

Artículo de investigación

The main provisions of the evolutionary doctrine in economics**Основные положения эволюционного учения в экономике**

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Mikhail Kovazhenkov⁸⁹**Abstract**

Today, in the economic theory, the mainstream is the following areas: neoclassical economic theory, neo-Keynesianism, monetarism, institutionalism. The basis of these areas is the principle of economic equilibrium. However, more and more economists see the economy not as an equilibrium, but, on the contrary, as a non-equilibrium system. In the framework of this study, the evolutionary economic theory is studied, which can become the theoretical basis for studying economics from the point of view of disequilibrium. For this purpose, the paper reveals the main provisions of evolutionary doctrine in economics, describes the evolutionary mechanisms of development in the economy (variability, heredity, selection, competition), defines the main elements of evolution in the economy (economic feasibility, levels of evolutionary transformation, evolutionary material in the economy, elementary evolutionary factors). This paper is part of a series that reveals the hypothesis that the evolutionary economic theory is a more general economic theory, from the position of which it is possible to more fully reveal the principles of behavior of individuals and institutions to maximize the satisfaction of material needs and on this basis to formulate an

Аннотация

Сегодня в экономической теории мейнстримом является следующие направления: неоклассическая экономическая теория, неокейнсианство, монетаризм, институционализм. В основе данных направлений лежит принцип экономического равновесия. Однако, все больше экономистов рассматривает экономику не как равновесную систему, а, наоборот, как неравновесную. В рамках данного исследования изучается эволюционная экономическая теория, которая сможет стать теоретической основой для изучения экономики с точки зрения неравновесия. Для этой цели в статье раскрываются основные положения эволюционного учения в экономике, описываются эволюционные механизмы развития в экономике (изменчивость, наследственность, отбор, конкурентная борьба), определяются основные элементы эволюции в экономике (экономическая целесообразность, уровни эволюционных преобразований, эволюционный материал в экономике, элементарные факторы эволюции). Данная статья входит в серию статей, в которых раскрывается гипотеза о

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effective economic policy of individuals and institutions, including the state.

Key Words: Economic Theory, Evolutionary Economics, Evolutionism, Institutional Economics.

Introduction

Economics is a social science that explores the problem of efficient use of resources in order to maximize the satisfaction of human material needs. The basis of economics is an economic approach or an economic phenomenon that is closely related to the following characteristics: limited resources and choice, rational behavior, marginalism: benefits and costs (McConnell and Flynn, 2011).

Economics is based on an analysis of the behavior of individuals (consumers, producers) and institutions (commercial, non-profit, state) engaged in the production, exchange and consumption of goods and services. The result of this work is the definition of the principles of behavior of these individuals and institutions, that is, the definition of generalized ideas. The process of defining such principles is called the economic theory. The role of the economic theory is to systematize facts, their interpretations and generalization. The results of the economic theory form the basis of economic policies of individuals and institutions, including the state (McConnell and Flynn, 2011).

The economic theory is so multifaceted that it is customary to divide it into the following sections: methodology of economic science, microeconomics, macroeconomics, international economics, econometrics. In addition, in the modern economic theory, one can distinguish a number of relevant scientific schools and areas that can be attributed to the mainstream: neoclassical economic theory, neo-Keynesianism, monetarism, institutionalism (Hudea (Caraman), 2015; Hiç, 2019; Mai Le, Meenagh and Minford, 2016; Ménard, 2018).

There are also separate scientific doctrines and areas of the economic theory that have existed for

том, что эволюционная экономическая теория является более общей экономической теорией, с позиции которой возможно более полно раскрыть принципы поведения индивидуумов и институтов по максимальному удовлетворению материальных потребностей и на этой основе сформулировать эффективную экономическую политику индивидуумов и институтов, в том числе государства.

