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AMOSHA, O.I., PIDORYCHEVA, I.Yu., and ZEMLIANKIN, A.I.
Institute of Industrial Economics, the NAS of Ukraine,
2, Maria Kapnist St., Kyiv, 03057, Ukraine,
+380 44 200 5571, admin@econindustry.org

TRENDS IN THE WORLD ECONOMY DEVELOPMENT: NEW CHALLENGES AND PROSPECTS

Introduction. *Globalization 4.0 and the underlying technological innovations have been leading the world into a new phase of development — cyber-physical systems and talents — an era that has no historical precedent in terms of scale, speed, and depth of changes.*

Problem Statement. *The latest waves of globalization and industrial revolution bear unprecedented challenges and development prospects that countries, regions, corporations, and individuals must be aware of in order to adequately respond and to make adequate decisions.*

Purpose. *Identification and analysis of key development trends in the world economy related to globalization and revolutionary technological transformations in their unity and interdependence, one of which is the development of a network economy as the next economic revolution based on trust, negotiations, diplomacy, and a culture of mutual assistance.*

Materials and Methods. *Analysis and synthesis, comparative analysis and systemic approach have been used for this research. Scientific reports of international organizations, private and public corporations, foreign and Ukrainian scholarly research publications on this issue have been used as references.*

Results. *The main features of Globalization 4.0 and the fourth industrial revolution, which are fundamentally transfor-ming the global economic, social, and geopolitical landscape have been generalized and systematized. The periodization of the globalization waves, as compared with the phases of the industrial revolutions, has been made. This has allowed a comprehensive analysis of the processes of globalization and technological development in their unity and interdependence and further substantiation of the key development trends in the world economy.*

Conclusions. *Globalization 4.0 and the fourth industrial revolution have been transforming all areas of society throughout the world, and therefore should be taken into account when making strategic decisions at all levels of management, from corporate to international.*

Keywords: globalization, Globalization 4.0, industrial revolutions, the fourth industrial revolution, network economy, and innovation.

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In the last decade, all processes and phenomena have speeded up significantly. The world has become more complicated and unpredictable, and the network of global economic ties has been getting much wider than ever before [1, 2]. Globalization[1] has got updated features and, according to experts of the World Economic Forum (WEF), has moved to a new phase of development, Globalization 4.0 [3, 4]. These unprecedented transformations in the world development in terms of size, speed, and scale are caused by the fourth industrial revolution based on the development of cyber-physical systems[2], blurring of the boundaries between physical, virtual, and biological spheres of life [5]. Under such conditions, innovations become more important than ever and, according to the founder and president of the WEF, Klaus Schwab, "is a decisive competitive advantage" [6]. Xi Jinping, the President of People's Republic of China, the country that confidently pursues the policy of technological transformations and claims leadership in many key technologies of the fourth industrial revolution[3], said at the WEF in Davos, "We need to relentlessly pursue innovation. Only with the courage to innovate and reform we can remove bottlenecks blocking global growth and development." [8].

The revolutionary technological breakthroughs that began with the digital revolution and accelerated in the second decade of the 21st century have radically changed the system of communications, the ways in which economic relations are organized and coordinated. The world moves from hierarchies to a more "horizontal network reality" [2, p. 140] associated with widespread use of information and communication technologies (ICT), in particular, the Internet that supports personal independence and prevents centralization [2, p. 161]. A network society and, thanks to it, a new network economy that is called the next economic revolution are formed [9]. This economy has arisen as a result of the convergence of national economies, the acceleration of global technological transformations, and now, according to experts, creates completely different opportunities for innovation [10].

There have been many theoretical and applied researches dealing with the development of network economy. This issue had been in the focus of international organizations, private and public corporations [9, 11—13], and individual researchers since the late 19th — early 20th centuries. Some of them pay attention to macroeconomic problems [14] and network relationships between companies [15]. For example, Daron Acemoglu, Ufuk Akcigit, and William Kerr [14] have empirically shown that the shocks experienced by corporations and industries may spread through a network of relationships in the economy, expanding and amplifying their initial impact. In the collective monograph [15], the phenomenon of network interaction of corporations has been studied, regularities of the formation of interfirm networks have been analyzed, advantages and disadvantages of forms of network interaction of corporations have been identified, the efficiency of interfirm relations has been interpreted, and the system for its assessment has been offered.

Other scholars are interested in the relationship between innovations and the network manner of economic activity organization [16, 17], the role of networks in innovation processes [18, 19], including social connections [20, 21], and the features of innovation policy in the network economy [22]. For example, Olav Sorenson [22] has examined the role of social networks in innovation

[1] Globalization is a phenomenon caused by tangible and intangible flows of ideas, people, goods, services, capital, and datax.

