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СУЧАСНІ ТЕОРЕТИЧНІ ЗАСАДИ ФОРМУВАННЯ РИНКУ ІННОВАЦІЙНИХ ТЕХНОЛОГІЙ В КОНТЕКСТІ КОНЦЕПЦІЇ НЕОІНДУСТРІАЛІЗАЦІЇ

Актуальність. *Актуальність проблеми розвитку сучасних теоретичних засад формування ринку інноваційних технологій в контексті концепції неоіндустріалізації сьогодні зростає через те, щонаукові дослідження, проведені численними фахівцями у сфері економіки, підтвердили, що інновації (особливо ті, що призводять до структурних трансформацій) відіграють центральну роль в стимулюванні довгострокового зростання країн. Однак, інновації, що стають причиною зміни техніко-економічної парадигми, стимулюють економічне зростання тільки в тому випадку, якщо вони широко поширюються в економіці, адже поява нових технологій, як правило, стимулює створення супутніх інновацій, пов'язаних з організаційними і бізнес-моделями. Отже, такі інновації самі по собі сприяють істотному зростанню економічної ефективності. Країни - світові технологічні лідери формують високу частку доданої вартості за рахунок використання результатів інтелектуальної діяльності (якими є інноваційні технології), при цьому міжнародний поділ праці відбувається не під дією природних розходжень у сировинних ресурсах, а на базі використання інтелектуального потенціалу, людського капіталу і високого технологічного рівня виробництва. Отже, однією з необхідних умов інноваційного розвитку є цивілізований ринок інноваційних технологій, як на міжнародному, так і на національному, і регіональному рівнях.*

Мета та завдання*. Метою статті є характеристика та розвиток сучасних теоретичних засад розвитку ринку інноваційних технологій в Україні, для чого необхідно визначення: інновацій, що призводять до зміни техніко-економічної парадигми; факторів, що впливають на розвиток ринку; методологічних принципів, згідно яких він відбувається; методичних підходів до розвитку і, в частині нашої країни, факторів, що заважають розвитку ринку інноваційних технологій в Україні.*

Результати. *Визначено фактори, що впливають на розвиток ринку інноваційних технологій, а саме: процеси деглобалізації, решорингу, автоматизації виробництва, зміни демографічної структури та соціального устрою суспільства, посилення державного стимулювання технологій. Класифіковано наукові підходи до визначення поняття «цифрова платформа», які розглядаються як: технологічна конструкція; бізнес-модель, корпоративна організація; відкрита, загальнодоступна інфраструктура для взаємодій між виробниками і споживачами; єдина інформаційно-управлінська система .Виявлено, що сучасний етап розвитку ринку інноваційних технологій характеризується наявністю декількох особливостей, які дещо корегують дію основних економічних законів, та сформульовано відповідні методологічні принципи розвитку ринку інноваційних технологій. Виявлено фактори, що заважають розвитку ринку інноваційних технологій в Україні.*

Висновки. *У статті викладено систематизовані теоретичні основи формування ринку інноваційних технологій в контексті технологічного розвитку Перспективним напрямком подальшого дослідження*

єформулювання понятійно-категоріального апарату ринку інноваційних технологій (у тому числі – дослідження особливостей інноваційної технології як товару.

Ключові слова: *науково-технологічний розвиток, ринок інноваційних технологій, інновації, фактори, методологічні принципи, державне стимулювання технологій.*

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MODERN THEORETICAL FOUNDATIONS OF FORMATION OF THE MARKET OF INNOVATIVE TECHNOLOGIES IN THE CONTEXT OF THE CONCEPT OF NEOINDUSTRIALIZATION

