

# Digital Economy as a Product of Post Capitalist Formation

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**Abstract—Purpose** – Using fundamental theoretical concepts and empirical data, the goal of this paper is to:

- \* study the relationship and economy digitalization impact on the processes of reproduction;
- \* determine the place of scientific knowledge in the material production.

**Methodology/approach** - This paper uses the research of both modern scientists and classical theories from such economic science mastodons as Karl Marx, Joseph Schumpeter. There are applied methods of analysis and synthesis of scientific theories, conceptual research and empirical data.

**Findings** – The authors conclude that at the present stage there is a new social division of labor, which involves the separation of information production from real production.

The study of the features for the modern technological structure and the specifics of information as a commodity allowed the authors to make the following conclusion:

1. There is an antagonism between private ownership of the means of production and the production of information.
2. Private ownership of the information product hinders the development of the economy.

**Originality** – The value of this article is due to the presentation of unique point of view on the relationship and interaction of information and digitalization for the economy with the reproduction process and private property

**Keywords**—digital economy, knowledge, information, production, public good

## I. INTRODUCTION

The definition of "knowledge economy" was introduced by the American scientist-economist Fritz Machlup [1] in 1962. This term characterizes a sector of the economy with significant excess for the market value of products and

enterprises over the balance sheet. Today, this term is used to define the type of economy that defines knowledge and its production as the development engine. It should be noted that the modern term "digital economy" has been appeared on the basis of the knowledge economy that also includes modern technologies and innovations. Valery Makarov's report [2] "Knowledge economy: lessons for Russia" states: "Nowadays, investment in knowledge is growing faster than investment in fixed assets. According statistics, investment in knowledge by OECD (Organization for economic cooperation and development) member-countries is 3.4% per year compared to 2.2% in Russia. Moreover, 90% of the total amount of knowledge, measured in physical units, has been obtained over the past 30 years. Furthermore, 90% of the total number of scientists and engineers trained throughout the history of civilization are our contemporaries. These are the most obvious signs of the transition from a natural resource-based economy to a knowledge-based economy."

This could be illustrated by the example of a high-tech business in Russia: in 2000 Paragraph International Company had a market value of \$ 40 million compared to its book value of \$ 1 million.

Therefore, knowledge is a public good that is not taken into account in the calculation of GDP. Whereby, Schumpeter's [3] research, that considered the value of knowledge through the costs, incurred to obtain it, presents a distorted picture of the government's expenditures on science, which in reality do not determine the cost of knowledge produced. Thus, mentioned contradiction leads us to conclusion that evaluation of knowledge should be based on its use, because it is a public good.

The main objectives of this article are to determine the value and place of knowledge in the modern production process, as well as to identify the relationship between the digitization of the economy and the reproduction process.

## II. MATERIALS AND METHODS

Using of analysis and synthesis methods for existing theories shows the way to this article conclusions.

The difficulties here lie in the formation of criteria for knowledge consumption. As academician V. L. Makarov noticed: the economy, based on knowledge, can be characterized in two ways.

Firstly, from the input side, that means an assessment of the total costs (total investment) for its basic sector development, in which new knowledge is generated and distributed

Secondly, from the output side, that means evaluation of the contribution to the industries gross value added that mainly consumes new knowledge.

It is possible to consider several concentric, gradually expanding areas:

- from the so-termed high-tech industries of the highest level (high technologies) or leading high-tech (leading edge), which also includes the defense industry,
- to high-tech medium - level (medium high technologies)
- and then to the high-tech services sector.

Generally, the sector of increased demand on new knowledge should certainly involve such sectors as Education and Health, furthermore, sometimes it could involve Culture and Management. Evaluating the relevant indicators allows us to calculate the following most crucial indicators:

- the level of support for the knowledge sector, determined in relation to the world's level or the most advanced countries' level;
- the level of knowledge use in the Russian economy, determined in relation to the world's level or the advanced countries' level;
- balanced development of the knowledge economy, defined by comparison between the input costs, such as research and education, and the output effect, such as the contribution of knowledge consumers-sectors of increased demand for knowledge to GDP.

