УДК 330:004.738.5

Опубліковано 19 лютого 2022 року

ECONOMIC AND ORGANIZATIONAL ISSUES OF RESTRUCTURIZATION OF ENTERPRISES WITHIN DIGITAL TRANSFORMATIONS

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Abstract: *The research analyses economic and organizational issues of restructurization of enterprises within digital transformations. It characterizes the composition and forms of socio-economic systems, which include tangible assets, information algorithms, and synergetic communications. The research determines vectors of restructuring of economic systems, the formation of prerequisites and appropriate disruptive technologies for the implementation of modern phase transition, quasi-viral nature of technological change, economic components of transformation processes, and digitization directions and components of restructuring of socio-economic systems. The research suggests tasks for solving critical socio-economic problems, including the prevention of the global environmental crisis.*

INTRODUCTION.

Currently, humanity is going through a phase transition to a new social order during the three industrial revolutions (Industry 3.0, Industry 4.0, industry 5.0). Today we are witnessing an unprecedented reality that humanity is experiencing - a phase transition to a new social order, formed on new technological principles, new social relations, new social institutions, a new human essence, which can be called a digital society.

 DOI 10.36074/paaaseeirdfegcc.ed-2.06

THE MAIN PART.

Transformational restructuring is based on appropriate preconditions that change the content of three key factors that determine the composition and forms of socio-economic systems: tangible assets, information algorithms, and synergetic communications. The result is a qualitative change in the main components of social production: the production base, information principles of production and consumption, social relations, and communication links.

Thanks to the new principles of the functioning of the productive forces and the realization of industrial relations, it is possible to solve critical socio-economic problems, including the prevention of the global environmental crisis that threatens the existence of human civilization on Earth.

Such tasks primarily include:

- obtaining energy from renewable sources, which will not be associated with the formation of additional energy on the planet;
- production based on additive technologies, which is based on the principles of "adding the necessary substance" and not on "cutting off excess" (from extracted from the bowels of the earth substance), i.e., the method that dominates production today;
- transition to closed cycles of resource use;
- transition to the use in the production of materials that are organically perceived and processed by the ecosystems of the planet;
- deconcentration of production systems and introduction of horizontal distributed networks of production and consumption of products;
- intellectualization of industrial and domestic systems;
- sustainable development of public life
- transition to the improvement of life quality and personal development.

Prerequisites for solving these problems today are laid in the processes of transformational changes and restructuring of socio-economic systems to new principles of organization of production and social life at different levels of management.

Economy and business are the two critical areas of society that ensure production and consumption processes. Therefore, they entirely depend on the fundamental technologies of production of material resources and energy and essential economic principles and principles of enterprise organization.

1. Vectors of restructuring of economic systems.

Like any physical process, socio-economic systems' phase transition (PhT) and corresponding restructuring require certain energy input. It is necessary

to transfer the system from one homeostatic level to another. Energy is expended even when the system moves to a lower level of new homeostatic status.

However, it should be noted that during the phase transition, part of the energy consumed can be compensated by its release during the dismantling of the old structure and connections of the system. However, energy consumption is not the only thing needed to implement PhT. It becomes clear if you dive deeper into the concept of system content.

Any system has a trialectic nature of its formation. This means that it is a material and energy object and an information entity, defining a certain information algorithm of mutual construction of parts of the system in space and the program of their development in time. The third natural principle is the synergetic phenomenon, which ensures the realization of the links between the interaction of individual parts of the system and the links of the system itself with the external environment.

In the system's functioning processes, the mentioned natural principles perform different functions. The material-energy principle performs a force function, ensuring the realization of any movement (and, consequently, changes) within the system and its interaction with the external environment. The information principle directs the action of energy impulses and, therefore, ensures the purposefulness and efficiency of the processes. The synergetic principle unites the activities of individual parts of the system into a single whole, ensuring mutual coherence of subsystem actions and functions. It also provides the integration of this system as a subsystem part in the external environment.

