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**The development of space activities economy as a factor of technological modernization of the Republic of Belarus**

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## The development of space activities economy as a factor of technological modernization of the Republic of Belarus

**Summary:** This article considers institutional consequences of contemporary stage of scientific and technological revolution, which include: universal (civilization) interdependence of scientific, technological, social and institutional, as well as economic dynamics; mechanisms of demonstration of designated planetary regularities in the Republic of Belarus and ways of formation of post-capitalist social and scientific community; development of space activities as a way of winning and retaining the scientific and technical leadership and one of the most effective instruments for ensuring strategic stability and security of the state.

**Keywords:** scientific and technological revolution, social and economic transformation, capitalism, post-capitalist social and scientific community, technological paradigms, space economy.

### Introduction

Today the Republic of Belarus, being a young, dynamically developing country, is at a new turning point of social and economic development. The financial and economic crisis of 2008–2010 has also shown in full the crisis of the capitalist social and economic paradigm, which is characterized by focus on individual and group egoism, the desire to maximize profits at any cost, the domination of industrial technologies and the introduction of social and functional innovations with no regard to their social and environmental consequences.

Today the Belarusian political economy has the task to propose the concept of providing innovative development of the country, while maintaining social and environmental priorities of domestic policy. Accordingly, there is a need to

develop a new paradigm of innovation development of the country, focused on global civilizational trends in the context of planetary financial, economic, political, environmental and other signs of crisis.

While considering sufficiently deeply any economic relationship, social exchange of activities is always found at the heart of it. The progress of human society is inextricably connected with the optimization of this exchange, the criterion of which is to reduce transaction costs. Scientific and technical advances, division and cooperation of labor, subordination and ordination between individuals, and many other social phenomena and institutions the more successfully promote economical getting of required materials and energy by humankind from nature, the higher the level of social progress in society is. With the development of “the division of labor” society this dependency increases. All this necessitates the provision of greater degree of economic freedom to economic entities, as a basis for positive synergistic effect of the increasingly complex social and economic system of society. In large part for this reason, in the XX century a social and institutional movement emerged and is rapidly developing in economic theory, focusing on social mechanisms of reducing transaction costs as a way of improving the market economy.

The transition from the economy of demand to the economy of supply can only occur due to the growth of business activity and domestic competition, which are able to increase the elasticity of supply in the domestic market. In its turn, the increase of business activity depends in many respects on the effective management of competitiveness at the level of state, sectors, companies and products. The most effective means in the long run can't become just the improvement of basic characteristics of the goods, but the introduction of innovative technologies into the industry, the creation of fundamentally new products on the basis of a radical modernization of production.

The current stage of scientific and technological revolution poses new challenges to the country, and the Republic of Belarus will be able to answer these challenges only on the basis of proper scientific understanding of interdependence, interdetermination and contradictoriness of process of using the latest technological advances and institutional changes in social and economic life.

The aim of this study is to identify the relationship between the development of space economy and technological modernization of the Republic of Belarus. The scientific hypothesis is the position of the space activities as an integral part of the economy based on the V and VI technological paradigm, as an important tool for winning and retaining scientific and technical leadership in the international arena, as a requirement for preserving national economic and political sovereignty in terms of institutional transformation of the society under the influence of scientific and technological revolution. To achieve this aim, general conceptual provisions about the institutional consequences of the present stage of scientific and technological revolution will be formed on the basis of methods

of system-oriented and institutional analysis, the structure and operating principles of the space activities economy, including the pace and peculiarities of the formation of social and scientific community in the development of space activities, will be clarified, general understanding of the way of building post-capitalist social and scientific community in the Republic of Belarus will be developed.

## **Results of the study**

### **Post-capitalist social and scientific society**

In the social science literature quite a large number of categories is now used to describe the institutional formalization of the impact of the modern stage of scientific and technological revolution, and these categories claim to a comprehensive philosophical and economic description of the society, which is in process of replacing the classical capitalism, based on the industrial technological paradigm. The surge of interest to this issue took place in the 60s of the last century, and, therefore, all these approaches, as V.L. Inozemtsev rightly noted, "...have the visible imprint of radicalism" [1], typical of that period. However, attempts of epistemological simulation of societies (ideal and real) with a high degree of participation of science (basic and applied) did not end there, and they are still going on with increasing energy.

The above theoretical constructions can be divided into three basic approaches. In the first case ([2], [3]), when describing the future society, extremely uncertain and relativistic social paradigms are taken as a criterion for separation. They include "... marked by the highest degree of abstraction – posthistory" and "postmodernity" [1], which have although become, according to V.L. Inozemtsev, "...core for the really serious conceptual paradigms" [1], but because of their exaggeratedly virtual (postmodern) character they are not applicable for the analysis and simulation of real social and economic processes taking place in society.

