

**CONCEPTUAL AND CATEGORICAL APPARATUS OF INFORMATION AND INNOVATION POTENTIAL OF THE ENTERPRISE IN THE CONTEXT OF THEORETICAL DISCOURSE****Nikitenko V.O.***Zaporizhzhia National University, Engineering Institution  
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**Key words:**

information and innovation, potential of the enterprise, creative potential, knowledge, development, technology, sophisticated adaptive systems.

The article is devoted to the actual problems of information and innovation potential of the enterprise, which are discussed in the context of theoretical discourse. The author accumulates existing approaches to the problem of information and innovation potential of the enterprise and forms its conceptual and categorical apparatus in her research, highlights the focus points of the topic, investigates the problem field of the mentioned problem. The article analyses creative and innovative potential of the enterprise, which is the key to the survival of the enterprise; research of the information-innovation system of the enterprise and its components; defining the creative-innovative potential of the enterprise as a complex and controversial process in modern society. The author studies scientific publications devoted to the problems of conceptual-categorical apparatus of information-innovation potential of the enterprise in the context of theoretical discourse, focuses on explaining the concept under analysis. The article discloses that innovation is the focus of science studying complex systems and knowledge is generated through the constant retrieval of information from the external environment through education and training, requests and specifications, measurement and feedback, resulting in a direct accumulation of experience. The author concludes that technological development enables us to create more efficient renewable resources, but despite the rapid development of technology and the introduction of innovation into production, the amount of non-renewable resources is still limited, and even in the case of such minerals that have not yet become a resource to developing countries.

**ПОНЯТІЙНО-КАТЕГОРІАЛЬНИЙ АПАРАТ ІНФОРМАЦІЙНО-ІННОВАЦІЙНОГО ПОТЕНЦІАЛУ ПІДПРИЄМСТВА В КОНТЕКСТІ ТЕОРЕТИЧНОГО ДИСКУРСУ****Нікітенко В.О.***Запорізький національний університет, Інженерний інститут  
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інформація та інновації, потенціал підприємства, творчий потенціал, знання, розвиток, технології, складні адаптивні системи.

Стаття присвячена актуальним проблемам інформаційно-інноваційного потенціалу підприємства, які обговорюються в контексті теоретичного дискурсу. Автор акумулює існуючі підходи до проблеми інформаційно-інноваційного потенціалу підприємства та формує в його дослідницькому понятійному та категоричному апараті, висвітлює основні моменти теми, досліджує проблемне поле зазначеної проблеми. Проаналізовано творчий та інноваційний потенціал підприємства, який є запорукою виживання підприємства; дослідження інформаційно-інноваційної системи підприємства та його складових; визначення творчо-інноваційного потенціалу підприємства як складного і суперечливого процесу в сучасному суспільстві. Автор вивчає наукові публікації, присвячені проблемам концептуально-категоріального апарату інформаційно-інноваційного потенціалу підприємства в контексті теоретичного дискурсу, акцентує увагу на поясненні аналізованої концепції. Розкрито, що інновації – це фокус науки, що вивчає складні системи, а знання формуються за рахунок постійного пошуку інформації із зовнішнього середовища через освіту та навчання, запити та технічні характеристики, вимірювання та зворотній зв'язок, що призводить до прямого накопичення досвіду. Автор робить висновок, що технологічний розвиток дозволяє нам створювати більш ефективні відновлювані ресурси, але, незважаючи на швидкий розвиток технології та впровадження інновацій у виробництво, кількість невідновлюваних ресурсів все ще обмежена, і навіть у випадку таких корисних копалин, які ще не стали ресурсом для країн, що розвиваються.

### Statement of the problem

The actual problems of information and innovation potential of the enterprise, which are discussed in the context of theoretical discourse necessitate the accumulation of existing approaches to the problem solution and the formation of its conceptual and categorical apparatus.