Thus, the PhT of the system to its new level can occur only if all three principles that form the system's content are rebuilt. For example, if you want to increase the car's power, you need to install a more powerful engine. All the layout of the technical part of the machine (in particular, the fuel supply system) must be changed. In addition, it is necessary to change the system of interaction of individual components of the car, making the transition from one mode to another and much more.

When it comes to PhT in socio-economic systems, it is worth noting that the change of any critical components of their functioning to some extent determines the transformation of all spheres of society related to it.

Speaking about the preconditions for the modern phase transition, it is necessary to identify several key events (Fig. 1). In the group of material and

 DOI 10.36074/paaaseeirdfegcc.ed-2.06

energy factors, the decisive role is beginning to be played by creating competitive alternative energy with a mass accumulation of energy; secondly, forming a fundamentally new production base based on additive technologies 3D printers.

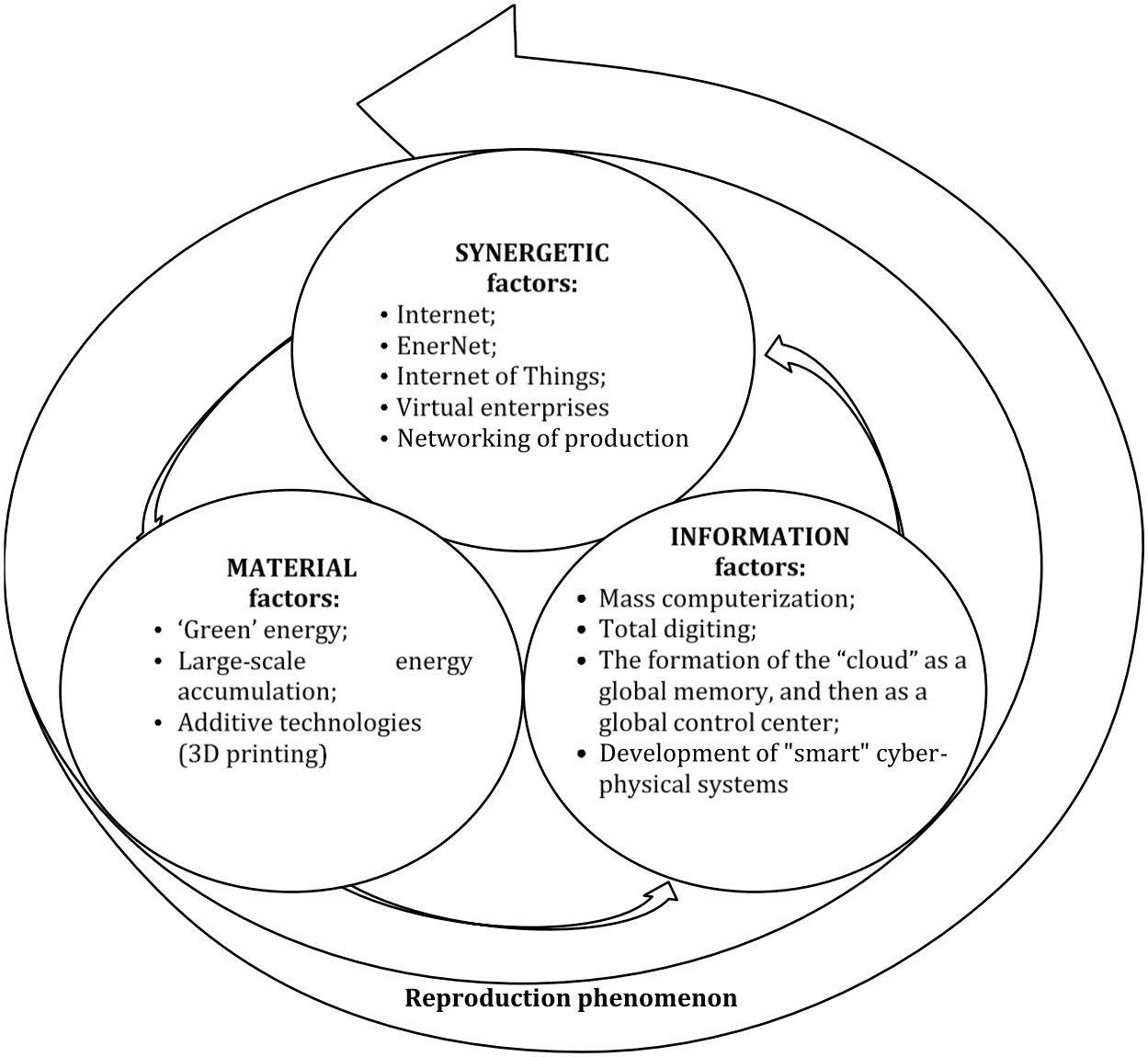

Fig. 1. **Formation of prerequisites and appropriate disruptive technologies for the implementation of modern phase transition**
[compiled by the authors]

In the group of information factors, along with mass computerization, the most crucial role is played by: first, the creation of a single ("digital") basis for recording and transmitting information that provides communication: human to human, human to machine, and machine to machine; secondly, the formation of the "cloud", i.e., the global memory system, which is increasingly beginning to perform the functions of a kind of control center; third, the use of artificial

intelligence and "smart" cyber-physical systems (the "Internet of Things"). In the group of synergetic factors, the decisive influence is exerted by total networking of economic systems and social life based on the Internet; formation of horizontal production and consumer structures; the emergence of intercontinental virtual enterprises.

As already mentioned, the driving forces of the modern phase transition are modern industrial revolutions (Industry 3.0, Industry 4.0, industry 5.0).

The third industrial revolution is a phenomenon of radical qualitative transformation of socio-economic systems, characterized by the following processes: the transition to renewable energy and raw materials, mass introduction of additive technologies and network production systems, digital basis for recording and transmission of information, production and consumer structures and the corresponding solidarity forms of economic relations.

The fourth industrial revolution is the introduction of cyber-physical systems in the production and consumption processes of products. There are fully automated networks that can operate without direct human participation [1].