Ключевые слова: Экономическая теория, эволюционная экономика, эволюционизм, институциональная экономика

quite some time and which have appeared quite recently, namely: Marxism, behavioral economics, neuroeconomics, environmental economics, Islamic economics, etc. (Christophers, 2014; Schnellenbach and Schubert, 2015; Kenning and Plassmann, 2005; Ma and Stern, 2006; Hassan and Aliyu, 2018).

All this variety of components of the modern economic theory and the presence of controversial points in the explanation of many economic phenomena indicates the absence of a single position among academic economists regarding the problem of efficient use of resources in order to maximize the satisfaction of the material needs of people and humanity as a whole. As part of this study, an attempt will be made to apply the principles of evolutionism to the economic theory.

It should be noted that quite often in economic studies the evolutionary approach is used, which is understood as a set of theoretical and methodological principles of the evolutionary theory, used as a conceptual model for scientific research, interpretation, evaluation and systematization of scientific data, to understand hypotheses and solve problems arising in the process of scientific cognition.

The evolutionary approach has been developing in specific sciences and at the public level since the second half of the 19th century. It has achieved significant success in the 20th-21st centuries in explaining various phenomena of nature and society, in the formation and evolution of a scientific worldview (for example, Latham et al (2006), Hodgson (2013), Almudi et al. (2017)). The evolutionary approach is primarily associated with Darwin, who revealed the mechanism of evolution, the driving force of

which is the interaction of heredity, variability and natural selection (Darwin, 1859). The immediate predecessor of Darwin was Lamarck, who formulated a concept designed to explain the mechanism of biological evolution. The Marxist doctrine made a significant contribution to the evolutionary explanation of history, revealing the fundamental role of economics and economic development in the evolution of social consciousness as a whole and its various forms – political, legal, religious, philosophical, moral. The application of the evolutionary approach began in many social sciences (Zoidov, 2009).

Evolutionary ideas also haunted economists. Thus, Mandeville, Smith, and Malthus expressed the ideas that can be attributed to the evolutionary approach (Yadgarov, 2009). In particular, they recognized the spontaneous nature of the socio-economic order. Smith believed that diversity and specialization not only do not impede order, but also form part of it, and this applies not only to the objects of the biological world, but also to the social one. Mandeville considered the problem of establishing order through the prism of ethics and pointed out that order can be born from disparate and disordered actions of people, that is, people do not act within the framework of a single program of behavior, but this does not prevent them from achieving common goals. Malthus introduced the idea of natural selection and connected it with the struggle for limited resources, he not only drew attention to the struggle as a necessary component of the development process, but also pointed out that without the struggle, defeat and even death, the development of a population is impossible.

Economists of that time recognized that the evolutionary theory of Darwin could be presented as an economic model of competition for limited resources, based on the so-called Darwinist triad of processes: variability, heredity, selection.

Despite the high potential for using evolutionary ideas in the study of economics, the evolutionary theory did not have a significant impact on the development of economic thought. Moreover, in the second half of the 19th century, evolutionary ideas began to fade from economic research. In economics, the approach of Jevons triumphed, namely, the Newtonian approach in its most simplified interpretation, the meaning of which was reduced to the theory of equilibrium (Yadgarov, 2009). In this regard, Veblen in 1898 asked the question: “Why is economics not an evolutionary science?” (Veblen, 1898), and with

the help of the institutional side of economic processes, the author proposed to correct this situation. The mechanical approach in economics has become even more firmly established in connection with the work of Bentham on the calculation of utility (Yadgarov, 2009).

Marginalist ideas have become increasingly established in the economic sciences, and less attention has been paid to the problems of development. Equilibrium was understood by economists as a perfect state in which individual plans were agreed upon and utility reached its maximum. Accordingly, the search for a natural-scientific analogy for the economic theory was no longer carried out in biology with its theory of evolution, but in mechanics with its equilibrium state in the absence of any movement (England, 1994).

However, in the authors’ opinion, the evolutionary economic theory is fully integrated into the modern understanding of the fact that economic development occurs not as a process of ensuring equilibrium, but quite the contrary as a non-equilibrium process, a process of constant transition of a system from one equilibrium state to another (Kostyuk, 2001, 2004).