Topicality. *The urgency of the development of modern theoretical foundations for the formation of the market for innovative technologies in the context of the concept of neo-industrialization is increasing today because scientific studies conducted by numerous experts in the field of economics have confirmed that innovations (especially those that lead to structural transformations) play a central role in stimulating long-term growth. countries. However, the innovations that cause a change in the techno-economic paradigm only stimulate economic growth if they are widespread in the economy, because the emergence of new technologies usually stimulates the creation of related innovations related to organizational and business models. . Thus, such innovations in themselves contribute to a significant increase in economic efficiency. Global technology leaders are generating a high share of value-added through the use of intellectual outputs (which are innovative technologies), with the international division of labor occurring not on the basis of natural differences in raw materials, but on the basis of the use of intellectual potential, human capital and high technology. level of production. Therefore, one of the prerequisites for innovative development is a civilized market for innovative technologies, both at the international, national, and regional levels.*

Aim and tasks*. The purpose of the article is to characterize and develop modern theoretical foundations for the development of the market for innovative technologies in Ukraine, for which it is necessary to determine: innovations that lead to a change in the techno-economic paradigm; factors affecting market development; methodological principles according to which it occurs; methodological approaches to development and, in part of our country, factors that hinder the development of the market for innovative technologies in Ukraine.*

Research results*. The factors influencing the development of the market of innovative technologies are identified, namely: processes of deglobalization, outsourcing, automation of production, changes of demographic structure and social structure of society, strengthening of state stimulation of technologies. Scientific approaches to the definition of the term "digital platform" are classified, which are considered as: technological construction; business model, corporate organization; open, publicly available infrastructure for interaction between producers and consumers; unified information and management system. It is revealed that the modern stage of development of the market of innovative technologies is characterized by the presence of several features that somewhat correct the action*

of basic economic laws, and the corresponding methodological principles of development of the market of innovative technologies are formulated. The factors that hinder the development of the market for innovative technologies in Ukraine have been identified.

***Conclusion**. The article presents the systematic theoretical foundations of the formation of the market for innovative technologies in the context of technological development.*

***Keywords:** scientific and technological development, market of innovative technologies, innovations, factors, methodological principles, state stimulation of technologies.*

Problem statement and its connection with important scientific and practical tasks. The world economy, entering a post-industrial era, actively transforms the usual forms of economic relations, forms new mechanisms of entrepreneurial activity, transforms style and way of life. Innovation is a decisive factor in the development and transformation of the economy, acting as a catalyst in adapting the economies of individual countries to rapidly changing global conditions. At the same time, the main tool for innovative transformations are innovative technologies. The latest patent-protected developments can contribute to the effective innovation development of the country. Global technology leaders are generating a high share of value-added through the use of intellectual outputs (which are innovative technologies), with the international division of labor occurring not on the basis of natural differences in raw materials, but on the basis of the use of intellectual potential, human capital and high technology. level of production. One of the prerequisites for innovative development is a civilized market for innovative technologies, both at the international, national, and regional levels.

Analysis of recent publications on the problem. Practically all scientists consider innovations (including innovative technologies) in different markets (goods and services). This approach is fully justified for gradual and radical innovations. However, for the innovations that lead to a change in the techno-economic paradigm, such an approach is, in our opinion, impractical, since such innovations (and innovative technologies) can be used in almost all markets (both goods and services).

Therefore, we consider it necessary to consider the theoretical issues of the development of the market for innovative technologies.

Formulation of research objectives (problem statement). Thus, all of the above indicates the needdevelopment of modern theoretical foundations for the formation of the market for innovative technologies in the context of the concept of neo-industrialization. Therefore, *the purpose of the article is* to characterize and develop modern theoretical foundations for the development of innovative technologies market in Ukraine..

An outline of the main results and their justification. To characterize the modern theoretical foundations of the development of the market for innovative technologies, we define: innovations that lead to a change in the technical and economic paradigm; factors affecting market development; the principles according to which it occurs; methodological approaches to development and, in part of our country, factors that hinder the development of innovative technologies market in Ukraine.

