

СУСПІЛЬНО-ГЕОГРАФІЧНІ ДОСЛІДЖЕННЯ

УДК 911.3

Gladkey A.V.

Taras Shevchenko National University of Kyiv

Information-production cycles as a new functioning mechanism for territorial-production systems

The essence of information-production cycles that provided highly innovative mechanisms for development of territorial-production systems is disclosed. The idea of information-production cycles is based on a classical Soviet scientist's investigation of energy-production cycles proposed by M.M. Kolosovsky. These energy-production cycles maintain rational distribution of industrial enterprises around a particular production process based on the usage of certain types of raw materials, fuel and energy. Nowadays, in new post-industrial conditions, the development of industrial enterprises in different territorial-production systems is based on information, new technologies and innovations distribution. This paper deals with comparative characteristics of energy-production cycles and information-production ones based on the difference in scientific concepts concerning their formation and development. The main fundamentals of information-production cycles as well as the specific features and mechanisms of their formation are analyzed. The peculiarities of information-production cycles usage in the process of economic development of the territory in order to increase its efficiency and improve people's lives are explored. The main scientific goal of this work consists in investigation of innovation and know-how as well as in investigation of their influence on rational distribution of industrial production and on the economic efficiency development on the territory.

Key words: information-production cycles, territorial-production systems, innovation, information technology, diffusion of innovation, the energy-production cycles, economic efficiency.

Гладкий О.В. Інформаційно-виробничі цикли як новий механізм функціонування територіально-виробничих систем. Розкрито сутність інформаційно-виробничих циклів (ІВЦ), що забезпечують нові високоінноваційні механізми розвитку територіально-виробничих систем (ТВС). Сама ідея їх дослідження заснована на класичному радянському вченні М.М. Колосовського про енерговиробничі цикли (ЕВЦ), які сприяють раціональному розміщенню промислових підприємств навколо певного технологічного процесу і на основі використання окремих видів сировини, палива та енергії. Однак, в нових постіндустріальних умовах, подібний ресурс для розвитку ТПС закладається, насамперед, у сфері інформації, нових технологій та інновацій. У роботі подана порівняльна характеристика концепцій енерговиробничих та інформаційно-виробничих циклів, заснована на відмінностях підходів їх формування та цілей функціонування. Розкрито основні концептуальні положення ІВЦ в рамках яких проведено аналіз видової структури і механізмів формування інформаційно-виробничих циклів, а також особливостей їх застосування в процесі господарського розвитку території з метою підвищення їх економічної ефективності та поліпшення рівня життя людей. Також, основний акцент у роботі зроблено на розвитку інновацій та ноу-хау, а також на їх впливі, який виявляється у сфері раціонального розміщення промислового виробництва та формуванні високих показників економічної ефективності підприємств.

Ключові слова: інформаційно-виробничий цикл, територіально-виробнича система, інновація, інформаційні технології, дифузія інновацій, енерговиробничий цикл, економічна ефективність.

Гладкий А.В. Информационно-производственные циклы как новый механизм функционирования территориально-производственных систем. Раскрыта сущность информационно-производственных циклов (ИПЦ), обеспечивающих новые высокоинновационные механизмы развития территориально-производственных систем (ТПС). Сама идея их исследования основана на классическом советском учении Н.Н. Колосовского об энергопроизводственных циклах (ЭПЦ), способствующих рациональному размещению промышленных предприятий вокруг определенного технологического процесса и на основе использования отдельных видов сырья, топлива и энергии.

Однако, в новых постиндустриальных условиях, подобный ресурс для развития ТПС закладывается, прежде всего, в сфере информации, новых технологий и инноваций. В работе подана сравнительная характеристика концепций энергопроизводственных и информационно-производственных циклов, основанная на различии подходов их формирования и целей функционирования. Раскрыты основные концептуальные положения ИПЦ в рамках которых проведен анализ видовой структуры и механизмов формирования информационно-производственных циклов, а также особенностей их применения в процессе хозяйственного развития территории с целью повышения ее экономической эффективности и улучшения уровня жизни людей. Также, основной акцент в работе сделан на развитии инноваций и ноу-хау, а также на их влиянии, которое оказывается в сфере рационального размещения промышленного производства и формировании высоких показателей экономической эффективности предприятий.

Ключевые слова: информационно-производственный цикл, территориально-производственная система, инновация, информационные технологии (ИТ), диффузия инноваций, энергопроизводственный цикл, экономическая эффективность.

Introduction. Problem statement. The Soviet theory on formation and development of the territorial-production complexes (TPC) was mostly based on the M. M. Kolosovky's theory of the energy-production cycles. The energy-production cycle (EPC) is a set of production processes successively rolling out in a certain territory on the basis of combination of various types of energy and raw material in order to manufacture certain products providing appropriate economic benefits. The energy-production cycles provided availability of the flow-through energy and sufficient quantities of the raw materials transformed under the impact of energy from their primary forms (produced and processed raw materials) into finished products of all types, which can be produced in situ because the production facilities are located in the vicinity of the raw material resources while all components of the energy and raw material resources are employed rationally [2].

