ЦИФРОВА ТРАНСФОРМАЦІЯ ЕКОНОМІЧНИХ ПРОЦЕСІВ

Актуальність. Цифрова трансформація формує нову реальність. Вона розвивається дуже швидкими темпами за рахунок інновацій. Технології і інновації змінюють свою направленість під впливом зовнішнього оточення та перетворюються з технологічних інновацій у інновації у сфері економічних процесів та реалізації бізнес-моделей.

Мета та завдання. Метою даної наукової статті є дослідження подальшої трансформації економічних процесів та бізнес-моделей в Україні та світі. Завданнями даного дослідження є: визначити сфери впливу цифрової трансформації; розглянути створення різних видів цінностей: дослідити сучасні технології економічного розвитку; проаналізувати позитивні зміни від цифрової трансформації економічних процесів.

Матеріали та методи. Порівняльний аналіз, системний аналіз, теоретичне узагальнення наукових досліджень, контент-аналіз, структурно-логічний аналіз, групування, моделювання. Також наукові дослідження розроблено на основі даних державної служби статистики, наукових публікаціях.

Результати. У статті визначено сфери впливу цифрової трансформації: економічний уклад під впливом цифрових технологій (зміна: традиційних ринків, державного управління, соціальних відносин); джерела доданої вартості та структура економіки (формування ефективних економічних процесів завдяки цифровій інфраструктури); функції механізму розвитку економіки до інститутів, які функціонують на цифрових платформах; ринкове середовище (бізнес-моделей) як єдине середовище, яке оптимізує розвиток рівнів економіки і технологій та посилює їх взаємодію (нормативне регулювання, інформаційну інфраструктуру та безпеку, кадрове забезпечення). Розглянуто створення різних видів цінностей: економії на витратах, цінності отримання досвіду, цінності співучасті суб'єктів.

Досліджено сучасні технології економічного розвитку: штучний інтелект, шарні обчислення, математичне моделювання, блокчейн, кіберфізичні системи, роботизація, 3-D технології, адаптивні технології, технології ідентифікації, «Інтернет речей».

Висновки. В сучасному світі формується нова парадигма подальшого розвитку і полягає вона, насамперед, у цифрових трансформаціях економічних процесів та бізнес-моделей. У ході цих процесів змінюються умови ведення бізнесу, бізнес-процеси та ринки, скорочується час операції та вартість транзакцій завдяки цифровим платформам.

Цифрові бізнеси охоплюють ринки та створюють конкурентні умови для зниження цін. Користувачі платформ швидко збільшують перехід до більш привабливої цінової пропозиції. У цей час, здійснюється зниження вартості транзакцій, що впливає на попит на товари/послуги і призводить до підвищення долі цифрових ринків. Підприємницькі моделі, які до цього ефективно функціонували, поступово змінюються на платформні. Традиційні операції у галузях, секторах, ринках перетворюються у платформні.

Ключові слова: цифрова трансформація, економічні процеси, бізнес-моделі, технології, розвиток.
Digital transformation is shaping a new reality. It develops at a very fast pace due to innovations. Technologies and innovations change their orientation under the influence of the external environment and turn from technological innovations into innovations in the field of economic processes and implementation of business models.

Aim and tasks. The purpose of this scientific article is to study the further transformation of economic processes and business models in Ukraine and the world. The tasks of this study are: to determine the spheres of influence of digital transformation; to consider the creation of various types of values: to investigate modern technologies of economic development; analyze positive changes from the digital transformation of economic processes.

Materials and Methods. Comparative analysis, system analysis, theoretical generalization of scientific research, content analysis, structural and logical analysis, grouping, modeling. Also, scientific research is developed on the basis of data from the State Statistics Service, scientific publications.

Research results. The article defines the spheres of influence of digital transformation: the economic structure under the influence of digital technologies (changes in: traditional markets, state administration, social relations); sources of added value and structure of the economy (formation of effective economic processes thanks to digital infrastructure); functions of the economic development mechanism to institutions that function on digital models and at different levels (markets, types of economic activity, industries, spheres of activity); technological level of development (advanced technologies, digital platforms); the market environment (business models) as a single environment that optimizes the development of economic and technological levels and strengthens their interaction (normative regulation, information infrastructure and security, human resources). The creation of different types of values is considered: cost savings, the value of gaining experience, the value of the participation of subjects. Modern technologies of economic development are studied: artificial intelligence, cloud computing, mathematical modeling, blockchain, cyber-physical systems, robotics, 3-D technologies, additive technologies, identification technologies, "Internet of Things". Positive changes from the digital transformation of economic processes are analyzed.