[2] Cyberphysical systems are complex engineering systems based on the integration of computer algorithms and physical components (tangible things) integrated with the Internet and its users.

[3] The technologies that shape the future global socio-economic environment are the following key technologies 4.0: artificial intelligence and machine learning, virtual realities, blockchain and big data, new advanced materials and nanomaterials, biotechnology, neurotechnology, geoengineering, space technology (the list of these technologies is constantly expended) [7, p. 1].

processes and identified the possible consequences of various political interventions that may either reduce the importance of social ties for innovation development or change the relationship patterns so that they may foster innovation.

To emphasize the nature of innovation in the network economy, some researchers use the term "networked innovation". For example, Jacky Swan and Harry Scarbrough have defined network innovations as those that are created through interconnections and communications that are different in terms of hierarchical and market mechanisms of cooperation [23]. The concept of network innovation has not been yet generally accepted in the research community, but it seems to be a valuable idea because it reflects the peculiarities of the innovation process under the conditions of the network economy and the development of the fourth industrial revolution.

In Ukraine, A. Hrytsenko and E. Pesotska [24], O. Palagin, V. Solovyov, and V. Senchenko [25], K. Sichkarenko [26], and L. Fedulova [27] have studied the theoretical aspects of the problems related to the formation of network economy and network structures and the network organization of innovative activity.

However, the problems related to the development of the network system in the world economy in the context of the unfolding globalization and the transition to the fourth industrial revolution have not been adequately covered in research because of their novelty. The researches are focused mainly on the solution of the problems typical for the digital age of the end of 20th — the early 21st centuries, instead of new challenges brought by the second wave of the digital revolution.

The purpose of this research is to identify and to analyze key trends in the world economy related to the globalization and revolutionary technological transformations in their unity and interdependence, one of which is the development of network economy as the next economic revolution based on trust, negotiation, diplomacy, and culture of mutual assistance.

DIGITAL REVOLUTION 3.0 AS PRECONDITION FOR UNFOLDING OF THE FOURTH INDUSTRIAL REVOLUTION

Each wave of globalization and technological innovation promotes economic growth for entire countries and regions. For example, during the industrial boom around the world, there appeared industrial centers like Manchester in Great Britain, the Ruhr region in Germany, and Pittsburgh in the United States. At that time, their strength was based on natural resources and developed industry: coal, steel, chemical and automotive industries. However, over time, the mineral reserves were depleted, their extraction became more expensive, the corporations became unprofitable and gradually closed down. The population lost jobs and left the regions. For example, in Ruhr, within 50 years (from 1956 to 2006), the number of coal mines decreased 23.5 times, and the number of miners downed 16.8 times [28]. The next wave of innovation and globalization lifted economies that managed to structurally transform or shift to the sector of services. Thanks to direct government support, after the opening of the *Emscher Park* Internationale Bauausstellung (an international construction exhibition), the industrial Ruhr has become a center of knowledge, technology, and services. As a result, the ratio of jobs in industry and services has changed dramatically: in 2005, the coal and metallurgical enterprises together employed a little bit more than 60 thousand people against 720 thousand people, in 1957 [28].

The Digital Revolution 3.0 moved the world to a new phase of development: digital, virtual, personal, and mobile, which affected the system of communication between people, corporations, and governments and radically changed the social, economic, and geopolitical reality [29, p. 48, 187].

The introduction and mass dissemination of computer information and communication technologies and, in particular, the Internet as “key technology of the information era” [30, p. 8] gen-

erated huge flows of information, eliminated the physical distances between people, provided numerous opportunities, but at the same time caused a high dynamism of the environment, increased the unpredictability of events and the level of interdependence of subjects. As Alvin Toffler put it, never in history has distance meant less [31, p. 89]. He called such a society "super-industrial" (a complex, swift-flowing society that relies on both modern technology and an updated communication system) [31, p. 31].

Indeed, under the influence of globalization and digital technologies, the forms of social communication have changed drastically. The use of computers, e-mail, new software has enabled many people to virtually communicate, collaborate, and compete in real time with many other people from around the world, in different fields of activity, on more equal conditions than ever before in world history [29, p. 8; 30, p. 15].

The scale of the third wave of globalization can be illustrated by the following example. Nandan Nilekani, CEO of the Indian technology company Infosys, while demonstrating the conference room and the screen, which connected forty digital monitors, he said that thanks to this device, Infosys was able to convene a virtual meeting at any time with all key partners located anywhere in the world. American customers, Indian programmers, manufacturers from Southeast Asia or, for instance, if the final product is made in Singapore, then a person from Singapore gets connected, all communicate live and discuss work on the project. This is the way Nilekani describes the face of globalization [29, p. 6].