However, nowadays under development of the post-industrial (better say informational) society, a role of natural energy sources in the production of various material and spiritual benefits gradually decreases. Instead, information and informational resources become the main motive force of the production processes in the territory within the territorial-production complexes. It is information that currently provides rapid development of the science-driven innovative commercial production and the social complexes (better say systems). Progress in science and technology, economic efficiency of production and quality of the public life now depend on continuous and cyclic information flow. Therefore, research of the information-production cycles becomes especially urgent at present.

Analysis of the latest publications and studies. The theory on the energy-production cycles intensively developed in the Soviet period of the national research. Based on the M.M. Kolosovky's fundamental works the idea of the information-production cycles was further developed in the works by M.I. Shrag, M.M. Palamarchuk, A.T. Khrushchov, S.I. Ischuk, O.I. Shably and others. The information resources and their role in formation of the local territorial-production systems (TPS) were studied in the works by A.V. Stepanenko, G.P. Pidgrushny, M.V. Bagrov, S.I. Ischuk, I.O. Pilipenko, D.S. Malchikova and others. In the foreign science the issue of the informational resources and their impact on the production were considered in the works by Geenhuizen, M., Nijkamp, P., Bechmann, M.J., Richardson, H.W. and by Fujita, M., Thisse, J.-F. However, formation and development of the information-production cycles have not yet been studied in detail.

Formulation of the goal and objectives. With this in mind, the goal of this research is to disclose the essence of the information-production cycles and mechanisms

of their impact on formation and development of the territorial-production systems economy, while the objectives include a comparison analysis of the concepts of the energy-production and information-production cycles, disclosure of their conceptual fundamentals, analysis of the type structure and mechanisms of the information-production cycle formation as well as specifics of their use in the economic development of the territories in order to increase their efficiency and improve the living standards of people.

Focus of the research. So, in the classic sense, the energy-production cycle is understood as a combination of various raw materials and energy in a certain territory providing high efficiency (mainly in gross measures) at all production stages. The energy generated from the production and processing of primary fuel and energy resources supposedly passed the whole production cycle up to the stage of the finished product, each time leaving its separate useful part with every transformation, every technological process, and finally released at the final stage creating either a broken cycle (production of the finished products not related to the production of new energy) or a closed cycle (production of the finished products, which in their turn are used for generation of new energy) [2].

The energy-production cycles were mostly open, which significantly reduced the effectiveness of the model under planning conditions. Also, development of the basic industries within the EPC of the local TPC did not take into account priorities in formation of the innovative high-tech industrial production with its high economic benefits. The EPC model underlain by the relations of the supply of raw materials, fuel and energy hampered the development of socially oriented industries as the leading forces in development of the innovative module industrial production.

Therefore, a model of the information-production cycles (IPC) should become, in our opinion, more efficient and modernized in conditions of the post-industrial information society development. Instead of the energy flow in this cycle we deal with through and continuous information flow. Originating in the environment of formation of the advanced innovative technologies, the information flow has a crucial impact on formation of a number of advanced high-tech industries, determining their specialization, economic profile and operational efficiency. In the social sector the information flow provides universal and yet individual nature of services, increases their quality, relevance, accessibility and comprehensiveness, stimulates growth of the services range and facilitates a mechanism for obtaining services [1, 3].

When analyzing the IPC varieties it is important in the first place to analyze those economic sectors that most amply use the advantages of quality and comprehensive information support of their technological processes.

In our opinion, IPC classification should be based on their grouping according to the individual types of cycles. Based on the works by I.V. Nikolsky, who distinguishes 7 IPC groups, we can identify the following information and production cycles: 1) cycles of the innovation metallurgy and blooming; 2) innovative alternative renewable electricity sources; 3) cycles of high-tech innovative machine-building and metalworking; 4) cycles of high-tech innovative chemistry and production of advanced structural materials; 5) cycles of the food production based on biochemistry and genetic engineering; 6) cycles for providing high-tech innovative social services related to access to information and its dissemination; 7) cycles of applied research and innovative design solutions.

Each group has certain types of cycles and every cycle type in its turn is divided into links. For example, a group of cycles on the innovation metallurgy is divided into

two types: ferrous metallurgy and non-ferrous metallurgy. The first type has two links – highly purified ore metallurgy and innovative high-tech blooming while the second one has also two links – rare-earth non-ferrous metals and minor metals.

Regarding the necessity of the production processes aggregation it is advisable to distinguish three main IPC groups formed in various TPCs at the current development stage:

1. The cycles developing on the basis of scientific and technological engineering information and related to the expansion of innovations in various branches of power engineering, metallurgy, machine-building, chemistry and others.

2. The cycles based on the academic science and education, which serve as a platform for further applied research fully implemented in the previous group.

3. The cycles developing on the basis of communication technologies and modern IT aiming at collection, systematization and distribution of various types of information among end users, consumers of the information services, for example, via Internet.

