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THE STRATEGY OF SUSTAINABLE INNOVATIVE SOCIETY-ORIENTED DEVELOPMENT OF UKRAINIAN ECONOMY (BY THE EXAMPLE OF MINERAL RESOURCE INDUSTRY)

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СТРАТЕГІЯ СТАЛОГО ІННОВАЦІЙНОГО СОЦІАЛЬНО ОРІЄНТОВАНОГО РОЗВИТКУ ЕКОНОМІКИ УКРАЇНИ (НА ПРИКЛАДІ РОЗВИТКУ ГІРНИЧОДОБУВНОЇ ПРОМИСЛОВОСТІ)

Purpose. Development of flowchart model of formation and implementation of strategy of sustainable innovative society-oriented economic development (SISODE) in the context of solving the problems of Ukrainian energy security.

Methodology. Realization of the goal is accomplished with the help of following methods: 1) generalization, analysis, synthesis and deduction in substantiating subsystems and indicators describing the type of innovation policy, which allows making an adequate choice as one of the stages of the formation of SISODE; as well as forming the list of priorities that determine objectives in SISODE management; 2) systems analysis, integrated, systematic and interdisciplinary approaches in developing a flowchart model of formation and implementation of SISODE of Ukraine; 3) analysis of hierarchies and dialectical method of scientific knowledge while adopting decisions according to development of programs and projects of SISODE of Ukraine.

Findings. The flowchart model of SISODE formation and implementation in Ukraine was developed and offered. It is based on the vital interests of the individual, society and state. Indicators characterising innovation policy type were substantiated in the context of the necessity of adequate assessment of the country's innovation policy as one of the stages for the development and implementation of SISODE. A list of priorities was formed that determine the set of tasks in SISODE management. The expansion of mining industries was positioned as SISODE drivers. It allows solving the problem of Ukrainian energy security. SISODE programs were developed and proposed according to the classification of vital interests by priorities and criteria for their evaluation.

Originality. The flowchart model of formation and implementation of SISODE of Ukraine was developed which meets the criteria of optimality, effectiveness and sustainability of dynamical systems development. Thus the Modernized Human Development Index is the main control parameter, which at the same time serves as an indicator of a decent standard of life and welfare of the country in general. The indicators were substantiated in the context of SISODE implementation which allow choosing the appropriate type of innovation policy, the list of priorities that determine the system of tasks was formed and SISODE programs and criteria for their evaluation were provided.

Practical value. Research results can be used by state authorities for formation and implementation of concepts, strategies and SISODE programs in Ukraine.

Keywords: *strategy of economic development, sustainability criteria, vital interests, national economy, energy security*

Introduction. Definition „сталий розвиток“ is an official Ukrainian equivalent to English term “sustainable development”. Its literal translation can be “healthy development” considering the context and “self-sustained development” regarding its meaning. Sometimes the term is understood as a comprehensive sustainable development. As defined by the UN Commission on

Sustainable Development it aims to meet the needs of modern society without endangering the ability of future generations to meet their needs. The theory of sustainable development is an alternative paradigm of economic growth, which sometimes ignores the ecological danger from extensive model development. In order to implement the course at sustainable innovative socially oriented Ukrainian economy development (SISODE) it is needed to actualize the principles of strategic manage-

ment, forecasting and indicative planning in the state practice. Leading experts advised the government to concentrate on developing an effective strategic management system which will result in the effective strategy of *SISODE*. The rational system of government research, technologies and innovations should be established...

Science, Technology and Innovation policy is a common platform on which all the necessary factors and conditions are formed for successful social and economic development of the country, society and people as well as for ensuring a high level of national security. Moving to the innovative model of development is simply impossible without proper attention to creating a management system in this field which would really influence the entire government policy and practice... For Ukraine it is unacceptable to retreat from saving innovative development model for restoring wellbeing and harmony in society nowadays.