Factors influencing the development of innovative technologies market

Deglobalization. The 2008 global financial crisis has led to the development of a reverse globalization process. Director of the BRICS Laboratory at Columbia University, MarcosTroicho, described this process as globalization [1], that is, a weakening of international economic ties, characterized by an increased role of factors related to national interests. Deglobalization is accompanied by a number of phenomena [2]:

– a slowdown in economic growth since 2008, which has led to increased demand for protectionist measures in many countries of the world;

– reduction in international trade as a result of weakening global demand and the introduction of import duties in several countries. The share of foreign trade in world GDP has fallen to 55% since 2008, although it has reached 60% by now. Annual growth of its volumes does not exceed 2% and is far behind the GDP growth rate;

– the reduction in the flow of international capital is mainly bank loans. The share of capital in world GDP fell from 16% in 2007 to almost 2%;

– reducing the rate of growth of labor productivity.

Resource. The weakening of foreign trade is accompanied by a re-pricing - the return of production abroad. Resourcing began in the US, helped by low energy costs as a result of the shale gas boom.

The main reasons for the rebound are wage growth and manufacturing problems in Southeast Asia. Previously low labor costs in China and other Southeast Asian countries have attracted production from around the world, but from 2005 to 2016 manufacturing wages in China's provinces have tripled and

manufacturers are beginning to look for new ways to reduce costs [3].

Among other reasons for the outsourcing are noted [4]:

– use by Asian factories of unauthorized suppliers or components;

– production of products that are worse than the samples;

– poor quality of the final product;

– intellectual property theft.

The advantage of rebounding is that production returns allow companies to simplify supply chains, provide shorter lead times and improve control over the manufacturing process. As a result, manufacturers can reduce order execution time and quickly adapt products to local consumers.

However, the main reason that hindered the re-hiring process was the lack of skilled personnel in developed countries, because in the last few decades, they have developed, above all, the services sector, which does not require a large number of skilled personnel. In industrial production, however, productivity has not been increasing for decades, and demand has been highly fragmented, and the need for innovation has long matured..

Production automation. According to the International Economic Forum [5], 29% of world production is automated. For comparison, in 2022 the share of machines and algorithms in working hours will be already 42%, in 2025 - 52%. However, it is estimated that only a quarter of jobs can be automated by more than 70%. Depending on the scope, automation indicators may vary: for example, in the field of data processing is currently automated about 47% of all processes, by 2022 will be already 62%, and in the field of decision-making - only 19% (up to 28% - up to 2022).

Changing demographic structure of society. Increasing life expectancy in developed countries is accompanied by declining birth rates. Currently, the same processes have begun in the rapidly urbanized countries of Asia, Africa and Latin America. In the future, the proportion of young people in the world population will decline and the proportion of people over 65 will increase. The general aging of the population will lead to a shortage of skilled workers. The Bureau of Labor Statistics estimates that by 2030 the relative proportion of the working-age population in the United States will drop to less than one dependent worker, leading to a shortage of workers. The same situation is observed in Europe, for example, in Germany the average age of the population is 46 years. For comparison, in 2000 this figure did not exceed 40 years, in 1970 - 34 years [6].

In addition to the demographic structure, the social structure of society is changing. In recent years, experts have spoken of a new social class of workers characterized by temporary or part-time employment, truncation of rights and social guarantees - the so-called precariat. The composition of this social layer usually includes [7]:

– able-bodied population employed on a temporary basis;

– people who work part-time or are interrupted by seasonal and part-time jobs;

– unemployed population;

– freelance population (free employment);

– migrants;

– students and interns.

The precariat is characterized by precarious social status - poor social security and lack of many social guarantees. Employees have an unstable income and can be unemployed at any time. However, they do not have the social guarantees provided by the employer. Many precariates are working for digital companies. These are Uber drivers, hired workers on YouDo. Such companies, as a rule, lack tangible assets and build businesses based on platforms based on computer algorithms. As a result, the precariat is not driven by humans, but literally by algorithms.

State promotion of technology development. Governments in many countries are introducing systems to stimulate the development of new technologies as a factor in the international competitiveness of national economies. For example, the Chinese government is actively promoting technological innovation, for which special national and regional awards in science and technology have been established. The implementation of the National Long-Term Plan for the Development of Science and Technology for 2006-2020 also promotes growth in science and technology, with local governments increasing their investment in technology annually. According to the 13th Five-Year National Science and Technology Development Plan, developed by the Ministry of Science and Technology, by 2020, China intends to increase average R&D costs to 500,000 yuan per person (approximately $ 78,000), or about by 35%, which will help narrow the gap with other developed countries [8].

