well-being of the society.

So, taking into account the global trends in technology development, Ukraine has to adapt to the new standards

quickly and implement innovative solutions for the economic development. The digitalization of the economy, on the one hand, is the key to economic success, on the other hand, it is the driving force in the conditions of the conceptual understanding of the digital economy essence. The growth of the quality and innovation level of domestic goods and services should provide not only sustainable economic growth, but also competitive advantages with further integration into the EU. At the same time, there is the relevant need of the scientific and technological research, the formation of a certain business ("digital") culture, the implementation of smart city ideas in Ukraine based on the development of local communities and the emergence of new initiatives and proposals for innovative solutions.

The implementation of these and other priorities will contribute to the restructuring and digitalization of the national economy sectors. It will increase the availability of the relevant services and products, the innovation level of which will continue to grow.

References:

- Chuprina, M. O., & Oronozova, A. A. (2020). Global trends in the development of the IT industry and technology. Available at: <http://confmanagement.kpi.ua/proc/article/view/201193/201226> (accessed 19 November 2020).
- Cone a Porter Novelli company (2019). The Top Ten Trends in CSR Reporting in 2019. Available at: <https://www.conecomm.com/insights-blog/2019/10/10/the-top-ten-trends-in-csr-reporting-in-2019> (accessed 10 November 2020).

- Deeva, N. E., & Delechuk, V. V. (2018). Mechanisms for attracting investments by issuers in the conditions of digital economy development. *Molodyy vchenyy*, vol. 3(2), pp. 653–659. Available at: http://nbuv.gov.ua/UJRN/molv_2018_3%282%29_60 (accessed 19 November 2020).
- Fleishmanhillard (2019). Fleishman Hillard Celebrates Two Silver PR Lions with Aflac. Available at: <https://fleishmanhillard.com/2019/06/news-and-opinions/fleishmanhillard-celebrates-two-silver-pr-lions-2019/> (accessed 19 November 2020).
- Global RepTrak 100 (2019). The Top Most Loved Brands. Available at: <https://www.rankingthebrands.com/The-Brand-Rankings.aspx?rankingID=248&year=1206> (accessed 17 November 2020).
- Glaxo Smith Kline plc. (2019). Responsibility reports and data. Annual report 2019. Available at: <https://www.gsk.com/en-gb/responsibility/responsibility-reports-data/> (accessed 10 November 2020).
- Hype Cycle for Emerging Technologies (2019). Available at: <https://iidf.ru/media/articles/trends/gartner-nazval-tehnologii-budushchego-versiya-2019-goda/> (accessed 19 November 2020).
- Karcheva, G. T., Ogorodnya, D. V., & Openko, V. A. (2017). Digital economy and its impact on the development of national and international economy. *Financial space*, vol. 3(27), pp. 13–21.
- Kolyadenko, S. V. (2016). Digital economy: preconditions and stages of formation in Ukraine and in the world. *Economy. Finances. Management*, vol. 6, pp. 106–107.
- Martyniuk, O. A. (2020). The impact of digital technologies on the development of business social responsibility. *Economics: time realities. Scientific journal*, vol. 4(50), pp. 78–86. Available at: <https://economics.opu.ua/files/archive/2020/No4/78.pdf>
- Miller, A., & Claire, C. (2017). How Jeanirole's Work Helps Explain the Internet Economy. The New York Times. Available at: <https://www.nytimes.com/2014/10/15/upshot/how-jeantiroles-work-helps-explain-the-internet-economy.html> (accessed 19 November 2020).
- Reputation Institut (2019). Global RepTrak 100. Available at: <https://www.reputationinstitute.com/about-ri/press-release/reputation-institute-says-its-reputation-judgement-day-2019-global-reptrakr> (accessed 19 November 2020).
- Robinson, G. E. (2007). Jihadi information strategy: sources, opportunities, and vulnerabilities. *Information strategy and warfare*. Ed. by J. Arquilla, D.A. Borer. New York.
- Skorobogatova, N. (2019). Conceptual bases of formation of sustainable development of society in the context of Industry 4.0. *Economic Bulletin of NTUU "KPI"*, pp. 388–400. DOI: <https://doi.org/10.20535/2307-5651.16.2019.182748>
- Readiness for the Future of Production Report (2018). Insight Report. In collaboration with A. T. Kearney. World Economic Forum, 266 p. Available at: http://www3.weforum.org/docs/FOP_Readiness_Report_2018.pdf (accessed 19 November 2020).