Factor of Digital Culture in the Application of Artificial Intelligence in Economics and Education

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***Abstract*—The purpose of the article is to attract the attention of young researchers of research on the problems of digital culture as one of the most important factors in the successful development and implementation of artificial intelligence technologies.It is shown that the relevance of the development and application of AI technologies is due to the growing complexity of the objectively necessary tasks of economic management and the ever-increasing pace and scale of digitalization.The importance of the digital culture factor in the formation of a digital environment comfortable for life and interaction is noted, which determines the effectiveness of synergistic processes of self-assembly and self-organization of complex dynamic systems, which are modern society and economy in the context of global digitalization.The role of digital culture is analyzed as a science about the relationship of people to each other in the digital environment and the environment itself with the outside world and as an institution for achieving excellence in the creation and application of digital technologies and artificial intelligence technologies.**

***Keywords*—artificial intelligence, digital culture, synergistic effects in the economy and society, digital culture in the economy and education, digital culture of the enterprise.**

I. Introduction

Currently, artificial intelligence (AI) is entering a new phase of development and is increasingly becoming one of the main catalysts for change in the economy and education.

At the same time, decisions on how to use this technology, to balance risks and opportunities, are made primarily by large corporations, relegating to the background research on assessing the risks of developing and implementing applications with AI technologies. As a result, the development of AI is very contradictory and zigzag.

If in 2022 32 significant industrial machine learning models were created, then only 3 by scientific centers. There is a tendency to reduce the departments dealing with ethics and security issues in corporations like Microsoft or Google. This is mainly due to the fact that AI technology has begun to require more and more resources: personnel, information (databases) and computing power necessary to create such applications. At the same time, there is a growing interest in the regulation of AI from the public administration: an analysis of the situation in 127 countries showed that the number of laws adopted in different countries containing the phrase "artificial intelligence" has grown from 2nd in 2016 to 37th in 2022 [1].

It is obvious that with the growing concerns about the impact of AI on the labor market, the regulation of the use of AI will be improved in various directions, which requires the development of an appropriate methodological framework for assessing the risks of AI and choosing directions for the development and application of applications with AI technologies. In terms of areas, in our opinion, these are economics and education. In terms of methodology, this is the application of the principles of synergetics to the construction of qualitative models (phase portraits) of economic development under the influence of the growth in the use of AI in various fields of activity with an assessment of the impact of the level of human development on the consistency and success of society development.

II. The objective necessity of AI

According to the conclusions made by academician V.M. Glushkov [2] in the early 70s of the last century, the complexity of objectively necessary management tasks is growing faster than the square of the number of people employed in the economy of people. Since, as a result of the constant development of technologies and organizations, the complication and deepening of specialization and cooperation between economic entities, new connections arise, and hence new management tasks. At the same time, the number and complexity of emerging tasks and the number of people employed in the economy have a non-linear relationship, which makes it diffi-

cult to build integrated planning and economic management systems in the context of digitalization: building a digital state plan and a digital strategic management system. Appropriate training and retraining of personnel is of key importance. If in recent centuries mental abilities were more important than emotional skills and the ability to work with hands, then now, there is a reversal of the trend — emotional (social) skills, such as empathy, the ability to build relationships and persuade, come to the fore. At the same time, the balance between cognitive and social skills will change significantly even in traditionally intellectual professions, which necessitates appropriate changes in the education system related to the development of emotional intelligence among schoolchildren and students and its adaptation to activities in the digital environment. Emotional intelligence is considered as important as mental ability (IQ) because it helps to establish teamwork and achieve synergies in production and management while reducing the number of employees. With regard to AI, it is assumed that intelligent digital technologies will replace people in routine tasks, and people will be successful in activities that require good social skills (soft skills) and interdisciplinary experience.

III. Synergetics is a "gathering point" of opinions on the directions of digitalization and the application of artificial intelligence technologies

The main goal of numerous theories of digital transformation and AI is an attempt to build certain models to predict the development directions of this process in order to increase the efficiency of the economy and the sustainable development of society [3].

In the last two decades, in the analysis of various problems, the principles of synergetics are increasingly used — the science of the processes of development and self-organization of complex systems, which, undoubtedly, is any modern enterprise. The main thing in synergetics is the self-organization of the components of complex systems when a certain variety of elements and relationships between them are reached, and the presence of a certain degree of culture of production participants.

Self-assembly refers to the process of combining system components into horizontal structures. And selforganization is the emergence of qualitatively new structures (bifurcation) as a result of multiple interactions of components of lower hierarchical levels in order to form a production environment that is comfortable for interaction — convenient, fast, with minimal barriers.

In practice, various irrational phenomena in the course of digital transformation are encouraged to turn to synergetics, which are not always amenable to clear definitions and explanations, but are definitely determined by the level of organizational and digital culture of the employees of the enterprise.

In a more simplified cybernetic representation, an enterprise is a program that ideally works according to self-assembly and self-organization algorithms through the dynamic formation of a cultural environment and cultural code (skills, abilities, traditions, values, ethics, aesthetics). This program "works" in the direction of ever faster, more diverse and simplified interaction of the elements of the enterprise to create higher forms of organization in accordance with the laws of natural harmony.

With this approach to considering the digital transformation of an enterprise, it becomes possible to analyze production and get an explanation of the reasons and forecasts for the development of modern digitized enterprises.