The second approach allows actual identification of the technological paradigm, which is likely to dominate in the future economic system, with the whole society (which is multistructural in its social and economic and technological nature). Thus, for example, F. Machlup and T. Umesao, M. Porat, Y. Masuda, T. Stonier, R. Katz ([4], [5], [6], [7], [8], [9]) write about the "information society", A. Touraine writes about the "programmable" society [10], D. Dickson writes about the "knowledge society" ([11], [12]), etc.

The third approach is based on the desire to take as a basis of criteria for separation of the future society the core political and economic features, which distinguish this society from the modern capitalist systems. These in particular are "post-bourgeois society" [13], "post-capitalist system" [14], "noosphere

economy” [15], “post-capitalist” [16], “post-entrepreneurial” [17] or “post-market” ([18], [19]) society, etc. It should be admitted, that the main methodological weakness of the latter approach is the fact that this approach is not based on the essential characteristics of the future social and economic system, but on the emphasizing of that institutional parameters which distinguish this system from the modern system of management.

The collapse of modern capitalism will be inevitably accompanied by the increase of international contradictions generated by egoism of the „golden billion” countries and unwillingness of most people of the world to put up with the modern forms of capitalist (predatory in nature) redistribution of material, intellectual and cultural benefits ([15], [20], [21]), and that allows with a high degree of probability to model future society (including its economic system) in case of a favorable (not catastrophic) version of development of human civilization. In this case, the future society that will manage to overcome the defects of classical capitalism, will be characterized by the following features:

- multistructural nature, with transition of private capitalist paradigm from dominant to peripheral, while maintaining its high entrepreneurial potential as an important factor of social reproduction;
- morality, i.e. advancement of morals as the most important criterion and factor in the formation and development of international political and economic relations and national economies;
- ecological compatibility, i.e. strengthening of ecological (environmentally friendly) imperative in the process of social reproduction;
- supermanufacturability, embodied by formation of 5-6th technological paradigms in the real sector of economy.

Thus, the transition of the economy to the “post-capitalist” stage of development cannot but be accompanied by the formation of a new form of social organization of society – social and scientific society. Therefore, in our opinion, until a more appropriate category is found, future society can be referred to as post-capitalist social and scientific society. Named definition stresses, on the one hand, the growth of moral and environmental (post-capitalist) principles of evaluating the cost-effectiveness of social reproduction, on the other hand it shows the increase of the role of scientific and technological revolution and new institutional forms of using its achievements in the economic system of society (the formation of social and scientific community).

Most foreign researchers, while writing about future (post-capitalist, post-industrial, post-entrepreneurial) society, notice that first of all the progress of theoretical knowledge is considered as a basic element in it. “Post-industrial society” – D. Bell says – “is developing today on the basis of all possible use, contained in the progress of theoretical knowledge” [22]. He emphasizes that in this society “the main thing... has become the domination of theoretical knowledge, the prevalence of theory over empiricism and codification of knowledge into ab-

stract codes of characters that ... can be used to study many different areas of experience" [22].

P. Zhraker also stresses that the most important distinction of the present stage of scientific and technological progress is that if the science was used before to improve the means of production and to develop new forms of its organization, now it is used to produce new knowledge [16]. L. Thurow has managed to prove that the development of experimental science in the direction of system science, and then theoretical (fundamental) science determined the consistent formation of leadership of Great Britain, Germany and the United States of America in economic and political terms [23].

With the appearance of the class of intellectuals and the increase of economic return from their labor, "tendency to separate capital from the worker «which existed in classical capitalist society» is replaced by the opposite tendency – to merger them" [24]. At the same time none of the parties (neither workers nor entrepreneurs) is either dependent or independent, they are "interdependent" [16], so they have "to be managed in such a way as if these people were members of voluntary organizations" [25].

A new post-capitalist motivational system is forming within the class of intellectuals, and their moral stands, which have prevented the optimization of their economic interests recently (such as it has occurred to the class of intellectuals in the Soviet Union and post-Soviet transitional society ([26], [27], [28]), today not only far from preventing the growth of their political and economic status in society, but also cause the evolution of the entire social and economic system of society, making it more moral. Morality and social capital accumulated at all levels of society ([29], [30]) ensure stable development, national security and high competitiveness of domestic products.

When choosing methods and mechanisms of social and economic development of Belarus, one should take into account the communal nature of the material and technological environment of our country. It should be pointed out that hypothesis of determinative, decisive influence of the communal and non-communal material and technological environment on the type of institutional structure of society was expressed in 1996 [31] for the first time and since then it has been successfully developed in the writings of S.G. Kirdina. One of the basic postulates in favor of this hypothesis is assumption "... that communal environment forms appropriate economic institutions and defines not market, but distributing nature of the economic system, while non-communal environment determines the formation of institutions of market, or exchange" [32]. It should be taken into account that when considering the process of genesis of the material and technological environment, S.G. Kirdina writes – "...the scientific and technological progress and large-scale human activity can not change the analyzed characteristic of the material and technological environment, transforming it from communal into non-communal, or vice versa. Moreover, it can be seen that

with the development of states the environment peculiar to them from the very beginning shows increasingly its worth and becomes larger-scale” [32]. Accordingly, the institutional consequences of the present stage of scientific and technological revolution will be different for the Republic of Belarus than for countries with non-communal material and technological environment.