The fourth industrial revolution is based on the digital revolution 3.0, but, according to K. Schwab, it is not its mere prolongation, because the scale, speed, and depth of change have no historical precedent [5, p. 8]. It develops exponentially rather than linearly and radically transforms all spheres of social life. In particular, machine learning, 3D printing, and large amount of data have created a "tsunami of transformations in the industry" [32]. According to the forecasts of American analytical agency *Homeland Security Research*, by 2023, the market of Industry 4.0[4] will reach USD 214 billion versus USD 60 billion, in 2017 [33]. In the upcoming decades, corporations will create global networks that cover their equipment, warehousing systems, and production facilities in the form of real-time cyber-physical systems. These flexible value networks will require new forms of cooperation between corporations at both the national and global levels.

PERIODIZATION OF GLOBALIZATION WAVES AND INDUSTRIAL REVOLUTIONS6

In the scholarly research literature there are many approaches to the periodization of globalization waves, they can be simplified to three categories of the globalization age: the age equal to the age of mankind, the middle age and the very young age with different variations [34, p. 138]. This study proposes to take as a basis two approaches: by T. Friedman and by experts of the World Economic Forum.

T. Friedman's approach is interesting because of vivid metaphors that accurately reflect the peculiarities of the modern world and numerous confirmations from everyday life that we live in the era of "flat world", when each individual has the opportunity to compete and to cooperate with others, regardless of place of residence, language of communication, and cultural differences. He has identified three major phases of globalization and named them "Globalization 1.0," "Globalization 2.0," and "Globalization 3.0." The first two globalizations were moved by countries and corporations, respectively. At the beginning of the 21st century, the driving force is individuals. The WEF experts have pointed out an important feature of the first three phases of globalization: they were driven by technological innovations

[4] The term "Industry 4.0" is not the same as the term "fourth industrial revolution." The latter means the penetration of key technologies 4.0 in all spheres of society: education, health, finance, agriculture, public administration, etc., while Industry 4.0 covers also the sphere of material production: industry, energy, and infrastructure.

combined with appropriate management decisions. The new phase of globalization is no exception.

Based on the above, an attempt has been made to associate the waves of globalization with the phases of industrial revolutions: Globalization 1.0 with the era of "steam energy", Globalization 2.0 with the era of electricity, Globalization 3.0 with the information age (digital, computer era), and Globalization 4.0 with era of cyberphysical systems and talents to determine the results of these processes in each globalization wave (Table 1).

In this context, it should be noted that, despite the decline in world trade in goods and services in the cross-border capital flows since 2008 [35, p. 3—4, 26—27], globalization has not stopped. It has moved to another level, has entered a phase determined not by the movement of goods, services, and capital, but by the growth of intangible data flows in the form of information, search queries, transactions, messages, and videos. Global data flows underlie and provide any other type of cross-border flow. Container vessels still move products to world markets, but now buyers order them online and pay for them through digital transactions.

Today, huge data flows in the form of information, search queries, transactions, messages, and videos are transmitted across borders every min-

Table 1. **Globalization Waves and Evolution of Industrial Revolutions**

Globalization waves and chronology	Specific features of globalization waves	Industrial revolutions as driving force of globalization	Outcomes of globalization and industrial revolutions
Globalization 1.0 (late 15th — late 19th centuries)	The starting point was the Columbus journey (1492) that marked the beginning of the exchange of goods between the Old and the New Worlds. During this period, barriers were removed between countries and their rulers who were the main drivers of global integration. Those countries that had brute force (muscle, horsepower, wind power, and then steam power) and could dispose of it effectively were advantageous. People got the opportunity to travel freely from one country to another without passports. Migration policy was virtually free of government restrictions. There were only a few international economic agreements and institutions, such as the International Telegraph Union (1865) (now the International Telecommunication Union), the Universal Postal Union (1874) (now a specialized agency of the United Nations). The world moved from the traditional agrarian society to the modern urbanized industrial one. Globalization 1.0 established a new dimension: the world was not large any longer and became medium. The fundamental question of Globalization 1.0: what is the place of an individual country in the global competition and what can it expect?	The driving force of globalization was the invention of steam engine at in the 16th — 17th centuries and its commercial use since the end of the 18th century. In general, it was the beginning of the First Industrial Revolution, the era of steam energy (1760s — 1840s), which was marked by the construction of railways and the use of steam energy for mechanization of production	Industrialization, urbanization, bureaucratization, mechanization, electrification, standardization, specialization, concentration, reduction of employment in the agricultural sector and the share of agricultural labor in GDP, public school education