### Analysis of recent studies and publications

An analysis of global scientific and technological changes, their socio-economic consequences and ecological prospects of humanity, criteria and the imperatives of sustainable development are one of the most important topics in the system of socio-economic problematic. At the heart of the study is the analysis of the works of Appelo Jurgen [1], Goodman Mark [4], Everett M. Rogers [6], Ha-Yong Chang [7], Ernst Ulrich von Weizsäcker, Anders Wijkman "Come On! Capitalism, shortsightedness, population and the destruction of the planet. "Report to the Roman Club"; Naomi Klein "Everything changes. Climate capitalism"; Maxton Graham, Randers Jørgensen "In Search of Welfare. Managing Economic Development to Reduce Unemployment, Inequality and Climate Change"; Meadows Donnelly, Meadows Dennis, Randers Jørgensen "Growth Limits. 30 years later"; Klaus Schwab's Fourth Industrial Revolution, Forming the Fourth Industrial Revolution; Joe Stowell's "Why Asia has Succeeded." The article analyses the works of domestic authors - V. Voronkova, V. Melnyk, A. Cherep and others [13].

### Objectives of the article

To study the existing approaches to the interpretation of the concept of "information and innovation potential of the enterprise," to analyse the creative and innovative potential of the enterprise, which is the key to the survival of the enterprise; research of the information-innovation system of the enterprise and its components; defining the creative-innovative potential of the enterprise as a complex and controversial process.

### The main material of the research

Scientific publications devoted to the problems of conceptual-categorical apparatus of information-innovation potential of the enterprise in the context of theoretical discourse focus on explaining the concept under analysis.

1. Creative and innovative potential of the enterprise as a key to the survival of enterprises.

Innovation, as the key to business survival, is competitive in the marketplace and should focus on creativity and advanced human potential. "In an environment where modern technology is constantly reducing the cost of iterations, enterprises in more industries can compete in the field of innovation," – said Appelo Jürgen [1, p. 79].

Innovation is the focus of science studying complex systems. Researchers have found that sophisticated adaptive systems are actively seeking a position between orderliness and chaos, as innovation and adaptation occur when systems are "on the edge of chaos." Complex

systems theory argues that innovation can only be an emergent result that cannot be planned. In order for something new to emerge, it is necessary to have a foundation on which it can emerge. It should be noted that there is a close link between innovation and information workers, which include developers, designers, architects, analysts, testers and other professionals in the field of software creation. Peter Drucker proposed this term to emphasize that in the new context, many professions are based on information. The notion that knowledge becomes the fuel for innovation was subsequently supported by many business experts, including Ikujiro Nonaka (2008).

Knowledge makes it possible to create new software products for customers that have a business value that they did not have before, the creative and innovative potential of the enterprise is that it is able to organize and transform production activities, and turn knowledge into innovations. Knowledge is generated through the constant retrieval of information from the external environment through education and training, requests and specifications, measurement and feedback, resulting in a direct accumulation of experience. The software development team becomes a system that consumes and transforms information, creating innovation. Knowledge used in enterprises is largely implicit (not documented and difficult to transmit), and people should pass it on to each other through "osmotic communication" when working together [2, p. 202].

Software developers convert information into knowledge and then into innovation, and this is entirely in line with the Robert Glass's assertion of his Professional Programming Facts and Mistakes: "80% of software development efforts are intellectual. A large part of this activity is creative, and only a small part is purely technical" [3, p. 60].

A similar study by R. Glass found that 16% of the intellectual tasks developers are dealing with require creativity. This again confirms the thesis that creativity plays an important role in the process of transforming information into innovation. Because all enterprise devices will have access to the Internet and start communicating with each other, they will greatly improve the logistics, efficiency of supply, energy, customer service and productivity [4, p.331].

Metcalf's law states the value of the network is increasing exponentially due to the number of nodes or computers added. The McKinsey Global Institute, one of the top think tanks in business and economics, predicts that innovations available in only a few sectors of the Institute of Things will increase the global economy's value by 6.3 trillion by 2025 dollars [5, p. 55]. (Many organizational innovations in manufacturing have shifted to other industries, especially service industries, and increased their productivity (fast-food restaurants, sushi restaurants, online stores, even agriculture, through the use of organizational knowledge (computer-assisted animal feeding).

Technological development enables us to create more efficient renewable resources, but despite the rapid development of technology and the introduction of

innovation into production, the amount of non-renewable resources is still limited, and even in the case of such minerals that have not yet become a resource for developing countries. To further increase production capacity, in order to be able to respond to the effects of climate change, in the language of experts, this is called climate adaptation. To be prepared, disadvantaged countries should be equipped with the best technology and organizational capabilities that emerge only in the face of economic development.