### **Economy of space activities**

Modern economy of almost every country, as already noted, is characterized by multistructural nature, and as for economically developed countries – with clear dominance of V technological paradigm, and VI technological paradigm comes to replace it. For example, “in Japan and the United States share of the spread of VI technological paradigm is about 10%” [33]. One of the key sectors of the economy, which V and VI technological paradigms are dominating in, is space activities.

Up to 80% of production technologies within the aerospace industry are universal and can be applied in various economic sectors [34]. As an integral component of scientific and technological progress, space activities provide infocommunication infrastructure necessary for functioning and development of any economic sector and, in its turn, for successful modernization of the national economy. Thus, reliable, timely, complete information about remote sensing of the Earth is increasingly in demand in almost all economic sectors ranging from agriculture and industry to services sector. In addition, within the framework of “new industrialization” it is supposed to switch to high-technology and science-intensive industrial base, to develop small and medium-sized innovative business, to use the cluster approach, to increase innovative activity and mobility of production, to optimize all levels of the formation of value added from the supply of raw materials and components to the after-sale and post-warranty service [35], which would be impossible without the simultaneous informatization of production.

The establishment of national satellite communication system is also essential in the field of national security. Such a system will allow to enhance the information security of the country, to expand the information presence of Belarus in other regions, to supply state administrative bodies, diplomatic and trade missions of the Republic of Belarus and other users with secure broadband connection.

System of navigation and time support will allow to reduce significantly the cost of transport services and to improve traffic safety by optimizing transportation, controlling the vehicle operation, increasing the capacity of highways and transportation speed, improving the efficiency of motor vehicle driving while promoting the safety of vehicle operation. The use of such a system will ensure the provision of timely and objective spatio-temporal information, thereby increasing the efficiency of decision-making.

Aerospace industry traditionally plays a leading role in military and economic security. Dual-use high technologies, widely used in aerospace industry, make an important contribution to ensuring strategic stability and security of the state. Economic efficiency of space activities can not be defined only by standard financial indicators, because in view of their innovative nature space activities have a wide impact on social and economic development of the state. Taking into account the indirect effects resulting from transfer of technologies, products and services (derived from space activities) into allied and related economic sectors, the overall economic impact of space activities can be estimated at the level of contribution to the gross domestic product.

The purpose of space activities goes beyond solving specific technical problems, and getting commercial benefit within its traditional meaning: space activities, bringing synergetic effect to the national economy, serve as a lever for creating competitive advantages both at the level of separate sectors and at the macro level.

## **Conclusions**

Thus, the main competitive advantage at present and in future is intellectual potential of the country, the formation of which should be considered as a priority. Perfecting the mechanism of promoting the most talented representatives of all social classes to the management and intellectual elite involves entering into it not only new people, but also new ideas.

As after overcoming the global financial crisis, the world economy will face increasing cross-country competition, which will be largely predetermined by transition to the next technological cycle, the advantage will go to those countries which have created post-capitalist social and scientific community with the most appropriate institutions. At the same time countries with communal material and technological environment will have a historic chance to become world technological and economic leaders, as post-capitalist (i.e. anti-egonal, humanistic, social), collective, public, universal moral values are more peculiar to the population of these countries. The majority of people of countries with non-communal material and technological environment, which include all the countries of "Protestant fundamentalism" or "the golden billion", its intellectuals among them, are focused on the dominance of individualistic motivations. All this allows the country to evolve institutionally at a leading rate towards the formation of institutions of post-capitalist social and scientific community, to find quickly replacement of the obsolete social and economic institutions, to capitalize resources needed for emergencies, to carry out socialization and moralization of economic practice.

Formation of a comprehensive strategy for space activities is part of deep structural modernization of the entire political and economic mechanism of the country. The strategy of economic development of the Republic of Belarus in the



medium term aims at the growth of share of value added in industry and services as a result of the increase of their intellectual intensity due to the rapid growth of space activities. At the same time the key role here belongs to the process of informatization as „organizational, social and economic and scientific and technological process, which provides conditions for formation and use of information resources and realization of information relations” [36].

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## **Rozwój działalności gospodarki kosmicznej jako czynnik modernizacji technologicznej Republiki Białorusi**

**Streszczenie:** Celem artykułu jest przedstawienie konsekwencji instytucjonalnej we współczesnym etapie rewolucji naukowo-technicznej, która obejmuje uniwersalną (cywilizacyjną) współzależność dynamiki naukowej, technologicznej, społecznej, instytucjonalnej i gospodarczej.

**Słowa kluczowe:** rewolucja naukowa i technologiczna, przemiany społeczne i ekonomiczne, kapitalizm, paradymaty technologiczne, przestrzeń gospodarki.