

GENERAL THEORY OF DEVELOPMENT AND STRUCTURAL TRANSFORMATION OF NATIONAL ECONOMY

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The components of development are studied on the basis of general systems theory. The role of changes, superdevelopment, crisis, stabilization, stability, adaptability and diversity for the implementation of structural transformations in the national economy is justified. Especial significance of crises under the change of the structure of economy is pointed out, as well as six groups of system sustainability, which arise in the period of structural transformation of the economy.

Keywords: adaptability, General theory of development, changes, the crisis of the national economy, diversity, structural adjustment, stabilization, stability, superdevelopment.

Statement of problem. Structural change is not made for the sake of itself. It starts at a place and time, where and when the issues of change in the strategic course of a state development are submitted for discussion. Global experience testifies that efficiency of structural transformations is fully determined by the fact how profoundly they represent interests of wide sections of the population and how much support they receive. Shaping of a new strategy always starts with searching the essence of the modern historical stage. It is important to see the main tendency of structural transformations behind multiple views and scientific thoughts; it is the tendency, which determines a national strategy with global tendencies being considered. First and foremost, the modern world is characterized by strengthening the tendency towards shaping the multipolar world, but its establishment will be protracted. Multipolarity is examined as a guarantor of stability and sustainability. This movement to multipolarity is seen in strengthening economic and political positions of national economies and their integration associations. However, at the current stage there are multiple recurrences of attempts to shape the international relations structure, which is based on unilateral settlement of key problems of the global politics and economy including solution by military force, which can be seen in the current conflict between Ukraine and Russia. Ukraine is aimed at modernizing the structure of its economy on the grounds of innovative technologies, facing the resistance of Russia, which is the major supplier of natural resources and has been the major economic partner until recently. Thus, to change the structure of the national economy not only a favour-

able internal environment but also an indisputably auspicious external one is essential.

Analysis of recent papers. Development is a concept, which in a wide sense can be interpreted through the theories of development: philosophical, social, economic, technocratic, institutional. In terms of philosophy, development is irrevocable, possesses certain definiteness and sees natural change of material and ideal objects, which result in emergence of a new quality. As far as comprehension of economic development is concerned, its most widespread interpretation is as follows: a multidimensional process, which embraces an economic increase, structural changes in economy, improvement of working conditions and the population's standard of living.

Investigation of the issues of development goes back to the old times, from the ancient philosophers Democritus, Plato, Aristotle, and Lucretius to the modern economists D. Bell, P. Drucker, A. Lewis, W. Rostow, H. Chenery and others. Among many models and theories of economic increase and development stimulation there are four major theories dominating; they are as follows: theory of the «linear stages of increase», model of «structural changes», theory of «external dependence», theory of «neoclassical counter-revolution». The characteristic feature of modern development processes consists in researching structural transformation of economy with reorientation to social tasks solution under conditions of ecological problems aggravation. These problems are covered in multiple works by the theorists of the Club of Rome, UNO and other international institutes.

The processes of economic development

and transformation of an economic system are investigated by the Ukrainian scientists as well, in particular, by V. Bazilevych, V. Bodrov, V. Heits, L. Hrazhevska, A. Hrytsenko, V. Dementiev, A. Zadoia, A. Chukhno, P. Yeshchenko and others [1–5]. The works by V. Heits, Ya. Zhalilo, B. Kvasniuk, I. Odotiuk, T. Ostashko, Yu. Pylypenko, V. Tochylin, L. Shynkaruk [6 – 9] are dedicated to the problems of structural transformation of the national economy.

Despite a considerable contribution of scientists to the theory of development and research of the problems of structural transformation of the national economy, at the present stage there is a need for a more profound theoretical and methodological research of the

structural transformation of the economy of Ukraine under conditions of the energy crisis, political instability and chosen Eurointegration vector.

Aim of the paper. The aim of this article is to highlight the constituents of development for revealing the features of structural transformation of the national economy.

Materials and methods. For substantial research of structural transformation of the national economy it is necessary to study in depth the general theory of development. Based on the general theory of systems, development will be examined through the following elements: changes, superdevelopment, crisis, stabilization, stability, adaptability and diversity (Fig.1).