Continuation table 1

Globalization waves and chronology	Specific features of globalization waves	Industrial revolutions as driving force of globalization	Outcomes of globalization and industrial revolutions
Globalization 2.0 (late 19th — mid-20th centuries)	The deepening of economic integration between countries, the signing of important international agreements/treaties and the creation of international organizations in the political (UN, Organization of American States, League of Arab States); the military and political (NATO, ANZUS); the economic (OPEC); the monetary and financial (IMF, IBRD); and the regional (European Coal and Steel Community, European Economic Community, the creation of which paved the way for the European Union) spheres. The globalization was driven by multinational corporations that had begun to reach the world level in search of labor and markets. This was the start of transnational mobility of goods and information, the development of the global market for industrial and labor relations. The world was not medium any longer and became small. The fundamental question of Globalization 2.0: what is the place of an individual company in the global economy? Does it utilize all the opportunities?	The dynamics of globalization were determined by the Second Industrial Revolution, the era of electricity (late 19th — mid- 20th centuries), which enabled mass production thanks to the discovery of electricity and conveyor	Popularization of knowledge, informatization, networking, development of services, enhancement of the role of innovation as an integral part of competition and success of countries, corporations, and individuals, digital technology, digitalization, personalization, diversification, greening, deindustrialization, lifelong learning
Globalization 3.0 (mid-20th century — 2010s)	The world has entered the phase of digitalization, personalization, miniaturization, visualization, and automation of all processes. This stage is marked by the creation of the World Trade Organization (WTO) and China's accession to it. The movement of goods and capital continued to get more liberalized, and global value chains were developed. World trade (as the sum of exports and imports of goods and services, in % of GDP) increased 1.5 times over the period 1990 — 2019. While the first two globalizations were moved predominantly by Europeans and Americans, Globalization 3.0 was driven by groups of people and individuals. It was more diverse in linguistic, cultural, and ethnic aspects.	The third industrial revolution, the information era (1960s — early 21st century) (digital or computer revolution) is associated with the development of semiconductors (1960s), personal computers (1970—1980s) and the Internet (1990s)	
Globalization 4.0 (nowadays)	The new phase of globalization requires global cooperation and changes in the archi-	The fourth industrial revolution, the era of cyberphy-	The embedded systems (those that are directly embedded

End of the table 1

Globalization waves and chronology	Specific features of globalization waves	Industrial revolutions as driving force of globalization	Outcomes of globalization and industrial revolutions
	tecture of global governance to adequately respond to the four key transformations in the economic, social, and political spaces, namely: 1) the beginning of the fourth industrial revolution and the development of its key technologies; 2) the emergence of environment constraints, including global warming; 3) the emergence of an increasingly multipolar international order; and 4) growing social discontent and inequality in many countries. In total, these four driving forces have led to the transition of globalization to a new phase of development. The further movement of countries and the well-being of people will depend on whether the systems of corporate, local, national, and international government are able to adapt to these challenges.	sical systems, the era of talent (the early 21st century until now) are continuation of the digital revolution. The scale, speed, and depth of the development of key technologies and new industries (such as precision medicine and genomics, robotics, cybersecurity), their interaction in physical, digital, and biological spaces have made the fourth industrial revolution fundamentally different from the previous revolutions	in the device they control) are being replaced by the cyberphysical systems. On the basis of cyberphysical systems, industry, transport, energy, finance, medicine, and education — all spheres of society — become intelligent. Human resources are the main tool for competitiveness. Innovation is created in open environments and flows between advanced economies and developing countries in both directions. Abandonment of hierarchies, development of network economy. Expanding communications and connections in the global economy

Source: prepared by the authors based on: [4, p. 5—6; 5, p. 11—27, 58—60, 75; 6; 29, p. 9—12, 30; 37; 38, p. 6; 39, p. 34, 44, 78—79, 85—87; 40, p. 55—56, 60; 41, p. 2941—2943; 42; 43].

ute and growing exponentially both in terms of volume and diversity. About 50 % of the international trade in services has been already digitized, about 12 % of the world trade in goods is carried out through international e-commerce, the share of cross-border calls via Skype accounts for 46 % of the total number of conventional international calls [35, p. 23]. Digital technologies and data flows are becoming the "connective tissue" of the world economy [36, p. 13].

