Iryna Kalenyuk
Prof. Dr.oec.
Kyiv National Economy University Named After Vadym Hetman, Kyiv, Ukraine
E-mail: kalenuk@ukr.net
ORCID: 0000-0003-1807-2849

Iryna Uninets
PhD, assoc.prof.
National pedagogical Dragomanov University, Kyiv, Ukraine
E-mail: germanirina777@gmail.com
ORCID: 0000-0002-1690-6590

Factors and features of the smart-economy development

Abstract

The article examines the prerequisites and features of the SMART-economy. This new phenomenon is still insufficiently studied in the scientific literature. Different approaches and separate definitions of SMART-economy in the scientific literature are systematized. An understanding of SMART-economy in a narrow (as part of SMART-city) and broad sense (as a set of economic relations) is proposed. The main processes that determine the emergence of SMART-economy as an ecosystem are identified and disclosed. Digitalization (spread of ICT), institutionalization (penetration of ICT into public administration), urbanization (unprecedented growth of urban population and large cities), greening (increasing attention to environmental issues) and socialization (increasing the importance of solving social problems of the population) all contribute to the emergence of new quality of ecosystems. Based on the data, the trend of increasing the share of urban population in recent years is revealed, the data on the population of the largest cities in the world are given. The increasing in urban population highlights the problems of using ICT to solve the problems of greening, socialization, institutionalization in large cities.

Keywords

globalization, information and communication technologies (ICT), digitalization, institutionalization, urbanization, greening, socialization

JEL: F63; L86; O32; Q01

1 Introduction

In the conditions of unprecedented growth of the role of knowledge, the study of those factors and drivers that determine the development of countries in the new social context is an urgent problem. It has long been a recognized fact that the development of countries depends not so much on the availability of resources as on the technology of their use. Only those countries that make significant efforts to accumulate intellectual resources and implement them in the economy become world leaders. Socio-economic development of countries in modern conditions is provided mainly not by resources, but by technological and innovative factors.

Under the influence of these processes, society and its economic base change. Such defining processes as the spread of ICT, digitalization, greening, socialization make radical changes in the system of economic relations, principles and mechanisms of the economy. Knowledge and information are becoming a major resource and factor of development, and modern technologies create extraordinary opportunities for their dissemination and use on a global scale.

From the end of the XXI century there is a new post-industrial paradigm, for which there is still no single definition of society among scientists (post-industrial, information, technotronic, innovative society, knowledge society, etc.). All of these approaches recognize the crucial importance of ensuring in these new conditions such factors as knowledge and information, which in turn have a systemic impact on all other factors (land, capital and human resources). In modern production, the

role of information-rich capital resources, goods, technologies, and most importantly - highly qualified human resources, which not only have large amounts of modern knowledge, but are able to work with them and thus produce qualitatively new knowledge. The requirements are set for a person not just as a pair of workers, but as a carrier of information, its generator and user.

Changes under the influence of new processes and technologies are becoming so rapid that with the beginning of the new century, new concepts to define modern society. The strengthening of intellectualization processes in world economic development has led to the emergence of new concepts and phenomena. One of these is the concept of "SMART-economy", which is the embodiment of consistent and pervasive intellectualization, institutionalization, urbanization, socialization and greening of the economy. Finding out the essence and features of this concept is an urgent problem of modern world economics.

2 Research review

In the scientific literature, one of the most pressing problems is the theoretical and methodological understanding of the essence of transformational processes occurring in society. A reflection of this is the emergence of theories of post-industrial society, technotronic society, information society, network society and knowledge society. In the works of foreign and domestic economists D. Bell, Z. Brzezinski, V. Inozemtsev, M. Kastels, F. Makhlup, A. Toffler, A. Chukhno and others. at the conceptual level, the issues of formation of a new type of society are studied. In the new century, under the influence of the unprecedented spread of information and communication technologies in all spheres of public life, the concept of SMART-economy appears. This new concept has not yet received sufficient justification and definition, which is of great scientific interest.

The purpose of the article is to identify the features and trends of SMART-economy in a global environment.