The fifth industrial revolution is a phenomenon of human adaptation to a cybergenic environment, which develops the personal basis of man, including based on synergetic integration of human cognitive abilities and artificial intelligence and human biological nature and technical means.

2. Quasi-viral nature of technological changes.

Other signs evidence that this transition has already begun, particularly the colossal rate of change of certain indicators that characterize the technological state of socio-economic systems are presented in tables 1, 2.

Table 1

Changes (increase) in some indicators of the world economy for the period 2017-2021

Index	Index increase, %
Solar energy production for the period	80
Production of wind energy for the period	62
Efficiency of solar panels	47
Total energy storage capacities	120
Sale of robots for the year	87
Sales of 3D printers for the year	102
Sales of electric cars for the year	112

compiled by the authors from [7; 8; 9]

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Table 2

Dynamics of the "green" economy of Ukraine for 2017-2021

Index	Index increase in times
Renewable electricity production for the period	8
Changing the power of private solar panels (From 17 MW in 2017 to 1200 MW in 2021)	38
Changing the number of electric cars (From 3.7 thousand units in 2017 to 42 thousand units in 2021)	11

compiled by the authors from [9; 10]

3. Economic component of transformation processes.

Economic factors are crucial components of the changes taking place, which can be called avalanche-like processes without exaggeration. One of the most important tasks to be solved by the Third Industrial Revolution is to make the progressive conquests of science and technology (including those mentioned at the beginning of this section) as cheap as possible. It makes them available to a wide range of users. In particular, PC, mobile phone, Internet, Wi-Fi, GPS were to appear in the majority of the population. Only then could there be a qualitative disruptive to a new technological and social level, preceding the beginning of the phase transition.

The latter is significant because the very concept of "transition to new technologies" involves the theoretical feasibility of specific processes (changes) and the practical implementation of this phenomenon on a mass scale, considering economic and environmental constraints.

The operation of some hundreds or even thousands of expensive home automation devices (even with the help of the Internet) that only very wealthy families can afford, even with great desire, cannot be called a revolution. To be considered revolutionary, any phenomenon must become widely accessible to most members of society. In particular, to implement the Fourth Industrial Revolution, which means direct inter-machine communication, computers, Internet connections, mobile phones and technical devices themselves must become cheap enough (in any case for most producers and consumers).