Modern society, economy, business, and politics have got transformed under the influence of technological advances in such areas as space, precision medicine and genomics, robotics, neurotechnology, nanomaterials, etc. They combine the physical, digital, and biological worlds, get united to create innovations with unprecedented speed and scale [36, p. 5—6]. When the key 4.0 technologies become widespread, they radically change the way in which people produce, consume, communicate, move, and interact with each other. Given the new opportunities in genetic engineering and neurobiology, they can directly affect the way in which people think and behave. The fundamental and global nature of this revolution also creates new threats to humanity affecting labor markets and the future of labor, income inequality and geopolitical security [5, p. 19—27, 92].

According to researchers from Oxford University, 47% of employees in the United States belong to the high-risk category; most of them are engaged in the field of transport and logistics, administrative backstopping and office activities, as well as in manufacture [44, p. 44]. Managing these changes and minimizing the risks requires new rules and regulations for national and multinational cooperation, as well as a renewed

education system complemented with targeted programs to train employees in new skills.

Globalization 4.0 has just begun and the world has shown its unpreparedness for it [4, p. 6—7]. The rightness of choice between free trade and protectionism, economic growth and social justice, technology and jobs, immigration and national identity has been often debated in political discourse. However, these are erroneous dichotomies that attract too much attention, and this fact indicates a misunderstanding of the importance of completely different challenges facing the world. These challenges concern not individual countries or industries, they are common to all, and the search for common solutions and joint efforts to address them may consolidate the international community that is now divided into many areas. Working together to address this common challenge may help build trust between countries and other stakeholders in a way that has a positive impact on other areas of their efforts.

THE FORMATION AND DEVELOPMENT OF NETWORK ECONOMY AND NETWORK FORMS OF ECONOMIC ACTIVITIES ORGANIZATION

Under the influence of these globalization trends, there has being spreading a completely different way of organizing and coordinating relations in the economy, as compared with the days of the agrarian and industrial societies.

In the slow agrarian society, the speed of information transfer was rather low because of difficulties in communication and transportation; there was no need to make quick operational decisions. The industrial revolution accelerated the pace of life, led to the emergence of bureaucracy, the spread of centralized hierarchies with rigid vertical links and directive management methods. However, over time, the changes became so rapid that even the bureaucracy was unable to withstand it, and its effectiveness has been increasingly criticized for its inability to adapt quickly and to solve non-standard problems.

Everywhere, at the level of organizations, markets, regions, countries, global integration entities, the hierarchies are replaced by open, non-hierarchical structures built on horizontal ties, trust, and collective cooperation. Successful organizations will increasingly move from hierarchical structures to networked and collaborative models[5] [5, p. 60]. "Wherever you turn, hierarchies are being challenged from below or transforming themselves from top-down structure into more horizontal and collaborative ones," says T. Friedman [29, p. 48]. Kevin Kelly notes that the shift from a vertical organizational structure to a horizontal one, from centralized authorities to global networks has become a major cultural trend of the last three decades and this process has not come to end yet. The effect of bottom-up control continues to gain strength [2, p. 174].

As a result, there have been formed a new type of society (the network society) and, thanks to it, a new type of economy (the network economy), the distinguishing features of which are not just large flows of information, but also a completely different logic of its use and dissemination, based on ICT and networks as a basic organizational form [30, p. 8, 14—15]. According to K. Kelly, the new economy is a real tectonic shift in our lives, which cannot be comparable to the emergence of digital technology either. The time of computers has passed, they have done their job, speeding up life; the prospects now are associated with the expansion of communications that embody the essence of the new economy. What matters today is not the very technologies, but their connections. In the new economy, everything is combined with other things; it is characterized not only with a mass dissemination of information, but also with the connection of life into a single whole, the net-

[5] Collaboration is a higher level of collective interaction of independent actors as compared with coordination and cooperation; it is a process in which autonomous or semi-autonomous entities interact with each other through formal and informal negotiations, jointly forming rules and structures to regulate their interactions and activities or to solve common problems; it is a process that includes common norms and mutually beneficial relationships [45].

Table 2. **Ways to Organize Economic Activities**

Typical features	Ways to organize economic activities		
	Markets	Hierarchies	Networks
Framework for relations between the subjects	Title to property and contracts	Labor relations	Exchange of resources
Exchange between the subjects	Based on prices	Based on power	Based on trust
Settlement of conflicts	Negotiations and court proceedings	Rules and commands	Negotiations and diplomacy
Culture	Competition	Subordination	Mutual assistance

Source: cprepared by the authors based on [47].

work. The dynamics of our society and, especially, our new economy will increasingly yield to the logic of networks [46, p. 1, 5, 9—10]. The key differences between the three ways of organizing economic activities — the markets, the hierarchies, and the networks — are given in Table 2.