3 Results and discussions

The current stage of world economic development is characterized by a huge increase in the importance of the intellectual component of socio-economic processes and resources. It is intellectual resources that directly determine the parameters of economic growth, create the foundations for innovative development and the formation of a post-industrial society. The study of the essence, role and mechanisms of intensive use of intellectual resources as a factor of socio-economic development of society is becoming an urgent task of modern domestic and foreign economics.

Intellectual resources create opportunities for breakthrough in economic and scientific and technological development, even for those countries that do not have a pronounced natural resource factors for this. The intellectualization of labor, acting as a global trend, has a specific manifestation in some economic systems. Manifestation of this trend in some national economies is realized as a nonlinear, but at the same time consistent and progressive process of accumulation of intellectual factors.

The information society, focused on intellectual development and intangible wealth (intelligence, information, knowledge), forms a new paradigm in which intellectualization becomes a decisive factor. Intellectualization means not only the growth of intellectual functions in the process of work and, accordingly, increase the educational level of employees, but also the strengthening of the cultural and ethical component. Economic activity is increasingly based on a combination of economic interests, ethical and cultural values. That is why the emergence of the concept of "SMART-economy" is evidence not only of consistent and pervasive intellectualization, but also the intensification of institutionalization, socialization and greening of the economy.

Intellectualization is manifested through the growth of scientific and technical developments, growth of innovation of production processes, stimulation of creative component, creative realization of tasks, creation and development of intellectual needs, formation and development of intellectual potential of both individual and enterprise as a whole, constant growth of knowledge, creation of innovative products, etc. No less important manifestation of intellectualization is the spread of information and communication technologies, often called the process of digitalization. The latest features are that ICTs no longer simply provide and accelerate communications, but become intelligent, performing more and more intellectual functions. The concept of the Internet of Things (IoT) appears - a system of managing things, devices, animals using the Internet; Artificial Intelligence (AI) - the ability of an engineering system to acquire, process and apply knowledge and skills.

Institutionalization is ensured through the formation of new technologies and mechanisms for managing the economy, the active participation of the state and other actors in the regulation of communications and various activities (research, innovation, entrepreneurship, etc.). The spread of ICT creates new opportunities for effective economic governance, effective communication and feedback. The concept of "e-government" appears as the embodiment of a new system of

relations between the state and its institutions in various branches of government and citizens. Within the framework of ICT and the Internet, new wide opportunities are created for quick and direct access of citizens to public authorities, for the provision of quality services by state institutions and, thus, to protect their interests.
An important trend in modern global development is greening as increasing the attention of mankind to the problems of environmental protection. Greening is realized in the system of ensuring ecological and economic interests, ensuring the integrity of natural systems, environmental protection, and others. And this trend is manifested not only in the declaration of important principles and goals, it becomes an essential component of all various types of social activities. In the implementation of any economic, social, business projects, consideration of the environmental context is becoming increasingly mandatory.

It is also necessary to note such an important trend of modernity as socialization - the growing importance of solving social problems of the population. Socialization is aimed at ensuring the welfare of the population, compliance with the values of civilization, the formation and implementation of social values, etc.

Smart-economy is a concept of stimulating and spreading innovations in all spheres of public life, creativity in combination with scientific research, advanced technologies and general trends of greening. In the information environment, the economic environment is increasingly intellectualized and takes the form of smart-economy, which is manifested through digitalization and new forms of organization of economic activity. Intelligent database management becomes a prerequisite for ensuring the competitiveness and level of the enterprise at the macroeconomic level. The study of smart-economy requires the definition of the main forms of its manifestation and the functioning of economic entities in these conditions.

Thus, a characteristic feature of the concept of Smart-economy is the combination in one system of processes of intellectualization, institutionalization, greening and socialization. This, in fact, means that the Smart-economy is seen as an ecosystem in which all components are balanced.

Lithuanian scientists J. Bruneckiene and J. Sinkiene attribute the following to the main components of the Smart Economy: Innovation and knowledge economy; Learning economy; Digital economy; Competetive economy; Green economy; Network economy; Socially responsible economy [1].