Conclusions. In the modern world, a new paradigm of further development is being formed, and it consists, first of all, in the digital transformation of economic processes and business models. In the course of these processes, business conditions, business processes and markets are changing, transaction times and transaction costs are reduced thanks to digital platforms.

Digital businesses are capturing markets and creating competitive conditions to drive down prices. Users of the platforms quickly make the transition to a more attractive price offer. At this time, the cost of transactions is reduced, which affects the demand for goods/services and leads to an increase in the share of digital markets. Business models that functioned effectively before are gradually being replaced by platform ones. Traditional operations in industries, sectors, and markets are turning into platform ones.

Keywords: digital transformation, economic processes, business models, technologies, development.

Problem statement and its connection with important scientific and practical tasks. Digital transformation is shaping a new reality. It develops at a very fast pace due to innovations. Technologies and innovations change their orientation under the influence of the external environment and turn from technological innovations into innovations in the field of economic processes and implementation of business models.


Allocation of previously unsolved parts of the general problem. However, the issues of transformative changes in the implementation of business models of the entrepreneurial sector remain unresolved.

Formulation of research objectives (problem statement). The purpose of this scientific article is to study the further transformation of economic processes and business models in Ukraine and the world.

The tasks of this study are:
- to determine the spheres of influence of digital transformation;
- to consider the creation of various types of values: to investigate modern technologies of economic development;
- analyze positive changes from the digital transformation of economic processes.

Materials and Methods. Comparative analysis, system analysis, theoretical generalization of scientific research, content analysis, structural and logical analysis, grouping, modeling. Also, scientific research is developed on the basis of data from the State Statistics Service, scientific publications.

An outline of the main results and their justification. Further global development and digital transformation consist in change (Pusenteylo, P.R., Humenyuk, O.O., 2018):
- economic structure under the influence of digital technologies (change: traditional markets,
state administration, social relations);  
- the main source of added value and structure of the economy (formation of effective economic processes thanks to digital infrastructure);  
- the functions of the economic development mechanism to institutes that function on digital models and at different levels (markets, types of economic activity, industries, spheres of activity);  
- technological level of development (advanced technologies, digital platforms);  
- the market environment (business models) into a single environment that optimizes the development of economic and technological levels and strengthens their interaction (normative regulation, information infrastructure and security, human resources).

Undoubtedly, a digital platform is a constituent element of digital transformation, as a digital platform where the interests of all subjects (participants) interacting on it collide. The main constituent elements of the platforms are: a trading platform (virtual), participants (entities), software, an idea for creating a business model and entities that implement it in life.

Modern scientists give their vision of the essence of the "digital platform". Thus, K. Sichkarenko believes that these are technological solutions that allow establishing digital interaction directly between participants, which will allow to exclude the participation of intermediaries and reduce the cost of operations (Sichkarenko, K.O., 2018).

L. Blahodyr sees that it is a mutually beneficial relationship between participants based on digital technologies, which allows creating economic value (Blahodyr, L.M., 2020).

We agree with the authors that by reducing the number of intermediaries in establishing connections between interested parties, it is possible to reduce transaction costs and create added value. It is the creation of added value and value for the consumer that drives the development of business structures.

Let's consider the creation of different types of values:

1. Cost savings: free (inexpensive) services, payment in installments, participation in capital distribution.
2. The value of gaining experience: consumers will gain power, all transactions are made only for the end customer.
3. The value of subject participation: creating chains, connecting access points.

As noted by M. Porter, any product is purchased by the consumer because it has some value, for which he pays the asking price (Porter, M.E., 1985). From a business perspective, it is the process of creating value for a product/service through the activities and functions performed within the business model.

B. Anderson believes that it is necessary to divide the value chain into links, taking into account the elements of aggregate value by stages of creation: the added value of the product - the cumulative value of the product - the value of the company (business model) - the value for personnel (Andersen, B.).

Note that these types of values are also created thanks to the implementation of entrepreneurial activities on digital platforms.

Digital platforms, as an ecosystem, consist of the following basic blocks (Mesenbourg, T.L., 2001):
- infrastructural (information and communication technologies, e-business infrastructure: networks, software, machinery and equipment);
- process (digital production and electronic business using computer networks);
- organizational (electronic trade, auctions).