The network society and network economy are based on new forms of social interactions: the network (online and offline) communication without any spatial boundaries and the network structures, in particular:

— *Network enterprises:* кthe concept of "network enterprise" is introduced by M. Castells at the end of the 20th century and described by him as an organizational form for business projects, which is created as a result of cooperation of various components of individual enterprises that are united onto a single network structure while working at these business projects and establish connections within the network to implement each project [30, p. 86];

— *Virtual corporations* are a new way of doing business, which provides instant and effective satisfaction of consumer demands and requirements. In a fast-paced globalized world, isolated organizations are unable to provide a required product to consumers. However, it is possible by integrating the companies into a network that responds quickly to changes in market conditions and benefits from new market opportunities [48—50];

— *New forms of horizontal cooperation* are radically different from bureaucratic hierarchies and firms in their classical sense. The emergence of new forms is dictated by time; it is a result of rapid technological development, organizational interdependence, devolution[6], and limited resources [45, p. 1]. In particular, such forms are as follows [29, p. 51—185; 51, p. 140—142]:

- *Open sourcing* is a movement for free access to intellectual property and software. It takes the form of a community of researchers and programmers who consolidate their intellectual efforts online to share ideas, knowledge, carry out joint research projects and develop software on a shareware basis. One of the first such structures in the field of software development is well-known web server *Apache*;
- *Outsourcing* is the transfer of special functions by enterprise (organization) to other corporate entities for their realization with the subsequent integration of the results into its full operating cycle in order to reduce costs and to focus on more complex functions. The leading country in outsourcing is India;
- *Insourcing* is the opposite of outsourcing; it is the use of internal resources of the company to perform new functions. A striking example of insourcing is American company *United Parcel Service* (UPS) established as a regular parcel service in the early 20th century, which now serves almost every supply channel around the world. By integrating the support and logistics processes of other companies (delivery and re-

[6] Devolution, in contrast to decentralization, involves the delegation by central authorities not only their executive, but also some legislative powers.

pair) into its structure, UPS allows its customers to improve quality and to reduce service time, the number of complaints received from clients, and the number of breakdowns during transportation. For example, *United Parcel Service* has been providing not only delivery, but also repair of *Hewlett Packard* and *Toshiba* computers, laptops, and printers in its own shops, thereby removing the need to spend time for sending broken equipment to the manufacturer's repair shop, picking up repaired equipment, and delivering it back to the client;

- *Offshoring* is the transfer of enterprises (their production facilities, research centers) to other countries in order to manufacture the same products, but at cheaper costs of labor, material resources, lower taxes, and access to new markets. After China's accession to the WTO[7] its territories have become the most attractive for the location of offshoring production of foreign companies due to several advantages: gaining access to a huge market and significantly reducing production costs. However, for the world's leading economies, especially the United States, offshoring loses its relevance. Costs, risks, and other strategic factors, including national security, reduction in unemployment and income inequality are very important and significantly depend on the development of industrial production. It is clear that such factors cannot be compensated for by the advantage of low wages in countries with offshoring production. Therefore, the reverse process of changing the trajectory of countries towards developing their own advanced industry and creating productive jobs is *reshoring*. In 2010—2018, 3,018 companies and 515,245 jobs were reshored to the United States together with foreign direct investments, including 51% from Asia and 33% from Western Europe [52, p. 13]. These reverse trends, however, do not apply to future centers of technological development in the world. According to the National Intelligence Council, in the future, the technological center of gravity will continue to shift from West to East and South, with increasing flows of companies, entrepreneurs, and capital from advanced economies to emerging markets. By 2030, much of the technological activity is projected to move to developing countries as multinational corporations have been focusing on their fast-growing markets, with Chinese, Indian, Brazilian, and other corporations quickly becoming competitive at the international level. The pace of this shift depends on the availability of venture capital in these countries, legal norms to protect intellectual property rights and the desire of companies to grow and to increase their competitiveness in the global market [53, p. 86];
- informing, according to T. Friedman [29, p. 178—179], is a personal analogue of the use of the above forms of cooperation for an individual; it is cooperation with oneself, formation of one's own independence and expansion of one's own possibilities in search of information, knowledge, and entertainment.

Such forms of cooperation destroy the old hierarchies and flat the world. The meaning of this metaphor is that because of the massive spread of digital technologies, hundreds millions people from countries like India, China, Brazil, the former Soviet Union have the opportunity to cooperate and to compete in the global labor market, which they never had before, thereby changing established rules, roles, and functions of organizations and mechanisms of coordination of relations in the economy "from vertical (command-control) to more horizontal (communicative-collaborative)" [29, p. 249]. Thus, *digitalization* is the process of converting information (data, music, images, photos, videos) into a digital form that can be used via computer, which can be stored, modified and, most importantly, transmitted over long distances with the help of fiber-optic communication systems and satellite communications. It has contributed to the development of outsour-

[7] This meant China has accepted the world rules of trade and business relations and provided guarantees for the protection of foreign investment under international law.

cing since created an opportunity to assign job to the best specialists in a particular field of activity.