However, the vast majority of scientists consider the concept of Smart-economy in a rather narrow sense, as part of a system - Smart-city. In this sense, the term first appeared. This is the definition of a system of a certain locality, all parts of which are connected by intelligent technologies, operate and are managed on the basis of the principles of economic expediency, sustainability and social responsibility. Vinod Kumar considers the Smart-city system as follows: Smart People, Smart Economy, Smart Mobility, Smart Environment, Smart Living, Smart Governance [2, p.12].

Indonesian scholars Indrawati, Najih Azkalhaq, Husni Amani emphasize that Smart Economy "refers to an open, transparent, diverse economy that adds value to smart cities. SE will promote an efficient and effective business environment that promotes and encourages innovation regardless of the outcome. It also provides a stable labor market with resources and the ability to adapt and make changes as needed. SE guarantees the success and economic growth of the city, as well as the livelihoods of its inhabitants" [10].

In this regard, it is necessary to note another important trend of modern global development - urbanization and the growing role of cities. The share of urban population is growing steadily, and from the second half of the twentieth century at a rapid pace. In general, the share of urban population in the world has grown from 29.6% in 1950 to 56.2% in 2020, and is projected to reach 68.4% in 2050 - ie more than double in a century. The most rapidly growing urban population grew between 1950 and 2020 in Africa (growth rates - 3.04), Asia (2.92), Latin America and the Caribbean (1.97). In Europe and North America, the growth rate is not so significant, but the share of urban population is very high - in 2020, respectively, 74.9% and 82.6% (Table 1).

TABLE 1 Urban population in the world and regions, % (1950 -2050 pp.) [11]

Regions	1950	1980	2000	2015	2020	2050
Africa	14.3	26.8	35.0	41.2	43.5	58.9
Asia	17.5	27.1	37.5	48.0	51.1	66.2
Europe	51.7	67.6	71.1	73.9	74.9	83.7
Latin America and Caribbean	41.3	64.6	75.5	79.9	81.2	87.8
North America	63.9	73.9	79.1	81.6	82.6	89.0
Oceania	62.5	70.9	68.3	68.1	68.2	72.1
World	**29.6**	**39.3**	**46.7**	**53.9**	**56.2**	**68.4**

And not just the urban population is growing. There are tendencies both in the growth of the number of cities - millionaires, and the total number of inhabitants of individual cities. According to the UN website "World Population Review" at the beginning of 2020 the population of most cities in the world was:

TABLE 2 Top 10 cities in the world by population [12]

No.	City	Population	Country	Change
1	Tokyo	37,435,191	Japan	-0,11%
2	Delhi	29,399,141	India	3,03%
3	Shanghai	26,317,104	China	2,82%
4	Sao Paulo	21,846,507	Brazil	0,90%
5	Mexico City	21,671,908	Mexico	0,51%
6	Cairo	20,484,965	Egypt	3,56%
7	Dhaka	20,283,552	China	2,03%
8	Mumbai	20,185,064	India	2,13%
9	Beijing	20,035,455	China	1,12%
10	Osaka	19,222,665	Japan	-0,30%

Most major cities are located in the largest countries in the world - China and India. Among European countries, the largest cities are Istanbul (14.5 million inhabitants), Moscow (more than 12 million), and Paris (more than 11 million). [12].

Along with the increase in the number of large cities and their population, the growing attention to the new role of cities as entities to ensure quality, safe and modern life of citizens has intensified in recent years. Evidence of this was the emergence of such concepts as "digital city", "cyber city", "inttelligent city", "sustainable city", "eco-city", "knowledge-based city", "cyberville" and others. Each of them has the right to life, as it emphasizes the most important imperatives of development of modern cities. In our opinion, Smart-city is the most successful term, as it includes the aspect of digitalization, sustainability, and knowledge-based and smart technologies.

R. Novotny et al. consider the structure of Smart-city in a fairly applied way: «general municipal and business services», «intelligent, sustainable buildings and building management (smart building)», «education, health and social care areas (smart education)», «energy production and energy efficiency (smart energy, smart lighting)», «gas, electricity and water smart metering (smart grad)», «smart water and waste management (smart utility)», «public safety, security and crime prevention», «real-time locating services and geographic» [3].