Thus, it is important to adhere to the main principles underlying the Concept of Sustainable Development, which clearly show the vital interests of population such as: 1) consideration of the future generations' needs; 2) limitations on exploitation of natural resources related to the current level of technology, social organization, the ability of the biosphere to renew itself; 3) creation of conditions to meet person's basic needs (food, housing, etc.), to provide everyone with an opportunity to realize their talent, their hopes for a happy, prosperous life; 4) adjusting instruments for containment of the excessive usage of monetary, material and energy resources taking into account the environmental capacity of the planet; 5) regulation of the size and rate of population growth [1].

Also should take into account that "...the future global order will be determined by solving one common energy problem for whole population" [2].

Analysis of the recent research. Currently, the issue of sustainable economic development has been considered by many scientists among whom are: V. H. Herasymchuk [1], V. Ye. Levkevych [3], V. V. Moskvichev [3], P. H. Nikitenko [3], N. Y. Shapariev [3], Y. I. Shokin [3] and others. The problems of society-oriented economic development and its formation mechanisms have been revealed in the writings of national and foreign scientists, among them a prominent place belongs to T. V. Honcharenko and I. V. Sitnik [4], P. H. Nikitenko [5], H. T. Kulakov [5], O. V. Bondar [5] and others.

Innovation as a factor of increasing production efficiency and nuances of managing innovative development in the context of its policies, models, mechanisms and strategies, as well as infrastructure elements of investment and innovation activities has been covered by foreign and domestic scholars, such as O. A. Bilovodska [6], O. V. Bondar-Pidhurska [7], A. O. Kasich [8] and others.

However, P. H. Nikitenko characterized retrospective economic development as the one which was not socially oriented: "During the years of Soviet power the socio-economic development was actually carried out not for the benefits of the working man to meet the

growing material and cultural needs, but to develop "production for production", "production for profits", "production for militarization" and, above all things, to do "accumulation for subject-material accumulation" [5]. This gave us reason to refer to the need for actualization of not *SISODE* only, but of the strategy development as well.

Honcharenko T. V. [4] is a supporter of the fact that in Ukraine the formation of socially oriented economy should be based on using the model of high-tech development of national economy along with the gradual development of human capital. In such a way the innovations are singled out as a management tool and another vector of economic development. The strategy aims to unite them.

Herasymchuk V. H. [1] considers the quality of life (he uses the Human Development Index for its assessment) as a criterion of sustainable development which asserts it as preferred in the hierarchy of goals of economic system and confirms the logic and expediency of formation and implementation of *SISODE* strategy. V. Ye. Levkevych [3], V. V. Moskvichev [3], P. H. Nikitenko [3], N. Y. Shapariev [3], Y. I. Shokin [3] emphasize the impossibility of technologies and the market economy to solve the problems of mankind because of three reasons: goals, costs, and delays [3], which necessitates the search for management tools to remove them, and it eventually positions *SISODE* strategy as possibility of preventing a singled conflict through their systematic coordination.

While studying the experience of formation of national innovation systems (NIS) in developing countries, Kasich A. underlines the need to develop a strategy of innovative development of Ukraine to implement the concept of the NIS in the national economy [8].

Despite the fact that experts (such as I. B. Dehtiarova, I. A. Doroshenko, L. H. Melnyk, P. G. Nikitenko, N. M. Shtefan) have conducted scientific research studies on issues of sustainable innovative economic development, effective management of such development, quantitative and qualitative indicators which are development guides and parameters of control of the execution stages of implementation of the development strategy, etc.; the aspects of structure and content of a model of *SISODE* strategy formation and implementation in Ukraine have been out of their attention.

Certain aspects of combination of socially oriented and innovative development occurred first in the writings of S. Kuznets, and recently, in studies of V. P. Solovyov, A. A. Mekh and A. I. Yaschyshena [9], innovation and sustainable economic development both are in the writings of B. A. Malitskiy, P. H. Nikitenko, L. Hannes and others.