Thus, the book by Prigorine and Stengers (1986) directly refutes the identification of equilibrium with order and argues that the emergence of new dynamic states of matter that determine the further evolution of material systems at various levels is possible only under highly non-equilibrium conditions. On the basis of this approach, the previous idea of equilibrium as a source of harmony, stability and order in Nature was noticeably shaken.

However, until now in the economic theory the mainstream is the provision on economic equilibrium. According to Makarov (1995), the theory of general economic equilibrium is not entirely consistent with reality. For example, in the real economic world, there are huge differences in the efficiency and profitability of various subjects of a market economy – firms, industries, regions, etc. From the point of view of the equilibrium theory, these differences should decrease and disappear as capital and labor overflow into the most effective areas of their application, as a result of which less effective competitors should disappear from the market or be absorbed by the most effective. In reality, just the opposite happens: the diversity and spread in efficiency not only do not disappear, but even increase sequentially.

Maevsky (1999) in his research notes that the magnitude of demand depends not only on income levels, interest rates and current prices, but also primarily on people's real needs for goods and services. Moreover, all entrepreneurs, planning their business for the future, in the face of the uncertainty of future current prices, are guided precisely by the excess of real demand over real supply, i.e. the occurrence of a non-equilibrium process. Thus, Mayevsky does not reject the main conclusions of the classical theory of equilibrium, he only proposes to supplement it with the evolutionary approach that takes into account non-equilibrium processes and their impact on market equilibrium.

The purpose of this study is to disclose the basic principles of the evolutionary doctrine in economics, a description of the evolutionary mechanisms of development in the economy (variability, heredity, selection, competition), the definition of the basic elements of evolution in the economy (economic feasibility, levels of evolutionary transformation, evolutionary material in the economy, elementary factors of the evolution) in order to reveal the evolutionary nature of the economy.

The research hypothesis is that the evolutionary economic theory is a more general economic theory, from the position of which it is possible to more fully reveal the principles of behavior of individuals and institutions to maximize the satisfaction of the material needs of individuals and society.

Methodology

This paper is one of a series of articles devoted to the evolutionary economic theory. Just as the evolutionary doctrine in biology encompasses a wide range of problems related to the historical development of wildlife, so in the economy there are some urgent problems related precisely to the evolutionary nature of its development. The most important of them, in the authors' opinion, should include:

- The problem of proving as a general, typical property of the economy and society the evolutionary nature of their development in spite of rather rare special, atypical cases of revolutionary, spasmodic changes in production relations and productive forces;
- The substantiation of the progressivity of the evolutionary development of social production as an irreversible,

positively directed historical phenomenon;

- The study of factors driving the evolution – technical and technological variability of social production, market-consumer selection of manufactured goods, heredity of technological structures – which lead to an understanding of the causality of the evolutionary development of the economy;
- The identification of directions, paths, levels and patterns of evolutionary processes in the economy;
- The forecast of the paths of technological breakthroughs, innovative development of the economy, predicting its future in order to manage evolutionary processes in the direction most favorable for society.

In the framework of this article, the issue of studying the factors driving the evolution in the economy is considered – technical and technological variability of social production, market-consumer selection of manufactured goods, heredity of technological structures.

The main research methods were the study and analysis of Russian and world literature on the topic of the evolutionary economic theory; a comparison of evolution in biology and economics was used. This paper is an attempt to identify the main provisions of the evolutionary doctrine in economics.

Results and discussion

Technical and technological variability of social production

Having shown the variety of forms of variability, Darwin explained its material causes, which are the environmental factors and the conditions of existence and development of living organisms. But the influence of these factors is not the same depending on the physiological state of the organism and the stage of its development.