The economy, which is built from a set of digital platforms, that is, on a platform basis, is formed from the use of external virtual trading platforms (platforms) connected to the ecosystem and existing in the ownership and management of third-party entities.

It can be argued that business conditions are changing, business processes and markets are changing, transaction times and transaction costs are being reduced thanks to digital platforms. This can be followed by the following algorithm:

Digital transformations of economic processes through the spread of digital platforms have a number of positive aspects, namely:
- the role of innovative development and its stimulation among business entities is increasing;
- consumer value is created by increasing product offerings and the quality of service provision for the end consumer;
- the transparency and openness of the markets is spread due to the absence of barriers to entering the markets;
- the time of transactions and business operations is reduced;
- the well-being of the participants (subjects) improves due to trust, the use of newer technologies, efficiency and standardization.

The socio-economic efficiency of economic activity on digital platforms increases.

Therefore, digital platforms have a number of advantages both for the implementation of business processes and for the post-war reproduction
(restoration) of the economy of Ukraine in general: stimulation of innovative development; creation of consumer value; transparency and openness of markets; reducing the time of operations; increasing efficiency.

In the world, there is a rapid growth of industries in which digital platforms are actively implemented. Let's consider the main ones in fig. 1.

![Fig. 1. Fields of activity and the main "operators" of platforms](image)

Undoubtedly, when making a theoretical justification for the further use of digital platforms, one should refer to the world experience of their functioning.

Let's consider the development strategies of several global players in the field of platform trade using the example of Amazon and Alibaba (Table 1).

### Table 1

<table>
<thead>
<tr>
<th>Areas of activity</th>
<th>Representatives of Internet trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon</td>
<td>Alibaba</td>
</tr>
<tr>
<td>Purpose of activity</td>
<td>Globalization of the brand. Absorbs a large number of companies and start-ups.</td>
</tr>
<tr>
<td>Sales</td>
<td>Direct sales model. Ecosystem of related services. Management of logistics and own warehouses. Delivery of products to consumers</td>
</tr>
<tr>
<td>Innovations</td>
<td>Technologies of artificial intelligence. Platform tools are in the &quot;clouds&quot; of service developers. Technologies in health care (study of the human genome)</td>
</tr>
<tr>
<td>Trade</td>
<td>Increasing the market share of retail trade in material goods. Own brands (lines) of clothing, consumer goods</td>
</tr>
<tr>
<td>Diversification of activities</td>
<td>Opening of a network of offline bookstores. Launch of automated minimarkets. Absorption of a chain of stores and ready-made food delivery services</td>
</tr>
</tbody>
</table>

Source: Compiled by the author

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*Fig. 1. Fields of activity and the main "operators" of platforms*

*Source: Compiled by the author*
The data in Table 1 allow us to assert that the following global strategic directions of digital development are: artificial intelligence technologies, "clouds", data analytics and computer programs.

The main "operator" of the Alibaba platforms distributes to almost 90% of the profiles of the Chinese population that has access to the Internet. At the same time, it installs and binds devices of citizens to one owner of the platform. Thus, there is a global absorption of subscribers, who over time become consumers of the services of this "operator".

However, along with world experience in Ukraine, there are a number of obstacles to further digital development, which are as follows:

1. **Legislative and institutional basis of digital changes:**
   - lack of regulation of the Internet of Things, regulation of cloud computing;
   - there are no (imperfect) incentives for the development of digital education;
   - lack of qualification requirements for digital skills for the population;
   - lack of a legal definition of digital rights (and delivery of this information to the population);
   - presence of financial risks associated with activities on digital platforms;
   - approval of Industry 4.0 at the state level;
   - lack of a digital transformation strategy for specific sectors of the economy;
   - low level of participation of state institutions and implementation of the Concept of Development of Digital Economy and Society (Digital Agenda of Ukraine);
   - inconsistency of specialized legislation with global challenges and opportunities (drafted bills are not implemented);
   - inconsistency of national, regional, regional, sectoral strategies and development programs for digital opportunities.