The balanced indicator should be within certain limits: it should not be too low or too high. The former shows that the cost of production and dissemination of knowledge is inefficient. The latter indicates that the country either does not develop the sphere of R&D and education, or the previously accumulated scientific potential is being exploited and new resources are not allocated for the development. The ratio between indicators of different levels at the output allows us to assess the internal balance of the sector with increased demand for knowledge. In respect of Russia, global research of

economic efficiency for the knowledge sector is just beginning.

The global changes in the national economy, that have taken place over the past fifteen years, are based on the accelerating pace of Internet development and IT technology expansion. Computing tools turn into tools of intelligence and remove the problem of constant reproduction for typical actions, as well as systematize information. Modern design of production facilities, tools, buildings and structures is impossible without the automation systems use.

Changes in production technologies and the nature of work are becoming significant. They are already perceived as an information scientific and technical revolution. The introduction of processors simplified the automation of technological processes. It also contributed to the emergence of a new tool necessary for application programs that makes up the software for the technological process implementation.

Over the past 15 years, robotics has been actively developing, but the greatest impact of intellectual labor automation has had on the design processes. Thus, the labor productivity of design engineers and architects increased by hundreds of times. For instance, BIM technologies (building information modeling), used for information modeling of objects, allow to create a complete information display for the created object.

At the same time, the quality of systems, that automate design processes, leaves great opportunities for their improvement. So, in the article "the Great digital revolution: challenges and prospects for the economy of the XXI century" S. Yu. Glazyev [4] writes: "Computers are revolutionizing the manufacturing sector, where there is widespread automation of routine operations and the manual labor replacement with industrial robots. In the management of complex machines and vehicles, on-Board computers are widely used. Mobile communication is booming, creating new fast-growing sectors in the consumer sphere and providing a significant improvement in the quality of life."

The study of the Kondratiev's [5] long waves formation, conducted by S. Yu. Glazyev for the capitalist formation, allowed him to determine the order of technological modes as certain technological aggregates connected by the same type of technological sequences and creating reproducible integrities.

Technological mode involves a complete macro production cycle including among other basic issues production of resources, their processing and production of final product for public consumption. Some of them are not used for a long time, because the dominant technological structure does not yet correspond to them in terms of the need for them on the part of production and technological systems.

At the present stage, there is a new social labor division, which implies the separation of information production from real production.

During the period of Karl Marx's [6] research, information production played an insignificant role in comparison with material production. It formed a small part of society's GDP.

While the isolation of information production implies, in our opinion, the Marxist theory corrections, singling out production information as the main productive force of society and considering science as an important branch of material production.

For the modern information economy, the law of A. A. Harkevich is valid [7] – "the Amount of information grows at least in proportion to the country's square for the industrial potential". It can be interpreted as follows: to get a linear growth for GDP, it is necessary to ensure a quadratic increase in the production of information.

Therefore, the digital economy is a concept that considers all aspects of the processes for information production separation (production and consumption) from the material. If we consider a number as an information element, any information that a person is aware of can be converted into a digital stream.

### III. RESULT

In order to create conditions for the development of the information space, strategy for the information development in the Russian Federation for 2017-2030 was approved by Russian Federation Presidential Decree No. 203 of 09 March 2017. The strategy sets National interests (paragraph 21) as the main goals: "development of human potential; improving the efficiency of public administration, economic and social development; formation of the digital economy"[8].

Later it was approved the "Digital economy development program in the Russian Federation until 2035" by Decree of the Government of the Russian Federation No. 1632-R of July 28, 2017[9]. To increase national welfare the Program involves the development of a new technological order with the participation of the state in creating a global new ecosystem of the economy.

The main goal of the Digital economy development program is to create favorable legal and organizational conditions for effective development of digital economy institutions with the state participation, the national business community and civil society, and to ensure rapid economic growth through qualitative changes in the structure and management system assets, achieving the effect of the "Russian economic miracle" in the context of the global digital ecosystem formation.

It is noteworthy that as the basis of an information product, information forms specific properties for the information economy:

Firstly, it is impossible to establish information ownership, since the presence of specific other people's information does not deprive you of the same information.

Secondly, if the information is provided for review, it is actually transmitted to the subject of review.

Thirdly, different subjects perceive the same information differently.

At last, once the information is received, it can no longer be recalled.

Accordingly, as the main feature of the information product, we can highlight its representation possibility as a public good. Because it has a property that assumes its production cost does not depend on the produced commodity volume, the information product cost can only be determined by its primary copy. This difference between the information economy and material production leads to the benefit of mass production based on new technologies or software products, because the implementation of each subsequent product instance does not require any information costs. Hereby, it just gives us an increase to net profit.