Same in the economy, the environmental factors, the environmental conditions of economic entities and the development of social production and reproduction influence the variability of production technologies for goods. At the same time, the main requirement for variability in the economy is to increase production efficiency, the level of which ultimately determines the degree to which the economic and commercial goal of entrepreneurship is achieved – maximum profit

(Coase, 1937). The production efficiency is the higher, the higher the efficiency of individual technical and technological evolutionary changes in the sense of the greatest saving of initial resources per unit of the desired product. Saving resources and producing, therefore, an additional quantity of goods in comparison with the previous reproduction cycle is the main condition for reducing the cost of production per unit and, consequently, increasing price competitiveness in the market among similar goods. The lower the cost of goods produced, the greater the reserve of possible maneuvering in pricing in order to attract as many consumers as possible through the cheapness and quality of the goods while maintaining high enough profit performance.

Meantime, it should be understood that the additional quantity of goods produced due to the resources saved is a tangible form of profit generation. Its implementation on the market already provides profit (surplus value) in the money form.

In connection with the aforementioned, it becomes clear that individual market entities, like living organisms in nature, striving for survival, cannot ignore the principle of technical, technological and organizational variability of production, since only it contains their ability to ensure sustainability, stability of own production (Cantner and Pyka, 1998).

Market selection

In accordance with the phases of the reproductive cycle of social reproduction, the next principle of evolution in the economy is the principle of selection (Winter, 1971, 1987).

In biology, artificial and natural forms of selection are distinguished. By artificial selection is meant a system of measures carried out by a person to improve existing and create new species of animals and plant varieties with economically useful hereditary traits.

In artificial selection, Darwin identified two forms – methodical and unconscious. Methodological selection is purposeful breeding of a breed or a variety. With the unconscious selection, a person does not set out to create a new breed or a variety, but only leaves for breeding and mainly breeds the best individuals. Due to the differentiated reproduction in a number of generations, certain characteristics of selected individuals gradually increase, which in the end, although slowly, leads to the formation of new breeds and varieties. Therefore, using

natural variability and heredity, through the reproduction of some individuals and culling of others, a person slowly changes organisms.

In the economy, both methodological and unconscious approaches of artificial selection of technologies, equipment and organization of production within the framework of various enterprises are actively used. Within the framework of such a selection, there are many facts of the budding of new branches and sectoral complexes from existing ones, which makes it possible to draw a corresponding analogy with the formation of new species of living organisms that arise from existing species.

In the economy, one can also see the makings of artificial and natural selection in the evolutionary process of its development. The artificial comes from the state as a guiding force for the development of certain sectors of the economy or various forms of production organizations, speaking about the degree of state intervention in the regulation of economic relations at various levels of the hierarchy. In the economic theory, there are many supporters of state regulation of the economy.

The natural comes from the market, as a mechanism for regulating economic relations, which in the economic theory since the time of Smith has been called the “invisible hand of the market” (Gilbert, 1997). If in nature, natural selection manifests itself through many generations, when subtle individual changes are summed up, combined and become characteristic adaptive signs of groups of organisms (population, species, etc.), then in the economy the process of natural selection occurs much more intensively and is carried out regularly through the mechanism of market selection of the best goods in the economic sense and the best enterprises. Natural selection in the economy is implemented in each reproductive cycle through which new batches of goods regularly pass. Any, even subtle, individual changes in engineering, technology and organization of production become the property of natural selection literally at every turn in the implementation of the reproductive cycle. Accordingly, adaptation to market conditions in the economy occurs systematically.

At the same time, if a new enterprise of a certain industrial orientation is born, then it certainly emerges in accordance with all the new advances in engineering, technology and organization of production that have been accumulated over many reproductive cycles of passing through the

sieve of market natural selection. In this regard, the process of accumulation of adaptive properties of manufacturing enterprises is similar to the natural process of adaptation of organisms to environmental conditions, to the conditions of existence.