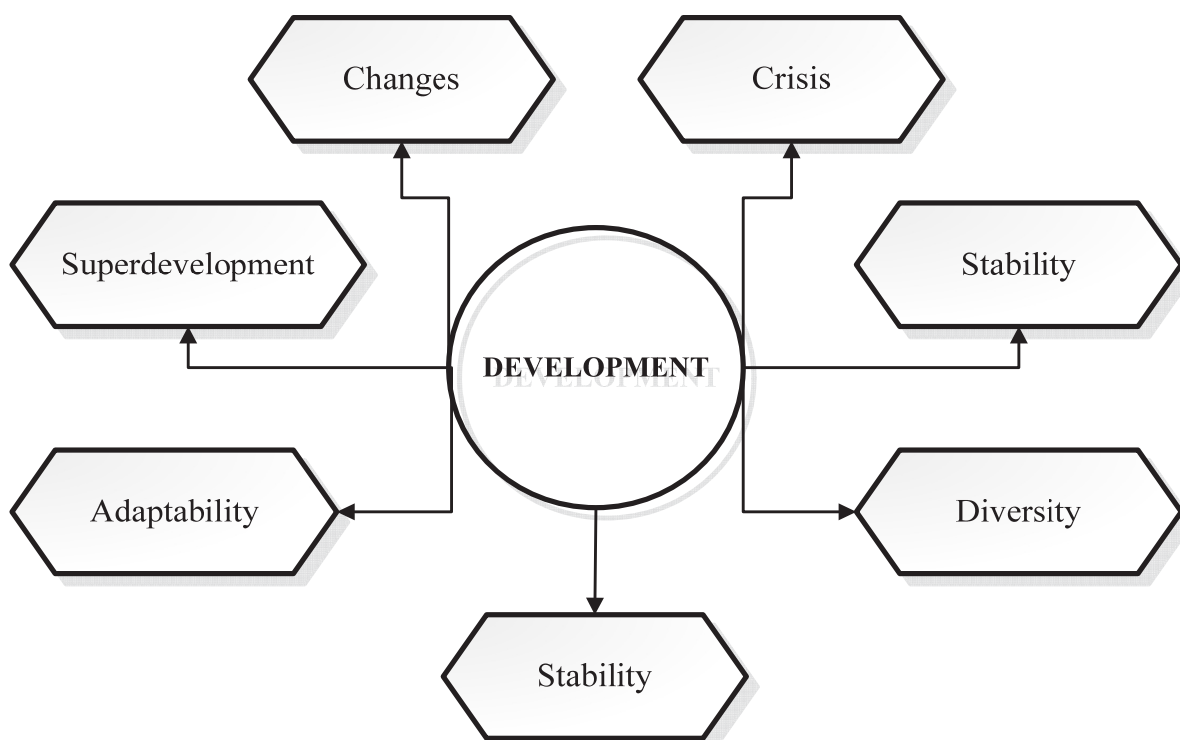


Fig. 1. Main elements of development

According to the general theory of systems, elementary change is a primary element of development [10]. That means that development is nothing else but a sequence of changes. This sequence, which establishes relations between elementary changes, is characterized by the corresponding law of composition, i.e. by the «process scheme». According to this scheme, we can talk about the processes of development referring them to the categories of «quick-slow», «progressive-regressive-cyclic». The important thing is that primary elements

are changes themselves but not their material or ideal carriers; absolutely different systems can develop according to the «scheme». For instance, progress can be scientific and technical, personal, social, spiritual, etc. – regardless of the nature of objects this type of development has the same features.

The theory of systems also examines development as the primary element of some dynamic system and defines it as a kind of «superdevelopment», which coincides with the concept of macroevolution by its content. Its

important feature is change of different types of development, which are corresponding primary «schemes», according to a certain general law (composition). The existence of the general law is evidence that any development has a non-random character, and there are entitative regularities, which are general for the processes of transformation and development of systems of any nature.

One of such regularities is directly related to the concept of «superdevelopment». The change of one process «scheme» to another is a serious qualitative change in a system, which is viewed as a crisis. Since a need for these changes lies in the essence of «superdevelopment», that is we should admit that crisis-free development does not exist as sooner or later the time will come when for the evolution to continue the development type should be changed, otherwise it will not take place and at most will turn into a balanced existence, which can be perpetuated. Scientific and technical progress can serve as an example. In particular, it affects change in the technological method of production in all its major sections. Under the impact of scientific and technical progress the structure of a country's national economy, nature of economic growth, lifestyle, system of values and incentives change, and the concept of «development» is reviewed as well. It should be noted that these changes are accompanied by crisis occurrences. In the economy of Ukraine the transition from the third and fourth technological structures to the fifth and sixth leads directly to changes in the sectoral structure, where movements between the sectors take place for the benefit of the tertiary sector of the economy. In the national economy the nature of economic growth factors (exogenous factors prevail) also change, the lifestyle of Ukrainians and the system of values and incentives change directly, unfortunately, not always towards progress. It should be marked that in the national economy of any country these processes are of a crisis nature. Thus, examining development, we cannot avoid the problem of crisis, which is a necessary stage in development of any system and mostly results in progressive changes in the structure of a national economy.