With raising international competition, accelerating all processes that become global and more open, increasing the diversity of consumer demands, the structure of markets changes from the conventional *industrial* (since manufacturers belonging to one industry can no longer maintain their competitive advantages on a long-term sustainable basis) on the *cluster* one. Today, the evolution of clusters is associated with deepening network links between enterprises, as well as with their entry into innovation clusters (a spatial concentration of interconnected organizations and enterprises belonging to different institutional sectors in order to generate, to disseminate, and to use innovations). Innovative activity is most actively carried out in clusters due to their following advantages:

- Firstly, a unique institutional environment is formed within the clusters built on network connections between its members, which increases the level of trust between them and allows them to better overcome the shortcomings of the external environment. As a result, the clusters are more resilient to economic downturns as compared with the region's economy as a whole. The clusters suffer losses, but recover faster than enterprises in the same industries that are not members of the clusters;
- Secondly, cluster members show better results in terms of, at least, two of the three indicators: value added growth, profitability growth, and wage growth. According to the results of the assessment of 12 clusters in Sweden, which was conducted in 2005—2012, 40 % of enterprises noted that coordinated efforts within the cluster had a positive impact on the mentioned indicators. In addition, 20—30 % of enterprises indicated an increase in employment rate and its diversification, improvement of environment efficiency of production. At some enterprises that were cluster members, on the contrary, the employment rate decreased, but wages grew as a result of increased productivity and the development of new activities and sectors [54]. In the long run, such processes will be crucial for each region, as they help create more productive and high-paying jobs;
- Thirdly, clusters are open structures for attracting new members, which corresponds to the dominant concept of open innovation in the modern world. G. Chesbro, the author of the open innovation concept notes that in the new model of open innovation, corporations commercialize both their own ideas and the ideas of other firms, look for mechanisms to market their own ideas by building relationships with other actors outside their current business. Under the new conditions, corporations shall no longer "block" their intellectual property. Instead, they shall look for ways to profit from the use of technologies developed by other members through licensing agreements, joint ventures, etc. [55];
- Fourthly, clusters allow corporations and organizations to bridge gaps in communications that inhibit innovation processes. Such gaps occur both inside the cluster (along the lines of "business — business," "business — research," "business — education," and others) and with other clusters.

Thus, clusters are a type of network structure and are flexible, dynamic entities that provide functional connections between members, as well as exchange of experience, information, and knowledge and, thanks to these properties, can withstand global competition and ensure their competitiveness in members and territories.

To summarize the analysis of the dominant trends in the world economy, we can state that in the near future, the transition of globalization to a new phase of development (Globalization 4.0), the beginning of the fourth industrial revolution, and the development of its key technologies will determine the position of countries and regions in the world economy. The centers of attraction for the next generation of innovation will be those countries and regions that work in new industries and use data and information as primary products.

While adapting to such large-scale transformations, economic systems change their organizational structure from pure hierarchical and market to the network one in which the relations between people, corporations, and governments, which are based on trust, diplomacy, and mutual assistance, come to forefront. The further direction of the development of countries and the well-being of the population will depend on whether the systems of corporate, regional, national, and international government are able to adapt to the existing challenges.

Hence, the world is undergoing a revolutionary transformation associated with Globalization 4.0 that is not limited to material flows of physical goods, but covers the most valuable resource of the 21st century, i.e. data in the form of information, transactions, search queries, etc.. and is associated with rapid development of key technologies 4.0 that radically transform all areas of society: health care, education, manufacture, finance, agriculture, government, and others. In such conditions, the sustainable development of countries, regions, and corporations directly depends on innovation as a decisive competitive advantage of the 21st century.

The globalization waves as compared to the phases of industrial revolutions (Globalization 1.0 to the era of "steam energy", Globalization 2.0 to the era of electricity, Globalization 3.0 to with the information era (digital, computer era), and Globalization 4.0 to the era of cyberphysics systems and talents) have been periodizied, which allow us to comprehensively analyze the processes of globalization and technological development, to identify the results of these processes in each wave of globalization and on this basis to substantiate the key trends of modern world development, which are as follows:

- Accelerated development of key technologies 4.0 and new industries;
- Introduction of cyberphysical systems that make all spheres of life intelligent;
- Transition of the global economy to a network structure, growing interdependence between people, corporations, and governments;
- Increasing role of human resources and individuals belonging to different cultures in ensuring the competitiveness of countries, regions, and businesses;
- Priority of innovations that are created in open environments and flow in both directions, from advanced economies to developing countries and vice versa, is becoming a decisive competitive advantage of the 21st century;
- Shift of the technological center of activities from West to developing countries of East and South.