The only difference is that the changes that have occurred in engineering, technologies, organization of production processes in the organizational and legal forms of enterprises are not automatically recorded in some of their gene structures, similar to what happens in the phenotypes of natural organisms, but are left to the will of the organizers of enterprises, technological lines, engineering developers, etc., so that they can consolidate their achievements in the manufacturing process (Brennan, 2006). Of course, all these changes are recorded by means of consolidation and transmission of information developed by the human community.

Heredity

The next important factor in evolution in Darwin's evolutionary theory is heredity, that is, the ability of organisms to transmit structural features, functions, and development to their offspring. Having substantiated the issue of variability and heredity as evolutionary factors, Darwin showed that they themselves do not yet explain the emergence of new animal breeds, plant varieties, species, and their fitness. His great merit lies in the fact that he developed the doctrine of selection as a leading and directing factor in the evolution of domestic forms and wild species.

In the economy, the question of heredity is also embedded in the organization of social production, somewhat genetically (Alchian, 1950). If, preceding the principle of heredity, the selection factor ensured the consumer choice of a particular product, then it also decided on the market choice of the appropriate technology, equipment and organization of production. Further, the market, following the principle of heredity, is left to consolidate the inherited engineering, technological, organizational features in future production through the acquisition of appropriate production factors by entrepreneurs.

Moreover, the heredity factor in the economy is a fairly stable phenomenon for the reason that as part of a set of production factors, an essential element is fixed assets that serve a long time, transferring their value to manufactured goods gradually via depreciation charges. In this regard,

they try not to allow frequent changes in technology in the sectors of the economy. For this, a thorough analysis of the prospects for the development of any production facility is carried out, the life cycle forecast of the product is provided in order to ensure long-term relatively sustainable development of this technology, equipment and organization of production.

Struggle for existence

Complex and diverse, multifaceted forms of organisms' dependence on environmental conditions and on other living beings, were called by Darwin the struggle for existence, or the struggle for life.

The evolutionary factor of the struggle for existence in the economy is called market competition. Market competition, as well as the relationship between the organism and the environment in biology, is extremely complex (Axelrod, 1997). Obviously, certain approaches in the analysis of the struggle for existence factor can be borrowed from biology and in the analysis of evolutionary processes in the economy.

In particular, the whole diversity of comprehensive relationships in nature is grouped into three main forms:

- 1) The relationship of organisms and species with the physical conditions of life, abiotic environment;
- 2) The relationship of the organism with individuals of other species (interspecific relationships);
- 3) The relationship between individuals and groups of individuals of the same species (intraspecific relationships).

Same on the market, the first form of relations between its subjects arises depending on the natural and climatic conditions of the administrative and economic territories, legal support for entrepreneurship, features of the sectoral nature of production and other factors affecting the functioning of economic entities. In the process of evolution, various organizational and legal forms of economic and commercial organizations develop adaptive functional structures to ensure their successful functioning in a certain market environment (Loasby, 2001). "Interspecific" (intersectoral) relationships in the economy, if calling the economic sector species of economic organizations, are also extremely diverse and complex. Of great importance are relations that are formed on the basis of technological chains of production of

final products, or technological redistributions. On the basis of these redistributions, various kinds of cooperative, integrated relations arise between economic entities for the transfer of products to each other, uniting of enterprises in various corporations, etc. Surely, between associations of enterprises, sectors, as well as between individual enterprises, competitive relations may arise for the mastery of individual market niches. In some cases, one can observe more stringent competitive relations between different enterprises and their associations, in others – less acute, and in the third – relatively peaceful, which very often have the nature of cooperation.

“Intraspecific” (intrasectoral) relationships are also quite comprehensive and diverse. Most forms of intrasectoral relations are important for the effective functioning of enterprises within a sector and sectors themselves, although there are intrasectoral forms of competition.

In the economy, all three considered forms of struggle for existence – competition – are not carried out in isolation. They are closely intertwined, due to which the interconnections of economic and commercial organizations, their associations, sectors are multifaceted and comprehensive. The study of the evolutionary factor of market competition is of great practical importance for the development of measures to ensure perfect competition, antitrust struggle with emerging monopolistic structures in the market.