According to the general theoretic system standpoint, crisis represents qualitative changes in a system through emergence or disappear-

ance of elements, relations, laws of composition [11]. Deterioration of any quantitative indices, which the concept of crisis is traditionally related to, is not actually such – it can cause a pre-crisis situation, however, until qualitative changes take place, it is not a crisis yet.

By the criterion of occurring changes typologization, the following crises are distinguished: destructive and constructive. All phenomena traditionally understood as a crisis are referred to a destructive type, i.e. when «something collapses». The consequence of this is qualitative changes. According to this standpoint, the concept of constructive crises is rather ambiguous. It is generally known that dramatic qualitative changes can take place in a system not only within its disintegration but also in the process of natural evolution, when nothing disappears in it but, on the contrary, something new emerges. Constructive crises can also be explained through the process of progressive development. This process contains a chain of structural crises, which lead to new changes of a progressive nature, and the country's economy enjoys structural transformations. Any «technological revolution» – from the steam-engine to the computer and nano-technologies can be a bright example of this crisis type.

Despite the typological differences there are certain similar features typical of all crisis processes. Consequently, this makes grounds for diagnosing and forecasting them.

If to examine the change of «the process scheme», first of all, it is concerned with regulation systems – old controlling mechanisms are already weak and disappearing, new ones are only being formed, but they are not strong yet. Under these terms regardless of the kind of the old and new systems, the given system being manifestation of «itself» is the most «natural». The actual establishment of a civil society in Ukraine through the Maidan, which is a nation-wide informal organisation of citizens, can be an example of these conclusions. A civil society mainly unites self-established organizations or organisations established under management, nongovernmental organizations, professional associations, charities, initiative organizations and those, which encourage to socially active life at a level of district and city, as well as organisations established with the aid of

local churches and their communities. According to the general laws of development, cognition of this system makes its behaviour predictable during a crisis.

The positive moment of weakening of the old scheme of relations is that diversity in the given system increases significantly. It is carried out through increasing a share of periphery subsystems, which were rarely seen earlier; the dominating «core» from subsystems is also diluted. An example of these theoretical speculations in the national economy of Ukraine is the choice of the Eurointegration vector of development, which leads to diversification of the geographical structure of exports and imports. In Ukraine before signing the association agreement with the EU in the geographical structure of exports and imports the share of the Russian Federation economy prevailed but due to its political ambitions, without any economic grounding Russia began to reduce its share in this structure. As a result Ukraine faced the problem of diversification of the structure of exports, search for new sales markets and cooperation with other countries. At the same time there is also diversification of the structure of imports by substituting imports of other countries of the world for Russian imports. It means that the dilution of the «core» (Russian) is being carried out and the share of periphery subsystems, which are most advantageous for the national economy, is increasing.

On the basis of the above-mentioned we can draw the conclusion that while generating a wide variety of structures, the system selectively «searches» a valuable combination, which, under new terms, will become prevailing and generally optimize the structure of the development-oriented national economy.

Examining the point of crisis by its properties, we can say that it is similar to the moment of phase transition – all the states are equiprobable, bifurcations may occur in any direction. They can be even caused by random external factors, which represent an original «core of crystallization». After emergence of the latter, processes develop as avalanche and come to an end within a short period of time. This property of the critical point is the most powerful nonlinear controlling mechanism, and there are no similar mechanisms existing.