### IV. DISCUSSION

One of the main challenges of the digitalization period for labor market, that is identified by many scientists, is the danger of mass loss of jobs and technological unemployment. From our point of view, the consequences of Soviet and post-Soviet economic policies for the Russian market will long be more significant than the challenges of the digital revolution. That period was characterized by the collapse of entire industries. However technological unemployment needs to requalify a lot of people and additional government budget spending, but at the same time it can bring significant economical results in a future, such as an effective use of requalified labor for high technologies and new technological way [10].

Contemporaneously, the trends of the Russian period in the 90s indicate a sharp reduction in production of old technological way. There has been a significant decrease in the number of engineers, scientists, programmers, and other highly qualified professionals. Most of them have lost their knowledge and worked out experience, changed the qualified profession to low-skilled job.

Hence, at the economy transition stage to a policy of advanced development based on a new technological way, it faces an acute shortage of engineering specialists.

The digital economy requires radical changes in the management systems of human society. Computerization of control systems will allow to:

- remove an individual from making decisions that are contrary to the interests of society
- apply the mechanisms of democracy and consultation in the decision-making process
- change the interaction of consumer preferences system and social needs, to identify and meet the needs of individuals. This will contribute to the systematic development of production and remove the contradictions between the individual entrepreneurship and production in the entire society.

The concept of Russian Federation information policy states: "In the public administration sphere the implementation of the government information policy opens up opportunities for transition to a new quality of management by providing all subjects of the management system with timely, complete and reliable information based on modern information, telecommunications and communication technologies.

This will allow to:

- significantly improve the preparation and decision-making at the Federal Regional and Municipal levels through the use of a complete, reliable and accessible databases systems for all management objects, as well as develop of intelligent information systems;
- ensure the implementation of all the basic functions for strategic and operative management (analysis and forecasting, information exchange, planning and activities coordination, monitoring the decisions implementation, etc.);
- develop monitoring of emergency situations (natural, man-made disasters and accidents), risky social and political situations, as well as build a system for fast response to these situations;
- make effective public control over the activities of public administration bodies and use transparency for information policy as an effective means to combat the shadow economy, corruption and official crimes"[11].

Therefore, the digital revolution seriously impacts all control systems in society, providing tools for removing the obstacles between the citizen and the government that exist in the modern democracy system. Moreover, digitalization will reduce management subjectivity and will contribute to the real power division into Executive, legislative and judicial, making it possible to change the hierarchical management to a distributed network, as more democratic and adaptive.

At the same time, the main reasons for the changes are tied to the restrictions on information removal access and the real information disclosure by providing General access to the information necessary for analyzing by the authorities. Additionally, it should be noted digitalization provides an excellent opportunity for preliminary decisions testing to assess their effectiveness and results.

It is generally admitted that capitalism relations have formed a class of entrepreneurs. Within the time the entrepreneurs displaced the owners of the means of production (the capitalists), developing new business processes based on innovation approaches. These new business ideas led to the improving of the social living standard that in its turn increased the efficiency factor important for capital investment. The digital revolution involves the creation of information as a commodity, and the form of private ownership for the information product hinders the economy development. If the material object can be saved, the information becomes outdated and cannot be used. Consequently, it can be stated that property is antagonistic to information production, and it requires the use of universal accessibility relations for improvement.

## V. CONCLUSION

Modern challenges and risks, including related to pandemic, have a negative impact on the development of the

national and world economy. They are based on the capital integration processes and the contradictions embedded by society in its reproduction. The current global economic conditions affect the financial system and global industrial production. Changes are revealing the failure of the current model and the need to move to a new model based on the paradigm of the financial and institutional framework. The development of appropriate conceptual approaches is necessary for the economic grows. Modern conceptual approaches define high rates of digitalization inherent in the current stage of economy development. All of the above points to the relevance of the study for Social relations, Property rights and the Reproduction process.

The study of the modern technological mode features and the specifics of information as a commodity, allowed us to come to the following conclusion within a framework of digital economy:

1. There is the antagonism of private ownership for means of production and production of information
2. The private ownership form for an information product hinders the development of the economy.

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