Such changes are currently happening. To understand this, look at the data in Table 3. It contains some indicators that characterize the dynamics of reducing the cost of specific technical means or services (works) that ensure the implementation of the most critical production processes.

Table 3

Decrease in the cost of technical means / implementation of a unit of work for the last 35 years

Technical means / process	Multiplicity of change, times
Cost of one processor in a computer	10 000
Cost of one RFID tag	1 000
Cost of one conditional operation by an automatic device	1 000
Cost of one video device	500
Cost of one kWh of electricity production by solar panels	150

compiled by the authors from [4; 5; 7; 9]

However, even such astonishing figures must be taken only conditionally because the qualitative properties of modern technology and their counterparts 35 years ago cannot be compared in terms of functions performed, neither in terms of their complexity nor quality of action.

4. Digitization and components of restructuring.

Based on the analysis of several publications [1; 2; 3], the authors formulated the most important functions that these cyber-physical systems will have to perform without human intervention: exchange of information (a kind of "communication" with each other) in real-time; control of environmental parameters and their own; self-activation and stopping at specific information signals; self-tuning to optimal operating modes; projected (advanced, preventive) self-service systems; interaction with the goods produced by them (if we are talking about the production system); adaptation to new consumer needs; identification of equipment needed to produce the necessary goods or meet new needs; self-study of new methods of work.

Without setting ourselves the task of detailing the multifaceted phenomenon of Industry 4.0, which has already been done to a large extent in several publications [2; 4; 5], we will focus only on some issues that seem important from the point of view of understanding the mechanisms of development of socio-economic systems.

Highly efficient autonomous power sources (batteries, accumulators) have appeared, which have provided freedom of movement (change) of technical systems. It would be impossible to create autonomous vehicles, drones, and robots without them. At the same time, sensor systems of colossal accuracy and extremely high efficiency (minimum resource consumption) are

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being created. The latter is extremely important for implementing cyber-physical systems on a large scale [4].

It is necessary to note another important detail. Processes that occur during 3rd and 4th industrial revolutions, in which individual economic entities and local communities form a new reality of the supra systemic level and this is a single global socio-economic system. The actions of cyber-physical systems formed during the 4rd industrial revolution will also be integrated into a single global system. A characteristic feature of metasystemic transitions (i.e. transformations, when systems combine to form a new supersystem level) is the formation of some "brain" centers that provide through the processing of information coordination of any form of movement. "Cloud", i.e., the system of supercomputers, which form a global system of memory and information processing play a big role in the implementation of the phenomenon of "Industry 4.0".

Creating cyber-physical systems during Industry 4.0 and ultimately the Internet of Things is a step towards building a circular economy. This is also facilitated by the digitalization of production processes and developing "cloud" technologies. Ideally, each product will have its label, which will carry information about the source of resources, production technology, the type of energy used for this purpose, and other data. This information is the basis for creating closed cycles of material use [6].

The European Community has initiated a study on another area of change. In several publications [7; 8; 9; 10], it is tentatively referred to as the Fifth Industrial Revolution (Industry 5.0). This direction involves the formation of a synergetic unity of man and cyber-physical systems. Here is how B. Rossi explains the essence of the Fifth Industrial Revolution: "It is aimed at achieving interaction between man and machine, the harmony of human mental work and cognitive computing systems. Man must return to industrial production in interaction with work ... This should provide, among other things, mass customization and personalization for consumers" [9].

CONCLUSIONS AND RECOMMENDATIONS.

Today, when humanity has entered a phase transition to a new socio-economic formation, the role of human capital has increased significantly. It is becoming increasingly clear that the success of economic systems is not determined by tangible assets (natural resources, means of production, financial resources), but by the quality of human capital. The content of human capital

transformations, which are dictated by the course of modern industrial revolutions (Industries 3.0; 4.0; 5.0), and which determine the contours of the future digital economy, are becoming increasingly important. The publication was prepared in the framework of the research project 0122U001232 "Restructuring of the national economy in the direction of digital transformations for sustainable development", funded by the National Research Foundation of Ukraine.

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