In 2014, the Government of France launched a special program for the accreditation of technology projects aimed at promoting and demonstrating the country's achievements in this area. At first, 13 French cities were expected to become high-tech centers, but since then their numbers have grown. French innovative companies are introducing advanced technical and business models, gaining more and more popularity in the world through FrenchTech and FrenchFab accreditation programs. In addition, FrenchTech creates additional advertising for French entrepreneurs taking part in major industry events such as the ConsumerElectronicsShow (CES) International Consumer Electronics Show.

A characteristic feature of support for technology development by the German Government is the determination as the main instrument of financial support for research and innovation by the state. The state itself plays an active role in the field of research: up to 80% of the research activity of universities is carried out through funding, which is allocated through grants from five large scientific societies. In addition, the government provides financial support for the development of long-term and risky research in key areas of scientific, technological and industrial activities [9].

The South Korean government has set up the Presidential Committee on the Fourth Industrial Revolution of I-Korea 4.0, which will help create a new mechanism for economic growth, increase industry productivity and competitiveness, the quality of operational data and innovation, as well as the level of inclusivity and engagement. In preparation for the fourth industrial revolution, the Korean government plans to allocate $ 2 billion. USA to carry out projects in the field of research and development until 2022. The Government also intends to assist companies in building an exclusive communications network to support the Internet of Things concept, including 5G network development services, convergent information and technology services development, and software development for software companies, which will help them become major players in the international market for innovative technologies [2].

Innovations that lead to a change in the techno-economic paradigm

For the purposes of our study, among other classifications, we will select and rely on the innovation classification proposed by K. Perez [10] (Table 1):

Table 1

Classification of innovations

Type of innovation	Localization	Consequences
Incremental innovation (gradual innovation)	Result of activity of several persons. The area of use is a production site, a workshop, and very often not an enterprise in general.	Within 1-2 years can be essential for increasing productivity (within their own localization)
Radical innovation	The result of the activities of many people with different qualifications. Area of Use - Enterprises of a certain type of activity or several related activities.	They can be important not only for individual enterprises but also for the economy as a whole.
New technology systems (innovations that result in new technological systems)	The result of the activities of many people with different qualifications (usually with the support of the state). The area of use is the cause of such profound changes in technology that several industries can undergo significant changes. They can stimulate the emergence of completely new sectors of production and consumption. The corresponding changes are based on a combination of previous incremental and radical innovations and are accompanied by organizational and managerial innovations.	They are essential for the economies of the countries as a whole.
Change of techno-economic paradigms (innovations that lead to a change in the techno-economic paradigm)	The result of the activities of many people with different qualifications with the support of large corporations (usually with the support of the state). The area of use is a revolutionary change in technologies that are affecting the world economy.	They are the reason for changing the technological way.

Innovations that cause a change in the techno-economic paradigm can be divided into 3 classes:

1. Cyberphysical systems.

Scientists who study the phenomenon of the fourth industrial revolution (neo-industrialization, the concept of "Industry 4.0") [5, 11-13], conclude that its main difference is the use of information-technology concept in industrial production, which integrates computing resources to physical processes. In other words, in such a cyber-physical system, technological equipment and information systems are aggregated into a single control system for product value creation, that is, complete digitization of both industrial production and society as a whole.

The main characteristic of this process is that data and software products become the main value creation tool and key management mechanism for all technological processes, move to the cloud space, and the Internet becomes the main channel of data rotation. These processes lead to an increase in speed, accuracy, flexibility and, at the expense of this, controllability of all production and technological processes, achievement of high levels of complexity. This produces significant macro- and microeconomic effects, including reducing time spent on design and production, yielding significant productivity gains, increasing the number of new products and technological complexes, and ultimately, increasing profits. In particular, the industry's shift to digital technology is the basis for creating high-precision, ultra-fast and high-performance auto-controlled systems capable of mass-producing products that meet the individual needs of consumers. Given the increasing volume of processed operating data that industrial companies take into account when forming the value chain of a final commodity, technologies for widespread equipment connectivity and data collection (including industrial sensorics) and processing technologies (Bigdataanalytics) are key - first of all, predictive (predictive) analytics).