2. **Organizational measures to implement digital changes:**
   - lack of strategic actions regarding the introduction of digital platforms;
   - lack of developed infrastructure for IoT and smart cities;
   - non-connection (non-conduction, absence) of the Internet in many settlements (institutions, institutions);
   - lack of a list of digital professions;
   - low level of digital skills of representatives of institutions (civil servants, doctors, teachers, specialists in "places");
   - the development of digital skills in education is slow compared to the labor market;
   - fragmentary use of the potential of digitization tools in state institutions (social protection, education, environmental protection, medicine – e-health);
   - absence (non-development) of digitalization road maps, Industry 4.0;
   - availability of resource-intensive paper document flow when transitioning to digital business processes;
   - issues of digitization and cyber security, protection of personal data (weak implementation of the cyber security strategy) are not related to each other;
   - lack of synchronization of digital norms of Ukraine with the European space.

3. **Technical and infrastructural support of the digitization process:**
   - low Internet speed compared to European countries;
   - spread of broadband access to the Internet by 50-60%;
   - limitation of fixed connection of broadband access to the Internet with a speed of more than 100 Mbit/s (only 12% of the population);
   - diversity of state registers, state classifiers and directories (135 state registers owned by more than 40 authorities);
   - free access to not all data sets (state registers of data sets), which are legally defined as open;
   - access to state online services is about 5%;
   - low level of the digital component in terms of customer service and consideration of complaints from them;
   - incomplete digitized procedure for obtaining permits and certificates for business representatives;
   - statistical reporting is partially digitized;
   - information and communication services of customs are not standardized and not combined into a single system (there is no transparency);
   - global information and digital corridors practically bypass Ukraine;
   - low level of innovative activity in the field of hardware (programming, digital circuits, sensor and measuring technologies);
   - low level of coverage of the territory by digital infrastructures (absence of such separate infrastructures as: Internet of Things, electronic identification and trust);
   - low level of automation and digitization of public services due to weak motivation of government institutions.

4. **Financial levers of influence on digital transformation:**
   - the high price of connecting fixed broadband access to the Internet in rural areas (almost 2
- the integration of digital solutions is introduced without increasing digital competences;
- expenditures on the administration of the social sphere (over 13 billion/year);
- the amount of research and development investments is no more than 0.5% of GDP;
- Ukraine is limitedly integrated into international innovation chains;
- the cost of maintaining one state register costs the country 21 million hryvnias.

5. The ecosystem of obstacles to the development of digital trends:
- weak state policy regarding incentives and incentives for the development of the digital and innovative economy;
- the investment capital market is not sufficiently developed;
- outdated education system, teaching methods, lack of focus on STEM education, soft skills and entrepreneurial skills;
- imperfect models of technology transfer and consolidation of knowledge and skills;
- shortage of highly qualified personnel for the full development of digital transformation.

However, technologies are emerging that improve the conditions for conducting business and economic activities on digital platforms. Let's consider the main ones in fig. 2.

![Fig. 2. Basic technologies for activities on digital platforms](source)

Source: Compiled by the author

The transformation of business processes based on digital platforms is the dematerialization of the economy, free access to data, innovations in information technology support, development and implementation of new business models. That is, under the influence of digital platforms, changes are made in various spheres of human activity, allowing to improve the quality of his life and the speed of any processes (including business processes) (Topalova, I.A., 2022, Topalova, I.A., 2023).

Also, it is important to understand that there is an understanding of "digital divides" in Ukraine and the world, both in the technical sense and in the initial sense. Many subjects (participants) of digital platforms need to acquire digital knowledge and expand their digital competences (Kraus, N.M., Kraus, K.M., Osetsyky V.L., 2021).

By digital competences of market subjects, we mean the ability to: evaluate and validate information, critical thinking, readiness to use appropriate digital tools, creation and accumulation of digital resources, solving tasks through the use of digital technologies (State and prospects of the development of state electronic information resources, 2018).

Precisely, the consideration of digital knowledge in combination with the constant growth of digitalization becomes the main reference point for the development of economic processes.

Conclusions and perspectives of further
In the modern world, a new paradigm of further development is being formed, and it consists, first of all, in the digital transformation of economic processes and business models. In the course of these processes, business conditions, business processes and markets are changing, transaction times and transaction costs are reduced thanks to digital platforms.

Digital businesses are increasingly covering markets and creating competitive conditions to lower prices for their consumers. In turn, users of the platforms quickly make the transition to a more attractive price offer. At that time, the cost of transactions is reduced, which affects the demand for goods/services and leads to an increase in the share of digital markets. Accordingly, business models that functioned effectively before are gradually being replaced by platform ones. Traditional business processes, operations in industries, sectors, markets are transformed into platform ones.

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