If it is said that “thinking individuals interact in perfect markets”, then it should be noted that this is just a theoretical passage (Krugman, 2009). In fact, the market, in one way or another, is more or less monopolized with all the ensuing consequences reducing the effectiveness of its functioning. In the case of monopolization, it begins to work worse, including in the performance of its direct function of implementing the principle of natural market selection. As a result of this, not the best firms in terms of efficiency survive, receiving support from the market selection system. Instead, the surviving mediocrity is fixed in a market niche and, accordingly, implements its heredity in the economy, preserving not the best set and type of use of resources, technologies, equipment, and organization of production. The principle of variability worsens, acting worse. The reproduction cycle begins to stall, slowing down the evolution of social production and reproduction. This is a view on the one hand.

On the other hand, the absenteeism system of income distribution characteristic of a market economy turns out to be a significant factor in washing out and disposing of real sector’s income, driving it into the mainstream of the low reproduction process and not allowing it to adequately serve the rate of capital accumulation and the formation of solvent demand, as factors stimulating supply.

In crisis periods of the economy, the decline in the rate of formation of solvent demand occurs faster than the decrease in the rate of capital accumulation. As a result, the effect of overproduction of goods occurs. This trend is caused by the fact that at the level of enterprises and their associations, greater economic power, following the power of absenteeism, is concentrated among entrepreneurs. Thus, overlapping one another, the prerequisites of an economic crisis are realized. And the more intensively the monopolization of the economy and the stratification of absentee, entrepreneurial and labor incomes take place, the faster the crisis sets in. If the monopolization and stratification of the income of economic entities are restrained by means of state regulatory measures, then the onset of the economic crisis is moving away.

Thus, the market mechanism should always be in a state of perfect competition. Otherwise, the functioning of the principle of natural selection is disrupted with a decrease in its effectiveness (Penrose, 1952).

The expediency problem in the economy

The problem of the expediency of the structure and functions of living organisms, their adaptability to the conditions of existence, which is important for self-preservation, self-reproduction of species, was carefully considered by Darwin. He proved that the fitness of species developed by selection cannot be absolute, it is always relative and useful only in those environmental conditions in which species have existed for a long time.

The indicated here regarding expediency in living nature is almost completely consistent with the relations of evolution in the economy. Adaptation of production enterprises to market conditions is also not absolutely perfect. Market needs, as well as environmental conditions in nature, determine the direction of adaptation of production enterprises and industries to the conditions of market operation.

On the example of artificial selection, Darwin developed the principle of divergence, that is, the divergence of the characteristics of varieties and breeds, their differentiation. He used the same principle to explain the origin of species of animals and plants, their diversity, the emergence of differentiation between species, substantiation of the doctrine of the monophyletic origin of species from a common root. Evolutionary differences in individual groups of animals and plants can also arise due to convergence – resemblance of signs, development of externally similar traits in forms of different origin, as a result of adaptation to similar conditions of existence. The inevitable consequence of divergent evolution is the progressive development of organic nature from simple to complex.

The Darwin's doctrine of the struggle for existence, natural selection and divergence also satisfactorily explains the issue of extinction of species. He showed that under constantly changing environmental conditions, some species, decreasing in numbers, must inevitably die and give way to others better adapted to these conditions. Thus, in the process of evolution, the destruction and creation of organic forms are constantly going on as a necessary condition for development.

Such conclusions and comments are also absolutely valid for economic relations, which develop as the productive forces and production relations do in the economy. Thus, it is not necessary to prove in a special way that the development of the economy at all times has been evolutionary.

This truth is also confirmed by the use of non-equilibrium tools of theoretical analysis (Nusratullin, 2006). In particular, the non-equilibrium economic model clearly illustrates the processes of bankruptcy in its ineffective part and the emergence of new manufacturing enterprises in the effective one. That is, in the economy, as well as in living nature, inefficient economic organisms die, giving way to other, more efficient ones.