However, the overwhelming majority of scientists tend to highlight only a few vectors in the model of the new economy, so the problem of complex analysis of the essence of sustainable innovative socially oriented economic development and mechanism of its control is topical for economic theory and practice.

Unsolved aspects of the problem. Despite many publications on "sustainable development", namely: The

Law of Ukraine “On the Concept of Ukraine’s transition to sustainable development”, The concept of sustainable development, Projects of sustainable development of Ukraine, the possibility of their improvement and applying [10] in fact the documents relating to this law are absent currently in Ukraine. A matter of fact therein lies the complexity of harmonization concepts of “sustainable development” with “socio-economic development and innovation”, and even more the comprehensive strategy development. Thus, despite the mentioned above obstacles the authors of this article constitute the scientific and methodological basis to fulfill the given task in a more narrow aspect – by the example of the mining industry.

Objectives of the article. The article aims at development of flowchart model of SISODE strategy formation and implementation in the context of solving the problems of Ukrainian energy security (by the example of mineral resource industry).

Presentation of the main research and explanation of scientific results. Strategy (Latin) is the art of troops deployment in battle which is appropriate to apply in pe-

riod of changes and instability. The algorithm of formation and implementation of SISODE strategy in Ukraine was developed by us. It includes 12 stages. The main parameter of its management is modernized human development index (MHDI) and updated stages. They allow reflecting all the specifics of future economic development compared with the universal algorithms of strategy development (Figure).

The first stage includes *developing a concept of economic development aimed at satisfying of vital interests of a person, society and state*. Its theoretical basis is connected with neo-Marxist, neo-Keynesian and conflict theories (by V.I. Muntiiian, M. Veber) being their logical extensions and organically fitting into the paradigm of sustainable development and the noosphere of V. I. Vernadsky.

It takes into account all possibilities of civilizational choice and provides primarily the innovative activity development in the context of stable satisfaction of population’s vital interests. The backbone vector of development is accelerated accumulation in the immateriality sphere, especially in people themselves, their mind, knowledge, science, education and culture. It lays the