Predictive analytics, unlike diagnostic and descriptive, it is built on a proactive approach, which makes it clear that the equipment will fail before its actual failure. Predictive analytics solutions are crucially linked to smart industrial sensor solutions that allow real-time collection of data to compare it with historical data [14].

According to Frost & Sullivan [15], the dynamics of industrial enterprises' revenue from the implementation of Big Data analytics solutions will grow from $ 0.37 billion. in 2017 to $ 3.51 billion in 2022, key topics in the big data field include neural networks and deep learning. The growing need for speed, accuracy and efficiency in processing big data generated by numerous smart devices is driving researchers to find new solutions that can overcome the shortcomings of traditional algorithms that depend on manually developed features.

Robotics, industrial sensorics

Foreign experts [16] have identified a list of technologies that will have the greatest impact on the development of robotics, in particular:

– new materials (gallium nitride for transistors, soft crystals as a flexible base for new types of materials, a combination of industrial production of graphene (high strength and precision) on an industrial scale with existing microelectronics technologies);

– new energy sources, technologies for storage and collection of electricity (introduction of portable hydrogen batteries, emergence of distributed wireless charging networks, development of quickcharge technologies, wireless energy transfer inside the work, flexible translucent solar cells);

– interoperability robots and humans (control unmanned traffic (management system that will create a single information field for group management drones, which are in the same location), group management as a way to navigate (the collective navigation of robots when devices of different types of acting together in different environments (land, air), refine their coordinates to each other, constantly comparing relative positions and exchanging information about surrounding objects));

– artificial intelligence technologies for robots (increasing the efficiency of artificial neural networks through new hardware platforms, cloud services for machine learning (the emergence of cloud services that integrate, aggregate and give access to collective knowledge), the evolution of robot movements through artificial intelligence technologies , neurocomputer interfaces, the development of remote sensing feedback controls, natural language use and emotion recognition);

– sensorics (development of modular solutions, which include a set of hardware and software for the development of robots of different complexity, increasing the density of integration - in one chip will increase the number of measurement methods, improving the sensory capabilities of robots on a number of metrics: accuracy of face recognition, facial expressions, gestures, voice , emotions, noises, lowering the cost of lidars, radars and other sensors);

– new principles of drive mechanisms (non-collector motors, wave reducers in drive mechanisms, creation of fundamentally new types of motors, for example, on thermoactive crystals);

– technologies of cross-cutting design of robotic systems (reducing the 3D printing of metals and improving the quality of printing from plastic, the development of additive production and optimization of software, reuse of the old base for automation).

It should be noted that there are two major trends in the market for industrial robotics:

– development of cooperative robotics (cobots) capable of working on assembly lines at the same time and "paired" with a person;

– development of multitasking robotic installations (first of all - robotic "hands") with reconfigured functionality. The need for complex solutions of this type is connected, first of all, with the expected development of "non-conveyor" or "post-conveyor" production systems in mechanical engineering, which are regarded as one of the solutions that allow to provide deep customization of products without the need to resort to the "scale effect".

According to Frost & Sullivan, the global robot market will grow from $ 0.12 billion. up to $ 10 billion in 2017 in 2022.

2. Industrial Internet of Things (IIoT)

According to Frost & Sullivan, the main event of 2018 in the field of IIoT was the emergence of Edge analytics, based on wireless data networks. Edge-analytics technology for industrial data is quite new and predicts a significant increase in the number of connected devices using this technology. The total volume of industrial Edge devices will reach 5.6 billion units by 2020, which will provide a significant base for Big Data deployment. In addition, energy-efficient long-range networks are being developed to collect information from Internet of Things devices and inter-machine communications.

Another innovative technology is the development of a computing infrastructure that exists close to data sources such as industrial installations (eg, air turbines, magnetic resonance scanners), controllers (in particular, SCADA systems) and the like. Such a data processing organization can serve as an alternative to cloud computing, allowing you to access data from connected devices in real time and respond quickly to cyber threats.