Levels of evolutionary transformations

The evolutionary process in wildlife is subdivided according to the levels of evolutionary transformations into micro- and macroevolution, sometimes highlighting megaevolution. By microevolution is understood as the processes of adaptive rearrangement within a species, the transformation of its

populations, which leads to speciation. Macroevolution is the process of the historical transformation of supraspecific taxa – genera, families. The concept of megaevolution includes the historical formation of larger systematic units (orders, classes, types). Most researchers in the concept of macroevolution include megaevolution. The elementary unit of evolution in wildlife is a population.

A population is a large group of individuals of one species, living for a long time (a large number of generations) in a certain part of the range of a given species, where there are no noticeable barriers to the random free crossing of individuals of this group. Organisms of a population connected in a single whole are characterized by a common genetic program and the possibility (through crossing) of the free exchange of genetic information.

In the economy, highlighting a population, obviously one needs to talk about the sectoral or territorial aggregate of enterprises. Or just about the totality of enterprises, producers, agents, economic entities, etc. in the understanding of many producers, which, for example, can be distinguished in the framework of the analysis of the economy using a non-equilibrium model.

The spatial and numerical sizes of a population are significantly affected by biotic and abiotic factors. After a long cold winter and long spring with a lack of food, a population is reduced by hundreds or even thousands of times. Fluctuations in the number of individuals in populations (“waves of life”) dramatically and non-directionally change the genetic composition of a population and therefore they are considered in biology as one of the factors of evolution.

There is an analogy with the phases of the economic cycle – crisis and depression. Accordingly, one can speak about the reduction of enterprises as a result of their bankruptcy. Economic cycles in the economy can be called “waves of economic life” or population waves, because as a result of economic crises in the economy, the qualitative composition of enterprises in the industry changes, which is one of the essential factors of economic evolution (Nelson and Winter, 1982).

The age and gender composition of the biological population is characterized by species-related features and is quite dynamic. These features depend on the life expectancy of individuals, the time to achieve puberty, the types and intensity

of reproduction, mortality in different age groups, and the rate of generational change.

In the economy, also within the framework of reproduction processes, one can distinguish their reproductive basis in the form of a combination (population) of economic entities or production facilities, which can be subdivided into components and constituent “gender and age” groups in accordance with the place occupied in the functional organization of “economic populations”.

But the allocation of levels of evolutionary transformations in the economy has already been carried out in the economic theory in the framework of dividing it according to hierarchical levels into micro-, meso-, macro- and mega-economy. A description of the development of the economy at these levels just reveals the evolutionary processes taking place in it over centuries and millennia.

Elementary evolutionary material in the economy

The problem of the material on the basis of which evolutionary transformations are carried out has always been given great attention and different approaches have been outlined in solving this problem. But only Darwin for the first time convincingly showed that the leading role in the evolution of species belongs to vague individual hereditary changes, which are the material for selection. However, the biology of that time was not yet able to reveal the process of formation of intraspecific diversity of individuals.

With the development of experimental genetics in the 20th century, all fundamental problems of variability received a scientific explanation: a material substrate of heredity was established, the basic laws of its variability and the formation of the genotypic diversity of individuals of a population and a species were revealed. In biology, mutations and their combinations are distinguished as an elementary material of evolution.

It is likely that the evolution of populations in biology can be identified with the innovation process in the economy (Malerba, 2006). Innovations turn out to be factors of mutations of the biological type in the field of economic relations, and sectoral communities of enterprises will be considered as populations. And then it can be said with respect to the economy that “not individuals, but populations, are evolving” (Sytnik, 1985).

Speaking of mutations, the authors have in mind various kinds of rationalization proposals, innovations and, in general, elementary processes of implementing the achievements of scientific and technological progress. And if innovative processes are studied, then the problems of the evolutionary development of the economy are simultaneously revealed.