The information-production cycles have complex structure and relationships. As structural entities the IPCs have the following units: 1) element (production); 2) stage; 3) sector; 4) elementary cycle; 5) a set of information and production cycles. In distinguishing the information-production cycles it is necessary to acknowledge that this is the whole number of various productions with many branches interconnected by information (or better by information and technology within IT). The information-technological combinations are called the production chains in these sets. Each of these chains is an element of a more complex whole.

It is necessary to distinguish the main production process in the information-production cycles, which is the cycle core. Further the stages and different side branches are determined. Therefore, the cycle core acting as a certain information flow forms an interdependent set of auxiliary productions and services [2].

The cycles can be complete and incomplete ('cut off' according to M.M. Kolo-sovsky). Completeness of the cycle depends on the conditions of its development in the TPC territory, the availability of the sources of information and mechanisms of its transformation at all stages of the production process, the efficiency of manufacturing the final product. Incomplete cycles exist in those TPCs that do not have their own database ('cut off from the bottom') and where information component of the production is economically ineffective ('cut off from the top') due to a number of structural and economic reasons (mostly in the regions with low-innovative industries that do not require significant information support).

Graphically the cycle can be represented as a tree whose trunk forms the main industries of the vertical relation (core of the cycle) while the branches of this tree represent the horizontal relations. Production cycles are characterized by interdependence of their separate links in their origin and development as well as interrelations of these links based on the production and overall economic relations.

Interrelation of the IPC elements, stages and links may be analyzed by comprehensive study of all forms of the internal relations. The major of them are as follows:

1. The relations formed by dissemination of the innovative engineering and technological information and know-how, information on the patents, inventions, utility models, innovative solutions and other high-tech novelties that stimulate the development of applied research and design solutions. They foster the progress in modern engineering, electronics, robotics, innovative chemistry, the production of new

structural materials, biochemistry and bioengineering and so on. These relations develop most rapidly in such TPCs as technopolises, technoparks, territories of the priority development [1, 3].

2. The relations formed by dissemination of the information flows generated from the commercial businesses, credit, financial and banking activities, international relations and entrepreneurship. Concentration of these activities, their relations and information resources by uniting with appropriate concentration of the financial, innovative, intellectual and creative resources form a unique commercial profitability effect that attract companies and enterprises to this informational and highly developed communicational TPC environment [4, 5].

3. The relations connected with rapid development of the information technologies, Internet, mobile and satellite communications. By receiving access to information and communications the module innovative industries and companies actively develop and form in those TPC where the economic conditions for the development are most profitable and where the use of land and labor resources offer the best economic effect [4, 5].

It is because these relations that the enterprises of certain TPC united into the IPC receive a number of additional economic advantages, high cost benefits and labor productivity, effective use of the fixed assets. Modeling of the above information and communication flows in the IPC is, in our opinion, one of the main factors of regional competitiveness of an enterprise.

Conclusions of this research and prospects of further studies in this direction. As a result, the method of information-production cycles allows moving from the traditional industry analysis based on the analysis of energy flows to the complex cross-industry information analysis. Application of this method greatly enriches the tools and techniques employed for the study of territorial organization of production in the territorial-production systems based on the innovative advanced science-intensive industries.

Literature

1. Ішук С.І. Територіально-виробничі комплекси і економічне районування (методологія, теорія) / С.І. Ішук. – К.: Українсько-фінський інститут менеджменту і бізнесу, 1996. – 244 с.
Ishchuk S.I. Terytorial'no-vyrobnychi komplekxy i ekonomichne rayonuvannya (metodolohiya, teoriya) / S.I. Ishchuk. – K.: Ukrayins'ko-fins'kyi instytut menedzhmentu i biznesu, 1996. – 244 s.
2. Колосовский Н.Н. Избранные труды / Н.Н. Колосовский. – Смоленск: Ойкумена, 2006. – 336 с.
Kolosovskyy N.N. Yzbrannyye trudy / N.N. Kolosovskyy. – Smolensk: Oykumena, 2006. – 336 s.
3. Fujita M. Economics of Agglomeration: cities, industrial location and regional growth / M. Fujita, J.-F. Thisse. – Cambridge: Cambridge University Press, 2004. – 466 p.
4. Fujita M. The Spatial Economy: Cities, Regions and International Trade / Fujita M., Krugman P.R., Venables A.J. – MIT Press, Cambridge MA, 1999. – 640 p.
5. Geenhuisen M. Urbanization, Industrial Dynamics, and Spatial Development: A Company Life History Approach / M. Geenhuisen, P. Nijkamp // Urban agglomerations and economic growth. (Publications of the Egon-Sohmen-Foundation). Papers of a conference held in Zurich in 1993. – Berlin: Springer-Verlag, 1995. – P. 39-79.
6. Hägerstrand T. Innovation diffusion as a spatial process / T. Hägerstrand. – Chicago, The University of Chicago Press, 1953.

Подано до редакції 16.09.2015

Рецензент – доктор географічних наук А.В. Гудзевич