In terms of theory, the definition of man-

agement strategy through a crisis in economic systems is absolutely real. Development does not consist of continuous crises. Crises only distinguish one stage of a system development from another. The history of economic development testifies that the 1929–1933 and 1971–1975 long wave crises represented the establishment of the fourth and the fifth technological structures respectively. We should mark that the fourth technological structure was based on the further development of the energy sector with the use of oil, oil products and gas as well as communication means and new energy materials. On the whole, this structure is characterized by excessive utilization of resources being of a limited nature. Therefore, the establishment of the fifth technological structure was dictated by the objective necessity of development. The fifth structure is based on achievements in microelectronics, informatics, biotechnologies, gene engineering, new types of energy development and space exploration. Every structure creates possibilities of transition of the economic system to a higher level of civilization development thus maintaining continuity in the historical process and increasing economic opportunities of a society. The 2008 global crisis was not only a financial crisis, and this crisis testifies the transition of the developed countries to the sixth technological structure. The sixth technological structure pushes development of a new stage of the economic system on the basis of biotechnologies, nanotechnologies, microelectronics, an artificial intelligence system, information technologies, HRMS, moletronics, photonics, etc. It should be noted that in Ukraine the transition to domination of the fifth technological structure based on energy-saving was not made. Respectively raw material and power industries are prevailing in the economic structure. Global processes promote distribution of the sixth technological structure in the national economy, but the internal processes restrain it due to a diversity of interests. Thus, a crisis encourages changes in the national economy structure on the ground of the fifth and sixth technological structures development. However, the solution of this problem is only possible provided the state's strategy of development and the strategy of managing these processes are weighted.

A crisis is followed by stabilization. Sta-

bilization (from the Latin *stabilis* – continuous, permanent) means strengthening, bringing anything to a permanent state. According to economic development, stabilization is a slowdown of an economic recession; fixation and maintenance of the indices of operation of economy at a specified level. A policy of national economy stabilization is a constituent of a government's economic policy aimed at providing control over an economic situation in the country for achievement of full employment, maintenance of a low level of inflation, increase in a GNP volume. For economy stabilization a state resorts to application of credit and monetary as well as budgetary levers in order to reduce unemployment and inflation rates. A fiscal policy must not be aimed at dissipation of financial resources but be concentrated on measures of economy support and priority directions of its development.

By the laws of development, stabilization must be carried out in accordance with the basic criterion of a certain system development. The latter means an increase in available energy supply, which can be released for performance of effective work. Thus, the system nature is not at all important – whether it is a primitive thermal machine or economy of an enormous country. If the system is unbalanced and exchanges raw materials and energy with the environment, all general regularities of development are typical of it.

Returning to general regularities of a system's progressive development, we should note that in an interrelated system an increase in available energy should be carried out in two ways: extensive and intensive. The extensive way of development foresees attraction of additional resources and is based on external factors, while the basis of the intensive way is efficient utilization of the present resources for the account of internal factors. Under real conditions, when the power of an energy flow is ultimate, the extensive way of development always faces a limit, beyond which for its further development the system should make a transition to the intensive way related to an increase in the efficiency of the obtained energy utilization, rise of own efficiency, which will mean concentration of energy in this system.

Based on scientific researches dedicated to exchange of materials and possible methods

of exchange of materials and energy in an abstract self-organizing system it is proved that it leads to establishment of a structure, which with a conclusive accuracy up to finest details coincides with a structure of ecosystems determined in ecology empirically. These theoretical scientific researches are additional proof of a necessity of the technosphere reorientation according to the biological principles of operation typical of an ecological type of development.

The conclusions are evident. The first one consists in inevitability of transition of any developing material system from the extensive way of development to the intensive one and then to ecological. Presently, according to all the features, we are at the stage of transition to the intensive model, and despite all the conversations about the post-industrial era, quite a lot of time will pass till the moment the humanity will be able to switch over to «closed cycles». The second conclusion has a feature of fatality – in terms of energy materials, any development is limited. Even if the problem of thermonuclear synthesis is solved successfully, unfortunately, an assimilatory capability of the environment will not enable the humanity to develop infinitely and the closed energy material cycles will be the «crown» of its development as before.

Does it mean the end of history? Surely, no, and here the following evolutionary analogy will be appropriate. While the biosphere was shaping, at first, all the solar energy was required for the biomass increase. When the «cycles were closed», and the biomass of the planet was stabilized, the process made possible, in which all the energy received and being received was transformed into information practically in full – variety of life (biotas), ways of its existence and primary skills; later it was transformed directly into human knowledge [12]. Thus, the essence of an ecological way of development consists in an indirect transformation of energy into information, knowledge. No doubt, the progress and further development will also take place in a fundamentally new field – intellectual.

Any development, except for balanced operation, can take place only on condition that the system is stable – in any other case it cannot possibly overcome the next crisis. This problem is covered in many scientific researches, includ-

ing the serious ones in mathematics [13]. However, like the case of development, the field of application of any of them is quite rather narrow; it is rather referred to special cases than to a wide range of systems. For instance, in the thermodynamics approximation considered above we can distinguish the extensive factors of stability (a general volume of energy material controlled by the system) and the intensive ones determined by the characteristics directly produced by the system. While these indices are sufficient for description of an energy material constituent, it is extremely difficult to estimate the information, structural constituent of stability in the energy positions – fundamentally new approaches are necessary in this case. Let us start with the most general approximation.