Elementary factors of evolution

The simplest evolutionary changes occur under the influence of those driving forces – factors that directionally transform populations. These basic elementary factors are: mutation, population waves, isolation, and natural selection.

The mutational process is one of the important elementary factors of evolution. It is significant as the continuous occurrence of spontaneous mutations and their combinations during crosses gives new combinations of genes and mutations, which inevitably causes hereditary changes in the population. But the mutational process itself, which increases the genetic heterogeneity of populations, without the participation of other evolutionary factors cannot direct the change in the natural population. It is only a supplier of elementary evolutionary material, a reserve of hereditary variation.

Population waves, or fluctuations in the number of individuals in a population (“waves of life”), are characteristic of all species. The causes of these fluctuations in numbers may be various factors of the biotic and abiotic environment.

The evolutionary significance of population waves consists in the fact that with a sharp decrease in the number of individuals of the population, rare genotypes can occur among randomly few surviving individuals. In the future, the restoration of numbers will come at the expense of these individuals, which will lead to a change in the frequencies of genes, which means the gene pool of a population that has survived a catastrophic decline in numbers. Thus, population waves can be considered as a supplier of evolutionary material.

There is also an analogy. As a result of the economic crisis, only the most efficient enterprises remain functioning, which will serve as the basis for the next cycle of economic growth, which will lead to the spread of the “gene pool” of the best enterprises throughout the economy that survived the economic crisis. Thus, the economic crisis can be considered a “supplier

of evolutionary material” in the economy (Alchian, 1950).

Isolation plays an important role in the formation of populations and species. Any form of isolation ultimately leads to reproductive dissociation, the emergence of barriers between isolated species. The main function of isolation is to protect the genetic system of a species.

With regard to the economy, one can speak about various forms of its monopolization, as well as about the autarkic direction of development of the economies of individual countries, which can lead to certain costs for both the development of the economy of the autarkic country and the global division of labor.

Conclusions

Darwin’s theory of selection is fundamental to evolutionary learning. Natural selection is the main, directing, driving factor in the historical development of the organic world. The arena of natural selection is the population as an elementary unit of evolution, and the object of selection is its individuals, phenotypes. The value of the individual that has passed the selection and gave offspring is determined by the contribution of its genotype to the gene pool of the population. The selection is based on phenotypes, specific traits and properties that are the result of the implementation of a particular genotype in these environmental conditions. Consequently, genotypes are also selected under the cover of phenotypes, since not traits are transmitted from generation to generation, but genes and their complexes. Therefore, not only genotype, but also phenotype and phenotypic variability are important for evolution.

That is, in the economy, the arena of market selection is the “nonequilibrium” set of commodity producers as an elementary unit of evolution, and the objects of selection are individual enterprises with their relationships with the surrounding economic environment. It is obvious that the shifts in the nonequilibrium model associated with the processes of bankruptcy of enterprises and the emergence of new ones are elementary events in the arena of market selection.

Here, continuing the thought, the goal-setting factor should be noted. In nature, the goal of evolution is the struggle for existence, the survival of the population and individuals. In economics, the survival of enterprises is associated with the achievement of a

predetermined criterion – maximum profit. And this criterion is already a factor in the natural selection of enterprises.

Thus, in this study, the basic principles of the evolutionary doctrine in the economy were disclosed, the evolutionary mechanisms of development in the economy (variability, heredity, selection, competition) were described, the main elements of evolution in the economy were identified (economic feasibility, levels of evolutionary transformations, evolutionary material in the economy, elementary factors of evolution). These results can be the basis for the development of a more general economic theory – the evolutionary one – rather than the existing mainstream.

Summing up, it should be noted that against the background of evolution of the economy, society, and humankind itself, social intelligence is evolving at the same time (Loasby, 2002). This begs the question: could not it be that the whole system of evolutionary development of the biosphere is working on its evolution? If one cannot answer positively to this question, then, in any case, one can state the fact that the indicated phenomenon of evolution cannot be fragmented, but is a somewhat interconnected and targeted process.

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