Thus, digital data has become the new economic resource needed to create value and reap benefits, that is, the ability to control data is of strategic importance as it enables it to be transformed into "digital intelligence". In virtually any value chain, the ability to collect, store, analyze and transform data creates competitive advantages.

3. Digital technologies

Platform technologies allow people, devices and systems across the value chain to be integrated into a single information space, as well as provide suppliers, manufacturers and customers with all the necessary information in real time. Today, there are many definitions of concepts and classifications of digital technology platforms (Table 2).

Table 2

Scientific approaches to the definition of "digital platform"

Scientific approach	Definition
as a technological construction	"…are an environment in which code and content developers create programs and software, for example, in the form of operating systems or technological standards" [17]
as a business model, a corporate organization	"...multilateral markets that use business models that allow manufacturers and users to create value together by interacting with each other" [18] "are bilateral / multilateral markets with an infrastructure that operates online and enables transactions between different parties" [17]
as an open, publicly available infrastructure for interaction between producers and consumers	"…are hybrid structures focused on forming mutually beneficial relationships of a large number of independent economic agents, carried out in a single information space and aimed at creating value through direct interaction and transactions between several groups of third parties" [19] "…this is a system of algorithmic mutually beneficial the relationship of a significant number of

Scientific approach	Definition
	independent participants in the industry (or industry), carried out in a single information environment, which leads to reducing transaction costs by deploying a digital data suite and changing the system of division of labor. than the simple sum of the components. The platform includes hardware, software and services" [21] "…search engines, social networks, e-commerce platforms, app shopping, price comparison sites" [22]. It is "...an economic activity using an online reseller that provides a site through which independent employees or sellers can provide a specific product or service to customers" [23]
as a single information and management system	"…a set of ordered digital data based on ontological modeling; mathematical algorithms, methods and models of their processing and software-technical means of collecting, storing, processing and transfer of data and knowledge, optimally integrated into a single information-management system, intended for management of the target subject area with organization of rational digital interaction of interested subjects" [24]

Based on the above, it should be noted that digital platforms can be a key productive asset that will provide:

- efficiency and flexibility of the production process;

- integration of smart industrial equipment based on internet connectivity, cloud resources, security solutions, data analysis and "digital workforce" with logistics and sales processes to consumers (both businesses and individuals).

This demonstrates the need for systems of complex technological solutions that will provide in the shortest possible time the design and production of competitive new generation of products on the world level. Such systems are called "factories of the future" (which can be "digital", "smart" or "virtual"), based on a multidisciplinary approach to creating advanced manufacturing, which includes [25, 26]:

– creation of digital platforms, kind of ecosystems of advanced digital technologies. Based on predictive analytics and big data, the platform approach allows to unite the territorially distributed participants of the design and production processes, to increase the level of flexibility and customization taking into account consumer requirements;

– development of a system of digital models, both new designed products and production processes. Digital models must have a high level of adequacy to real objects and real processes (convergence of material and digital worlds that produce synergistic effects);

– digitization of the entire product life cycle (from idea, design, production, operation, maintenance to disposal). The later changes are made, the greater their cost, and therefore the center of gravity shifts to the design processes, within which the characteristics of global competitiveness or high consumer demands are laid..

In addition, platforms create value for their customers by removing barriers to effective interaction between members of different groups. The more obstacles, the more opportunities for platform development.

The favorable conditions for the development of a platform business may arise for the following reasons [27]:

– the lack of opportunities to expand the geographical reach of many sellers and, as a result, their focus on local markets;

– lack of communication channels: consumers and sellers are limited in sources of information about each other. Platforms create multilateral communication channels and provide the conditions for dissemination and retrieval of process participants;

– insufficient resources to invest in marketing and sales from local vendors: platforms are capable of providing powerful tools for advertising and finding new markets for a small fee;

– lack of legal and other mechanisms to ensure the transparency and reliability of transactions in most developing countries and in many specific markets. Platforms create automated patronage and insurance systems for their users.