The application of the general theory of systems to the research of the stability phenomenon on the basis of a genetic analysis allowed us to distinguish its main groups as follows.

First-order visible stability is referred to the first group. Interpretation of this stability type allows to define it as a pseudoanalogue. Its essence consists in the fact that as a result of inappropriate organization of surveillance one thing changes, another thing is registered. It is obvious that as changes accumulate, the system can just disintegrate rather «unexpectedly» for the observer at any moment. For instance, at the end of the 1990-ies a lot of experts forecasted that in 2000 and further years a slowdown of the GDP and industrial production rates decrease are to be expected in Ukraine. The realities of economic life in the national economy showed that this forecast did not stand verification as in the economy of this period there was an increase of the GDP up to 2008, id est to the period of the global crisis. 2009 saw the lowest point of the GDP reduction – 15%. In Ukraine this GDP reduction was the greatest within recent 20 years. The steadiness of the GDP increase in Ukraine was provided by metallurgical production, which worked to meet external demand. Due to the global crisis the demand for products of this industry reduced. Consequently, the violation of the first-order stability took place.

Second-order visible stability is referred to the second group. It is displayed in case part of the features of the environment is un-

changed, and the system does not possess corresponding compensatory mechanisms. For instance, tropical plants cannot stand frosts and exist in other conditions. If the environment is unchanged, the similar system can exist extremely long, however, any change of corresponding features leads to a loss of stability. This type of stability can be observed in the structure of the national economy. For instance, state support of health care, which is socially significant, allows it to develop both through different organizational forms and by favourable selective support of separate groups of the population. In turn, a reduction in the support of a certain industry results in reverse processes and a loss of stability. It means the types of system stability depend on the environment.

Group stability is the next. It demonstrates the real stability, at which the system disposes of a complete group of compensatory mechanisms for all possible types of changes (including «destruction» of mechanisms). Such stability is characteristic of repeatedly duplicated life-support systems for space and submarine vehicles, nuclear power stations and dangerous productions in economy as well as of a diversity of ownership forms in the economic system. Different ownership forms in the economic system of a certain country can be an example of group existence stability. Global experience proves that an economic system, where there is a diversity of different ownership forms, performs more efficiently. This experience must be also taken into account when making structural reforms in the national economy.

The fourth group is represented by a first-order adaptive stability. It provides for availability in the system of a limited set of mechanisms capable of compensating external «arousal» of the system by creating adaptive chains from a combination of the existing elements. The first-order adaptive stability differs from the previous ones by the fact that «arousal» consistently «disperses» at the component elements of the chain thus generating a null output result. For instance, the mechanisms of natural purification of biological systems or industrial treatment facilities work in this way. It is important to mark that in the national economy start-up and updating of industrial facilities are of an urgent need for ecological

development on the whole and serve as a necessary premise of Eurointegration processes.

The second-order adaptive stability is referred to the fifth group. Its compensatory mechanism is similar to the previous one; however, in this case the chain is non-linear and closed in a cycle. This results in a possibility within several «cycles» to compensate «arousal», the capacity of which exceeds the capability of a separate chain. Essentially, it is a mechanism of feed-back or homeostasis profoundly studied in cybernetics by N. Wiener. In the national economy it is refracted through an operative change of the economy structure when the vector of integration is changed. Thus, the orientation of Ukraine to Euro integration forces to develop not only raw material industries but also industries with hi-tech products as well as agro-industrial complex branches manufacturing final goods. Consequently, it will lead to restructuring of the national economy.

The sixth group is represented by suspended stability. This is a group of stability, which characterizes possibilities of the system to avoid impact of the «arousal» factor and can provide for absence of relevant compensatory mechanisms. In the national economy activities of firms under conditions of monopolistic competition is an example of this group of stability. The action of the mechanism of suspended stability, when the market is saturated with a certain product, forces a leading firm to search other sales markets or even change the industry in order to continue its existence. The structure of the national economy changes consequently.