In the conditions of globalization under the influence of revolutionary technological transformations the usual market and hierarchical orders are replaced by the network organization of economic activities. Everywhere (at the level of corporations, markets, regions, countries, and global integration entities) hierarchies are replaced by open, non-hierarchical structures built on horizontal connections and collective cooperation. A network society and a new network economy are being formed as the next economic revolution, based on trust, negotiations, diplomacy, and mutual assistance. The transition from centralized structures to networks is one of the main trends of recent decades, which has accelerated significantly with the transition of the world to new phases of globalization and the industrial revolution.

Distinctive features of the network economy are the development of new forms of social interactions, online and offline communications without any spatial boundaries; the network enterprises, virtual corporations, and new forms of horizontal cooperation (open-sourcing, outsourcing, insourcing, informing), which radically differ from the hierarchies and firms in their classical sense. The emergence of new forms of cooperation is a matter of time, a result of the introduction of technological innovations, an increase in the interdependence of organizations and the limitation of resources.

The economies of countries and regions are transforming their structure from the conventional industry to the cluster. Clusters are loca-

lized (flexible and dynamic) network structures that provide functional connections between members as well as exchange of experience, information, and knowledge, by means of which they enable the members to withstand global competition and to ensure sustainable competitiveness. Today, the evolution of clusters is associated with the development of innovation clusters, i.e. the spatial concentration of organizations and enterprises belonging to different institutional sectors interconnected by the innovation process in order to generate, to disseminate, and to use innovations.

The dominant trends in the world economy described in this research have been radically changing the global economic, social, and geopolitical landscape. They bear new risks and development prospects for countries, regions, corporations, and individuals and shall be taken into account as much as possible when making strategic decisions at all levels of government, from corporate to international.

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О.І. Амоша, І.Ю. Підоричева, А.І. Землянкін
Інститут економіки промисловості НАН України,
вул. Марії Капніст, 2, Київ, 03057, Україна,
+380 44 200 5571, admin@econindustry.org

КЛЮЧОВІ ТЕНДЕНЦІЇ РОЗВИТКУ СВІТОВОЇ ЕКОНОМІКИ: НОВІ ВИКЛИКИ ТА ПЕРСПЕКТИВИ

Вступ. Глобалізація 4.0 і технологічні інновації, що лежать в її основі, переводять світ до нової ери розвитку — кіберфізичних систем і талантів — ери, яка за масштабами, швидкістю та глибиною змін не має історичного прецеденту.

Проблематика. Останні хвилі глобалізації та промислової революції несуть безпрецедентні виклики та перспективи розвитку, з якими мають бути обізнані країни, регіони, компанії та люди для адекватного реагування та вироблення релевантних рішень.

Мета. Визначення та аналіз ключових тенденцій розвитку світової економіки, пов'язаних з глобалізацією й революційними технологічними трансформаціями в їх єдності та взаємообумовленості, однією з яких є розвиток мережевої економіки як наступної економічної революції, в основу якої покладено довіру, переговори, дипломатію та культуру взаємодопомоги.

Матеріали й методи. Використано методи аналізу й синтезу, порівняльного аналізу та системного підходу. Матеріалами слугували наукові доповіді міжнародних організацій, приватних і публічних компаній, публікації зарубіжних та українських науковців, присвячені зазначеній проблематиці.

Результати. Узагальнено та систематизовано основні риси Глобалізації 4.0 та четвертої промислової революції, які докорінним чином змінюють глобальний економічний, соціальний та геополітичний ландшафт. Здійснено періодизацію хвиль глобалізації, які співставлено з фазами промислових революцій, що дало можливість усебічно проаналізувати процеси глобалізації й технологічного розвитку в їх єдності та взаємообумовленості та на цій основі визначити домінуючі тенденції сучасного світового розвитку.

Висновки. Глобалізація 4.0 і четверта промислова революція трансформують всі сфери діяльності суспільства в усьому світі, а тому мають бути максимально враховані при реалізації стратегічних рішень на всіх рівнях управління — від корпоративного до міжнародного.

Ключові слова: глобалізація, Глобалізація 4.0, промислові революції, четверта промислова революція, мережева економіка, інновації.