The process of creating innovation, as Everett M. Rogers points out in the book "Diffusion of Innovations," consists of all decisions, actions and their consequences that occur from the moment of awareness of a need or problem, further during the research, development, commercialization of innovation, in the process of its diffusion and implementation by users and up to the impact of innovation"[6, p. 162]. Therefore, it is necessary to identify the stages and components of the innovation process as a kind of social change that can lead to their implementation. Everett M. Rogers thus distinguishes four basic elements of diffusion - innovation, channels of communication, time and the social system [6, p. 30].

SRD is a major indicator of economic development in a country – especially in high-income countries – is the share of SRD spending in GDP and its development over time. As of 2010, Finland spent 3.9% of its GDP on SRD, South Korea was far behind – 3.7%, other countries did not spend a significant share of GDP on SRD – Sweden – 3.4%, Japan – 3.3 %, Denmark – 3.1%, Switzerland – 3.0%, Germany – 2.8%. The OECD average is 2.3%, with some countries' spending over 3% of GDP. Finland and South Korea top the list. It is striking how quickly they have increased the ratio of GDP to SRD over the past decades and the breakthroughs they have achieved in the technological industries. Most developing countries are practically not engaged in SRD. Indonesia spends 0.1% on it, Colombia 0.2%, Kenya 0.5% [7, p. 214].

The share of investment in SRD is a key indicator of the development of creative and innovative potential of the enterprise as a key to the survival of enterprises. In order to use technology, they need to attract constant capital, namely the use of upgrades to equipment and structures (buildings, railways, etc.). Without significant investment in fixed capital, which experts call gross fixed capital formation, an enterprise will not be able to develop its production potential. Thus, the investment ratio (ratio of GDP to SRD) is a good indicator of development potential. Indeed, the positive ratio of the investment ratio for the rate of economic growth is one of the few relationships in an economy that is beyond doubt. At the peak of their growth, countries invest at least 30% of GDP, but the investment ratio and its development over time is the best indicator of the development of the productive potential of the country, and therefore of the economy [7, p. 214].

2. The enterprise information and innovation system and its components.

#### Knowledge and innovation

Knowledge-based new meta-ideas that embody innovation that most effectively support the creation of a new idea which was found in new associations of the human mind and machines, and implemented through a network of digital devices that run on an incredible amount of software. ICT has generated radically new ways of combining and recombining new ideas.

Digital innovations are recombination innovations, each enhancement being a design element for future innovations, enabling them to transform into a growing number of appliances – from door handles to greeting cards. At an early stage of development in an enterprise, growth is limited by the number of new potential ideas, but subsequently it is constrained only by the ability to process them.

Innovation is a factor that drives productivity growth. Economists often argue, but still agree with the fundamental importance of innovation for growth and prosperity through knowledge. Most experts agree with Joseph Schumpeter, a respected scholar and researcher on the subject, who wrote that innovation is an outstanding phenomenon in the economic history of a capitalist society, and they are also largely responsible for much of what we have at first glance attributed to innovation [8, p. 86].

Economist Bob Gordon concluded that innovation had slowed down over the last 150 years and emphasized the important role of technology in driving economic growth. According to B. Gordon, the steam engine became the first truly significant event in the economic history of the world and has moved sharply upwards for 200 years. The "great inventions" of the Second Industrial Revolution were so important and far-reaching that it took them as long as 100 years to achieve their main effect, which is considered the invention of powerful technologies for economic growth that are significant to accelerate the course of economic progress. Economists call innovations similar to steam power and electricity for general purpose (GPT) technologies that have the potential to have a significant impact on many sectors of the economy [9, p. 161-162].

At the same time, scientists have come to a consensus on how to recognize general-purpose technologies: they need to be widespread, refined over time and able to lead to new innovations. The author supports the view of foreign scientists that information and communication technologies (ICTs) belong to the same category as steam and electricity, therefore leading to a new golden age of innovation and growth. Thus, the first industrial robot was introduced by General Motors in 1961, airline reservation systems appeared in 1967, and in 1980 barcode scanners and ATMs expanded into the commercial and banking industries; the first personal computers emerged in the early 1980s, offering text and spreadsheet features; the next stage was the rapid

development of the Internet and e-commerce after 1995, which practically ended by 2005 [10, p. 64].