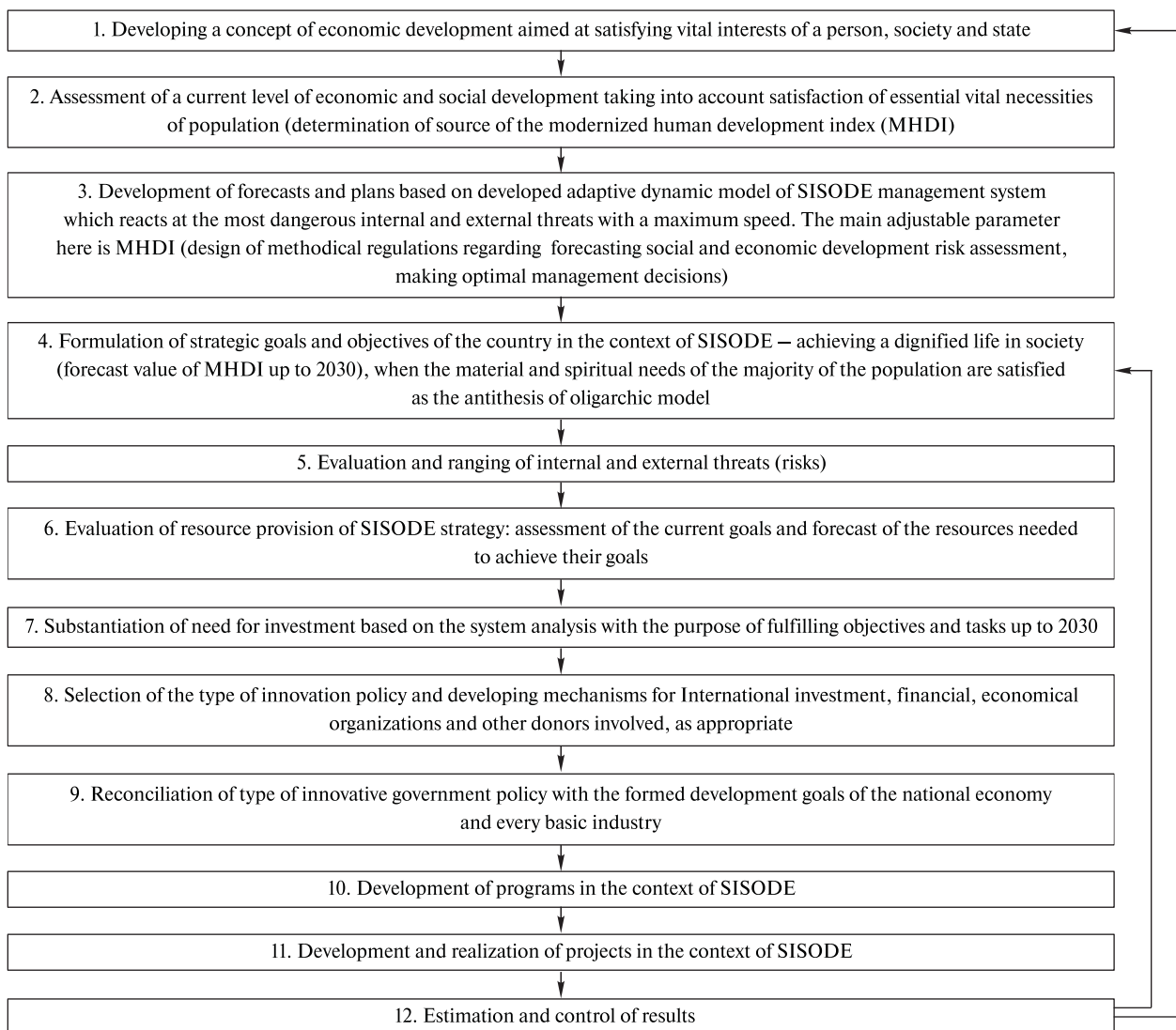


Fig. The flowchart model of formation and implementation of SISODE in Ukraine

foundations for GDP growth, improving efficiency in material and non-material production. Only this concept, which is based on the methodology of socially oriented model of noosphere economy and noosphere society as a new paradigm of human activity on Earth in order to preserve the person, nature and society in XXI century can, as the authors believe, can provide Ukraine with access to new level of competitiveness and decent living.

The second stage is assessment of current level of economic and social development taking into account satisfaction of essential vital interests of population (determination of source of the modernized human development index (MHDI)). It is based on scientific and methodological approach to evaluating and forecasting the MHDI.

The third stage is development of forecasts and plans based on developed adaptive dynamic model of management system of SISODE. It reacts at the most dangerous internal and external threats with a maximum speed in proper time. The main adjustable parameter here is MHDI. Also this stage involves the design of methodical regulations regarding forecasting social and economic development, risk assessment, making optimal management decisions.

If the national economy is regarded as an open economic system of global character, its sustainable development is ensured through metabolism – the exchange with the external environment under the following scheme “information – knowledge – innovation – satisfying vital interests of population”.

Each component of this logical chain, under the law of analogies, corresponds to a particular type of economy (informational – F. Hayek and E. Toffler, knowledge economy – D. Bell and innovative one – P. Drucker), causing mutually diffusive influence on each other and determines an appropriate system of goals and indicators that characterize each of its main factors of development most comprehensively. Thus, the accomplishment of the task caused the development of the list of priorities that define the system of purposes in SISODE management (Table 1).

The fourth stage includes formulation of strategic goals and objectives of the country in the context of SISODE – achieving a dignified life in society (forecast value of MHDI up to 2030), when the material and spiritual needs of the majority of the population are satisfied as the antithesis of an oligarchic model.

This stage involves the development of social and economic indices (indicators) to assess the priorities of vital interests of population within the context of SISODE.