Summarizing the above-mentioned, it should be noted that the main idea of stable development consists in the fact that at first stability is foreseen, and then it is affected by anything and therefore changes. In terms of evolution, an ability to foresee future is almost a single adaptation mechanism, which enabled the man to conquer the planet, in a literal sense. Therefore, the only prospect, which makes stable development of any state possible, is a change of priorities for the sake of an intellectual field, first of all, towards science and education development. It is important to mark that a consecutive implementation of the priorities towards development of intellectual industries, except for providing a stable development, will simultaneously help to establish the «core of

crystallization», which will allow quickly and with the least losses possible to survive the next system crisis in a long-term prospect, and in a short-term prospect it will optimize the national economy structures.

Knowledge of the mechanisms of adaptive stability allows to forecast the behaviour of complicated systems and to shape rational management strategies.

The mechanism of an adaptive strategy of stability maintenance consists in the fact that in reply to unfavourable external changes the system reacts with alteration of the structure, mainly preserving its initial composition to a certain limit and, even its size. Thus, the measure of adaptive stability is the number of potentially possible combinations, which can be generated by the system under these conditions. To quantitatively measure it for the real systems is possible by calculations according to the existing functional dependences.

It should be marked that in the research of the system stability dependence on its structure there is some prognostic potential. It is determined that adaptive stability depends on a variety of elements in a non-linear way. The greatest stability is characteristic not of various systems but of those where there is a kind of «balance» between a variety and monotony. As these systems as a result of an increased firmness in the real systems are seen more frequently, they are the core; extreme, less stable structures are the periphery.

It should be noted that systems, which are the core, are the most inertial and predictable, i.e. with a decrease in a variety they reduce adaptability to an insignificant degree, with an increase – they increase it a little without showing any extreme properties. A special role of the core in the processes of development should be emphasized – this is the most balanced, harmonious state to be sought by systems in the process of natural evolution. The distinguished feature must be taken into account while researching any real system with expressed properties of the core. This system does not recognize artificial development of its any subsystem as the purpose of the core development is not the development of its separate part but the development of the entire system.

For the national economy the problem of adaptation of the core and periphery can be in-

terpreted through co-operation of the centre and regions. Under conditions of structural transformation of the economy of Ukraine and of the political crisis escalation, this problem is pressing for maintaining the integrity of the country and requires a further profound scientific research. The concentration of authority in the «centre» resulted in the aggravation of contradictions in the regions and requirements to carry out decentralization. The most sensible regions are those with a depressed character of development, id est old industrial regions, where there was no economy modernization and the branch structure allowing the region to be self-sufficient was not established. Based on the general theory of systems, we should remind that a system, which represses elements, cannot expect stable development. That means that the core will be intact and «powerful» at the time when the periphery possesses the same characteristics. Therefore in Ukraine at the current stage of development and conduction of the structural transformations of the national economy the development of the laws on granting greater powers to the regions is extremely essential and requires further scientific grounding.

Conclusion. Structural transformations in the national economy under conditions of globalization should not be carried out automatically but be based on the theory of development. The general theory of development includes the following constituents: change, «superdevelopment», crisis, stabilization, stability, adaptivity and diversity. Consideration of these constituents of development when restructuring the national economy allows to develop a clear strategy, both in long-term and short-term prospects. At the current stage in Ukraine the structural transformations related not only to the change of the economic system are carried out; as well restructuring of the economy from the extensive way of development to the intensive one, including its ecological constituent, is also being made. This process is protracted and contradictory. In fact, development is a sequence of non-random changes, i.e. there are objective regularities common to the processes of transformation and development of the system. Implementation of these changes is a nec-

essary condition of development of the Ukraine's economy for the purpose of entering into the global economic space as a highly developed European country.

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У статті досліджуються складові розвитку на базі загальної теорії систем. Обґрунтова-

но роль зміни, суперрозвитку, кризи, стабілізації, стійкості, адаптивності та різноманітності для здійснення структурних трансформацій в національній економіці. Виокремлено особливе значення криз при реструктуруванні економіки, а також шість груп стійкості системи, які виникають в період структурної трансформації економіки.

Ключові слова: адаптивність, загальна теорія розвитку, зміни, криза, національна економіка, різноманітність, структурна трансформація, стабілізація, стійкість, суперрозвиток.

В статье исследуются составляющие развития на базе общей теории систем. Обоснована роль изменения, суперразвития, кризиса, стабилизации, устойчивости, адаптивности и разнообразия для осуществления структурных преобразований в национальной экономике. Выделены особое значение кризисов при реструктурировании экономики, а также шесть групп устойчивости системы, которые возникают в период структурной трансформации экономики.

Ключевые слова: адаптивность, общая теория развития, изменения, кризис, национальная экономика, разнообразие, структурная трансформация, стабилизация, устойчивость, суперразвитие.

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