If multiple general-purpose technologies emerge simultaneously or in close succession, we may see growth over time, but if there is a large gap between significant innovations, economic growth will eventually decline. True innovation does not invent anything new and great, but recombines factors that are already dreaming. As Brian Arthur says, in his book, "The Nature of Technology": "In order to invent something, one must find it in what already exists" [11, p. 122].

#### Drivers of innovation

For many businesses, innovation is driven by five drivers: 1) the teams need knowledge to succeed; 2) original and useful results cannot be obtained without creativity; 3) employees achieve outstanding results through motivation; 4) diversity increases the resilience and flexibility of the enterprise; 5) managers must possess basic qualities that allow them to be productive [1, p. 94]. Economists call innovations similar to steam power and electricity by General Purpose Technology (GPT). In recent years, many businesses have embraced at NASA's strategy of using technology to open up with innovative ideas and realize innovative opportunities. This strategy has the various names of "open innovation" and "crowd sourcing" and can be extremely effective not to stall your businesses and help you solve problems and succeed.

Creativity is a critical component of the knowledge-based value creation process, which is the ability to move away from template approaches when creating new ones, to offer new answers based on old information and to see solutions where no one has seen them before. The importance of knowledge as a raw material for creativity is now widely recognized by researchers. There is confirmation that creativity is based on people's knowledge and ability to combine dissimilar concepts, resulting in new ways of perceiving things, manifesting in the ability to come up with new ideas, original and useful at the same time [11, p. 83].

Creating creativity requires the availability of knowledge and information, as well as a group of motivated executives who have a broad set of knowledge, skills and practical skills needed to generate creative ideas. However, managers may take additional measures to stimulate the creativity and initiative of employees, but the necessary conditions for the development of creativity are in need. There are hundreds of activities that stimulate creativity. Some creative techniques (creative decision-making technique, model of productive thinking, synthetic thinking, synectics) are complex processes that result in the creation of variants of creative solutions to problems, in which other special creative techniques can be involved [12, p. 83].

3. Creative and innovative potential of the enterprise as a complex and controversial process.

The creative and innovative potential of an enterprise as a complex and controversial process is a fold of adaptive

systems, since it consists of many parts that interact with each other within certain limits and are able to change to learn from their own experience. As early as the late 1940s, a separate branch was created by Ludwig von Bertalanffy, known as the general theory of systems, in the context of which most phenomena in the universe can be regarded as a network of interactions between elements of a particular system. Thereby, it was recognized that the relationships between the elements of the system were dynamic rather than static. In this case, the creative and innovative potential of the enterprise as a complex and controversial process is considered in the context of autopsy categories, (self-construction of the ways in which the systems constitute themselves), homeostasis (the ability of the system to support itself), adaptation (the ability of the system to interact with the environment) [13].

Cybernetics studies sophisticated managed systems that have goals and interact with the environment through feedback mechanisms. The goal of cybernetics is to study processes that occur in managed processes, consisting of multiple iterations of any action that causes changes in the environment aimed at obtaining information about the state of the environment and returning on that basis to take a new action. For cybernetics, this cyclical process is fundamental. For the development of the creative and innovative potential of an enterprise as a complex and controversial process, the most important factors are information, knowledge, communication and purpose, as well as the crucial role of feedback in the evolution of behaviour of complex systems [14].

The theory of dynamical systems that emerged from applied mathematics in the 1960s examines the states inherent in systems, some of which are stable and the other unstable. If the individual components of the system do not change over time or, after being subjected to one or other perturbations always return to their original state, this means that such stable states act as attractors. Dynamic systems theory is that in order to develop creative and innovative potential of an enterprise as a complex and controversial process, it is necessary to have the stability that is formed due to the components – knowledge, information, qualified staff, etc. [15]. Game theory seeks to describe the behaviour of systems in situations that require a strategic approach, when the success of one system depends in part on models of the development of creative and innovative potential of the enterprise as a complex and controversial process that leads to sustainability, chosen by other systems and explains the behaviour of people in systems that lead to sustainability [16].