Methodological principles according to which the market of innovative technologies develops

The current stage of development of the market for innovative technologies is characterized by the presence of several features that somewhat correct the effect of the basic economic laws.

First, the existence of a technological gap between countries in different stages of techno-economic development leads to the so-called "multi-stage" scenario of exchange of innovative technologies. In other words, the parity exchange of the latest technologies takes place only between the developed countries, and the technologies of the previous levels are transferred to the markets of other countries, which allows the companies of the developed countries to increase profits at the expense of "stretching" over the life cycle of the technologies. Thus, the average "age" of US firms' technology during the first transfer is: to a firm that is located in industrialized countries - about 6 years, in a developing country - about 10 years, and to third-party enterprises - more than 13 years [28]. This conclusion allows us to formulate a modern methodological principle for the development of the market for innovative technologies, namely:

– principle of technological breaks.

Secondly, in the period of neo-industrialization, incl. the emergence of new industries and related infrastructure creates a mismatch between the techno-economic and socio-institutional spheres, that is, the institutional environment that regulates socio-economic processes needs to change, because it determines the ability of the economy to support the spread of breakthrough technologies and innovations, maximize their economic effects application. This allows us to form the following methodological principle for the development of the market for innovative technologies, namely:

– the principle of the systemic presence of the state in the economy, which is implemented in the system of planning and stimulation of scientific and technological development.

Third, there is a shift from disparate firms to a single network of large and small companies connected by an electronic network on the basis of the Internet, which work closely in technology, product quality control, innovation planning. This defines the formulation of the third methodological principle of development of the market of innovative technologies, namely:

– principle of network development.

Fourth, a new paradigm has emerged - open innovation - the use of targeted knowledge flows (both internally and externally) to accelerate internal innovation processes, as well as expand markets for the external use of innovation. This paradigm assumes that enterprises can and should use both external ideas and internal developments if they are to improve their technology. That is, the fourth methodological principle can be formulated as:

– the principle of open science.

Fifth, the role of the most valuable resource as a source of economic value began to belong to intellectual property and information, not to land, labor and capital. Therefore, the fifth methodological principle is as follows:

– the primacy of intellectual property and information.

Sixth, there is an increase in social differentiation and a reduction in the middle class as a result of the decline in middle- and low-skilled jobs. That is, the sixth methodological principle can be formulated as:

– lifelong learning.

Methodical approaches to the development of the market of innovative technologies

The development of an innovative technology market in the context of the concept of neo-industrialization is linked to the emergence of such a new phenomenon as "hyperconnectedness": multi-level relationships in relations between people, between consumers and producers, citizens and governments [29]. Hyperconnection has led to a change in the way business is organized, including the use of platform technologies.

Many scholars say that the main consequence of the emergence of platforms was a new phenomenon - multilateral markets. A multilateral market exists if there are such factors at any time [30]:

– presence of two or more different parties (groups) of participants (users);

– the value gained on one side increases with the number of participants on the other side (on the other side);

– the presence of an intermediary to provide direct interaction between participants of different parties and to provide network effects created on one side for the other party.

We analyze the differences between one-sided and multilateral markets.

In one-sided markets, value is created linearly: within the value chains, ie raw materials, materials, components, through the production stages, they are transformed into a product that is sold to the consumer. However, to increase revenue, it is necessary to reduce the cost of the value creation process. Second, the

expansion of such markets requires the growth of tangible assets and large investments.

Multilateral markets are growing by increasing the number of participants (including platform users).

The same tendency towards platformization is observed in the market of innovative technologies. Thus, a European Enterprise Support Network (EnterpriseEuropeNetwork) has been set up in the EU, which in fact is a technology transfer network [31]. Here, network centers are regional organizations (or consortia of specialized regional organizations) that provide technology transfer services. They are interconnected through a specialized information platform, representing a kind of virtual organization. At the national level, the network centers are coordinated by a national coordinator and at the international level by a transnational coordinator.