A similar approach is declared by Romanian scientists M.Eremia, L.Toma, M.Sanduleac, who consider Smart-city in the set of the following components: “smart buildings”, “education, medical and social care”, “smart energy”, “smart grid (smart metering of natural gas, water, electrical energy)”, “smart utilities (smart water distribution and smart waste management)”, «smart parking», “integrated supply systems», «smart and integrated transport” [4].

Thus, we believe that there is every reason to consider the Smart-economy in a narrow and broad sense. In a narrow sense, Smart-economy means a system of economic relations and interconnections within a certain locality, which is provided by the latest technologies based on the principles of sustainability and social responsibility and serves the purpose of creating comfortable and safe living conditions for citizens.

In a broad sense, we can understand the Smart-economy as a way of streamlining economic relations, which is based on the use of the latest smart technologies, the introduction of the principles of sustainability and social responsibility and is subject to the goals of creating comfortable and safe living conditions.

According to some scientists, the main goals of smart-economy include: ensuring high rates of economic growth, achieving high productivity, increasing the participation of intellectual workers and producing innovations in production, the formation of innovation ecosystem, digitalization and innovation of production, creating a productive business environment, forming " green "economy, ensuring social stability, etc. [5]

At the same time, some scientists claim that there is a conflict in the very goals of the smart economy, because social goals do not always correspond to economic ones, etc. [6]. One of the key indicators that express the concept of smart is the welfare index (Table 3).

The vast majority of countries in the TOP-10 belong to the countries of Northern Europe, which have reached a high level of development: economic, social, environmental, institutional. The smart economy in the context of globalization has no borders, because its integral component - ICT

TABLE 3 Country Welfare Index, 2019 [7]

Rating	Country	Index
1	Denmark	83,96
2	Norway	83,96
3	Switzerland	83,64
4	Sweden	83,04
5	Finland	82,39
6	Nederland	82,19
7	New Zealand	81,24
8	Germany	81,14
9	Luxemburg	80,95
10	Iceland	80,72

connects the whole world into a single interconnected network. Smart-economy has specific forms of manifestation, all its components are developing rapidly and cause the emergence of new processes and phenomena. In scientific research, the issue of assessing the Smart-economy with the help of a system of indicators that would reflect various aspects and take into account all possible variations of its implementation is relevant and open.

The structure of the economy in the conditions of formation of smart-society is constantly changing, which is caused by rapid changes in technology and their penetration into all spheres of human life. Thus, the prerequisites for the formation of smart-economy include significant changes in the structure of demand at all levels, which in turn is caused by increasing the participation of technology in production, thus forming a spiral of increasing the intellectual capacity of production. In addition, the preconditions are the processes of globalization, which lead to the possibility of maintaining systemic governance and balance by coordinating the dependence of individual countries on the global level of development and key processes (political, economic, financial and social). This in turn involves, above all, increasing the openness of economic entities, liberalizing markets, creating structures that are resistant to external influences, or able to adapt quickly to the challenges of the economic, social and cultural information environment [8].

4 Conclusions

The emergence of the phenomenon of Smart-economy is due primarily to the acceleration of the process of intellectualization of the world economy. The appearance of new technologies, products, services increasingly means the spread of completely new principles of economic activity and people's lives. All this is also accompanied by increased attention to social problems and environmental issues. In all spheres of society, the use of ICT technologies is relevant, both to ensure and accelerate all transactions, and to successfully manage a variety of actors and processes.

The main feature of Smart-economy is the penetration of smart technologies in all spheres of life. However, this concept is still insufficiently substantiated in the scientific literature. It is most often used in the context of the "economy of the Smart City". Whereas, in our opinion, there is every reason to consider it in a broader sense, not only within the city. The problem of determining the components of the Smart-economy also leaves a lot of space. The analysis showed that there is no single and established view of the essence and structure of the concept. In general, this confirms the great relevance of this issue and the significant potential for its further development.

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