It is important to note the interdisciplinary nature of the synergetic method, which requires the joint efforts of scientists and specialists from various fields — from philosophers, artists, mathematicians, engineers to managers and system analysts.

It can be assumed that both the industrial revolution in the past and the modern information and digital revolution are the result of the adaptation of people and industries to new technologies. In turn, the problem of creating an information and digital culture is to form the environment and people's skills (digital competencies) as a condition for self-assembly and self-organization. The understanding of technologies should turn into a desire to use them effectively.

At the same time, as practice shows, the main engine of self-assembly and self-organization is artificial intelligence (AI), on the level of development and application of which economic growth and quality of life depend.

IV. Principles of synergetics in the development of the economy

The structure of the economic system and society as a whole is determined by the nature of the interaction between its elements. From the point of view of synergetics, the goal of the economy as a subsystem of society is the self-organization of producers and consumers of goods and services, which works according to the pricing model "goods — money — goods". The current market economy is focused on the concentration of ownership, which leads to the division of players into active and passive ones. In the time of Adam Smith, the economy was a market economy as long as producers and consumers strictly followed the postulates of the Protestant ethic [4]. Over time, the ethical culture of selforganization of the economy under the influence of the imperative of profit was increasingly eroded, leading to an increase in inequality in society, which was offset by an increase in consumption and a decrease in the birth rate in the most civilized countries. In a planned economy, self-organization was hampered by excessive administrative regulation of the forms of interaction between economic agents and prices for products and services. Therefore, it is necessary to move to a new paradigm - a digital

sharing economy, which will give a new impetus to self-organization due to the greater information content of consumers and producers and the growth of opportunities for their cooperation in the production of goods and services. That is, cultural self-organization is required first, and then economic selforganization takes place.

The digital economy of the future is an inclusive, solidarity and sharing economy, which means the maximum involvement of the population in production, the distribution of income in accordance with collective interests, the maximum efficiency in the use of the country's resources through cooperation between enterprises and individuals based on trust and transferring responsibility for work to lower levels of decision making. As a result, there is more space for the emergence and development of new ways of entrepreneurship and cooperation between producers of goods and services and taking advantage of the digital environment.

V. Features of the digital environment

The digital environment is an integral part of the natural and virtual worlds surrounding a person and becomes as significant as the natural world. The speed and extent of change is critical. The forecast of unregulated development of the digital environment is not optimistic. It is not those who provide quality content that win, but those who quickly gain a critical mass of consumers. The intelligence level of data processing systems ("digital footprints") is growing, but trust in the system is decreasing. Deepfakes and chatbots increase the entropy of the environment, which goes into the turbulence stage. The environment is no longer conducive to the production and perception of new information, ceases to be useful for development and increases cognitive degradation. The pattern of thinking and the pattern of behavior are changing. New synergies are emerging, and the challenge is to predict bifurcation points and define digital development trajectories. The maximum effort is to determine what measures should be taken. To do this, it is necessary to define some research framework and methodology. For a qualitative assessment of development, synergetics is most applicable, among the priority measures is raising the level of digital culture [5].

The four new laws of robotics formulated in Frank Pasquale's book also confirm the growing importance of culture in the creation and application of AI systems [6]:

1) Robotic systems and AI should complement professionals, not replace them.

2) Robotic systems and AI should not pretend to be people.

3) Robotic systems and AI should not fuel a zero-sum arms race.

4) Robotic systems and AI must always contain an indication of the identity of its creator (or creators), operator (or operators) and owner (or owners).

VI. Digital culture

Digital culture is the science of the relationship of people to each other in the digital environment and the environment itself with the outside world. In the most general sense, digital culture can be viewed, on the one hand, as an institution for achieving excellence in the creation and application of digital technologies, on the other hand, as a set of practices for regulating the behavior of people and communities in the digital environment. The methodology for creating an environment with such characteristics is based on the synergistic principles of self-assembly and self-organization of complex dynamic systems, such as modern society and the economy in the context of global digitalization. Synergetics makes it possible to connect the humanities and natural sciences and gives an understanding that we live in a highly nonlinear world, that social systems are historical and depend on their "trajectory" in the past [7].

The phenomenon of digital culture, due to its complexity, should be considered at three levels: a person, an enterprise (community) and society as a whole:

1) With regard to an individual, the essence of culture is the development of imaginative thinking, which allows you to create an ethical coordinate system for life in a digital environment. Culture creates appreciation and self-esteem of the individual in digital interactions. Digital culture is the ability to understand the patterns of development of digital systems, which gives a person additional vitality to solve complex problems and determine their role in shaping the digital environment. It is conscious activity in the digital environment that gives rise to digital culture.

2) In relation to the enterprise, digital culture is what employees do, what they believe in and how they behave over time, that is, it is the attitudes, behaviors and habits associated with digital technologies that employees repeat over time.

For an enterprise, digital culture is to some extent a task, after completing which one can begin to solve the technical and organizational problems of introducing new technologies into production and management. That is, understanding that the digital environment predetermines both the appropriate organizational structure of the business and the behavior of the employee in terms of his competencies and values.

Cultural costs have a strong impact on the development of the traditional economy and have even greater consequences in the digital economy. The more complex the technology, the higher the requirements for qualification and quality of interactions. Studies show that over 30of the obstacles to successful digital transformation of enterprises are due to the cultural and behavioral problems of employees and the unwillingness of managers to communicate effectively in the digital environment.