Chaos theory argues that even the smallest changes in the beginnings of models of a dynamic system of creative-innovative potential of the enterprise as a complex and controversial process can subsequently cause serious consequences. This means that the behaviour of many systems is ultimately unpredictable, and small difficulties can translate into huge problems. Another of the breakthroughs of chaos theory is fractals and large-scale

invariance, when they demonstrate uncertainty and variability as the basic properties of an enterprise's creative-innovation potential as a complex and controversial process.

Studies of dissipative systems have given us an idea of the spontaneous formation of structures of creative and innovative potential of the enterprise and how the organization or reorganization of self-organization of systems and the enterprise can be blown within the achievement of the purpose and results of the enterprise as a single social organism. The creative and innovative potential of the enterprise as a complex and controversial process should facilitate innovative production and their introduction of scientific innovative inventions into mass production.

Provide the author's definition of the definition of creative and innovative potential of the enterprise as a complex and controversial process. The creative-innovative potential of the enterprise as a complex and controversial process includes knowledge, information, technologies, human experience, material means necessary for the development and solving of problems of the enterprise – economic, infrastructural, social, existential, production, aimed at economic growth, increase of income, addressing social justice issues that create the conditions for new products and increase the efficiency of the economy, providing greater opportunities for technological development turning and empowering the resources themselves; increasing production efficiency and well-being for more employees of the enterprise, which necessitates significant changes in production to boost economic development and promote the competitiveness of the enterprise, which needs to be equipped with the best technologies and organizational capabilities that appear only in the presence of creative and innovative potential, which is the main source of the latest technological and organizational findings, the engine of an economic mechanism that can contribute to a lively economy growth.

From creativity, knowledge and innovation, it is necessary to move to innovative production and their introduction into mass production, combining the cycles of research and production, promoting the development of new products and the introduction of new technologies and the growth of production volumes through the introduction of innovations, retraining of employees development of new technologies.

Success of innovation can occur only when developing a cluster approach, when there is an accumulation of a critical mass of specialists, knowledge, information, thereby achieving a synergistic effect and the economy of the enterprise "shoots" towards the innovative development of the economy as a whole and the development of high-tech sectors of production, which can be identified by ultra-high efficiency, technology mastery are the obvious cause of aggregate wealth, insofar as they are an integral part of many industries the main criteria of which are knowledge-intensive (high

ratio of scientific professionals to the total number of employees), a large percentage of research costs compared to total costs, maximum flexibility and availability, high quality competitive products, high risk and profit [17, p. 216].

The development of creative and innovative potential of enterprises captures a certain process of cultural creation, the conditions of its flow, denounced in the form of artefacts, but also a broader socio-cultural context associated with changes in the process of being, as it is the systemic factor and the basis, key business products the engine of scientific and technological process, has a high share of high-tech products, high speed of their introduction, which contributes to the structural restructuring of the economy and forms of organization and management of science, manufacturing (business), provides for the creation of new industries and resulting impacts on society, economy and people.

### Conclusions

1. The development of productive capacity, especially in the field of production, is key if we are to adequately respond to the most serious emergence of our time – climate change. In addition to changing the demand pattern, rich countries will need to continue to increase their productive capacity in green technologies. Developing countries to cope with the adverse effects of climate change need to further develop technological and organizational capacity, much of which can only be gained through the industrialization and introduction of new technologies based on information and communication technologies and the stimulation of competitive enterprises.
2. In connection with the development of creative and innovative potential of enterprises, as a key to their survival, research and development works, research and innovations of innovations should be financed, and then their development and commercialization, the decision of the management of the enterprise to extend and bring them into the circle of potential implementers and only then the innovation will be introduced for the first time and the process of diffusion will begin.
3. To develop a conceptual model of creative-innovative potential of the enterprise as a new socio-cultural phenomenon, which can be constructed at the expense of concepts - methodology, technologies, innervations and forms of their organization, technologicalization and commercialization and technologicalization of science. Modern science is a major factor in the intellectual resource of the creative-innovative potential of the enterprise, in which the innovative development as a priority of material and economic and social prosperity come to life in the means of production (for example, technological lines) and provides the guaranteed desired result and produces algorithms intellectually-logical operations, which provides a guaranteed result of the activity in the form of a commercial product, as much provides a level of quality as a measure of satisfaction of the request and high-tech innovations attract maximum investment and maximize profits.

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