This approach (network of brokers) is more suitable for transnational technology transfer as it takes into account cultural differences, diversity of national innovation systems and legislation, etc. Organized in this way, a network of national brokers provides customers with better services by attracting a wider range of potential technology partners.

This network serves as a tool to support the implementation of innovative transnational technology transfer projects as well as European science and technology programs.

Other models of international technology transfer networks are:

– Technology Brokers Network is an association that brings together technology transfer professionals. Examples of such networks are the Association of University Technology Managers, Alliance of Technology Transfe rProfessionals;

– specialized technology transfer networks created as special projects. For example, a network created by the World Intellectual Property Organization - the Network of Technology and Innovation Support Centers (WIPO TICS), which offers qualified patent database support, or the Green Technology Transfer Network (WIPO GREEN);

– technology marketplaces - networks that implement an open innovation tool and bring together customers and technology solution providers.

Such approaches are being implemented in technologically advanced countries, to which, unfortunately, our country does not yet apply. For example, in Ukraine, for example, the share of high and medium-tech sectors in industrial production in 2016 was 2.9% and 10.9%, respectively, while in developed countries: Switzerland, respectively, 14.6% and 21 , 3%, Israel - 38% and 12.6%, South Korea - 21% and 33.4%, Germany - 3.7% and 28%, the Czech Republic - 4.2% and 42% [32].

In addition, there is a gradual degradation of innovation potential in Ukraine. Thus, according to the State Statistics Service of Ukraine, the number of researchers in our country is shrinking rapidly (from nearly 144,000 people in 2010 to about 59,000 people in 2017), GDP (ie, research and development costs across all sources in percent of GDP)

in 2017 it was only 0.45%, the dynamics of the number of enterprises engaged in innovation is negative (in 2017 there was a reduction in the number of enterprises engaged in innovation activities by 9% compared to 2016 to 16.2% of all industrial enterprises) .

Therefore, we consider it necessary to investigate what factors impede the development of the innovative services market in Ukraine.

Factors hindering the development of the innovative technology market in Ukraine

1). The legislation does not fully regulate the development of innovative activity. In particular, the conceptual apparatus, organizational, economic and financial measures, as well as intellectual property protection issues have not been fully completed. In this regard, the regulatory framework available today does not ensure reconciliation of interests of the state, regions, business structures and population in the implementation of the model of innovation and technological development. Clear definition of goals and objectives, defining the role and place of each of the leading economic entities in innovative development and establishing effective links between the state, business, science and education.

2). The critical situation was with the state funding of science and education. The share of fundamental science funding (without which innovations that lead to a change in the techno-economic paradigm) cannot be reduced every year. The Ministry of Education and Science of Ukraine plans to reduce the volume of government procurement for training in higher education institutions directly contradicts the Government's stated goal of innovation and technological development of Ukraine.

3). Functional insufficiency of innovative infrastructure is observed. At present, there is no integrity, there is a "detachment" of individual elements of the innovation infrastructure from each other. In view of this, the completeness of the innovation infrastructure should be achieved through the development of

technological infrastructure, training infrastructure, consulting, information, financial and other types of infrastructure.

4). The development of innovative activities is mainly due to the own funds of enterprises, but the catastrophic shortage of these funds does not allow to support and develop innovative processes..

5). Limited funding from the state, certain difficulties in terms of taxation, leasing, intellectual property have provoked the loss of interest of small and medium-sized enterprises to the implementation of innovative activities, the loss of human resources of the scientific sphere, the reduction of the volume of research, the destruction of scientific infrastructure.

6). There is no effective mechanism for interaction between state, regional, municipal authorities, business structures and the population. Today, the implementation of the public-private partnership principle does not have the same effectiveness as in foreign countries, despite the fact that there are some changes in the legislation on public-private partnership. Constraining legal and organizational factors do not allow public-private partnerships to become a locomotive for the implementation of innovation-investment projects at different levels.

Conclusions and perspectives of further research. The article presents the systematic theoretical bases of formation of the market of innovative technologies in the context of technological development. A promising direction for further research is the formulation of the conceptual and categorical apparatus of the market for innovative technologies (including - the study of the features of innovative technology as a commodity.

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