1. *Substantiation of primary economic goal* – providing a given GDP growth in the country each year from 2015 to 2030 in order to enter the “thirty” of the world developed countries till 2030. In this case it should provide an accelerated growth rates of “social product”, the production of consumer goods over manufacturing of the means of production.

2. *Substantiation of expediency of restructuring* the economy through the implementation of new high tech-

Table 1

List of priorities that determine goals system in managing Sustainable innovative socially oriented economic development

Field of research	The main factor of development	Characteristic
GROUPS OF INDICATORS BY ECONOMIES		
INDICATORS OF THE INFORMATION ECONOMY	information as a general description of the country	1) the population using the Internet and other communications; 2) visiting theaters, museums and so on, their quantity; 3) number of nationally controlled critical technologies; 4) segment of the population aged 25 to 64 who continue learning; 5) the proportion of population who are university graduates; 6) the number of medals at the international competitions for pupils and students; 7) the number of students per 10,000 inhabitants; 8) the proportion of foreign students in the total number of students; 9) public health; 10) medals at the international sports competitions; 11) segment of the population who are engaged in physical activities (groups, clubs)
INDICATORS OF THE KNOWLEDGE ECONOMY	knowledge as materialized form of information	1) the number of patents per capita and the number of patents granted abroad; 2) the number of scientific discoveries; 3) the number of scientific citations of national researchers per capita; 4) number of intellectual property object (<i>the authors' recommendation</i>); 5) the number of research staff (<i>the authors' recommendation</i>)
INDICATORS OF THE INNOVATIVE ECONOMY	innovation as an implemented result of intellectual work	1) the share of scientific products per capita; 2) the share of scientific products in the global market; 3) the share of innovative products in overall output mix; 4) the share of raw materials and scientific products in total exports; 5) the share of raw materials and scientific products in total imports
GROUP OF NEW ECONOMIC INDICATORS	innovation, investments, vital interests of population	1) GDP; GDP per capita; GDP energy efficiency; labor productivity; added value; the volume of innovative product sales; the science intensity of GDP; % R&D in GDP; 2) energy intensity of GDP; contamination factors for soil, water and air (CO2 emission volume per capita); 3) tendencies of population change, stratification of population structure, ownership structure, satisfaction of vital interests of population (<i>the authors' recommendation</i>)

nologies that replace highly energy-intensive and material intensive industries, are not able to ensure the implementation of priority strategic goals for the country's GDP growth and reduction in energy intensity of products, formation of middle class and a decent standard of human life, i. e. contributing to satisfaction of people's vital interests.

The fifth stage involves evaluation and ranging of internal and external threats (risks) of economic development and satisfaction of vital interests of population. So, we should distinguish the main global problems caused by the aggravation of contradictions in society and the devastating impact of human activity on the nature that should be considered during the neutralization of external threats of SISODE such as economic and information actions of separate countries or organizations that negatively affect strategic stability in the world; globalization; the balance of war and peace, the arms race; the activation of military activities of many countries; availability of facilities that should cause regional or global disasters when they can be destructed; crisis state of international law system and international organizations both; employment of international organizations by certain countries and actions on behalf of them and under their cover for implementing their own interests; significant imbalances in demographic situation in different countries and regions – increase in the world population due to separate nations and peoples to critical limits from the perspective of resource opportunities; expression of geopolitical and economic contradictions between the industrialized countries; striking difference between levels of economic development of different regions of the world; poverty in many countries of the “third world”, which is the cause of massive social disruptions; weak (inefficient) system of government; general deterioration of the crime situation in the world; conditions which increase the probability of pandemics, further intensification of the struggle over access to natural resources and control over the effect of flow of information increases, mechanical and electronic systems and mechanisms for human, etc.; severe environmental crisis; significant (up to dangerous levels) increase in migrations of many countries, backwardness of some countries and regions at high and other innovative technologies and others. Factors a set of which determines the probability of internal threats of SISODE are gross domestic product, the average official subsistence minimum, the population of the country, the value of payments in international currency reserves, accumulated (multiplied) value of international currency reserves, current official rate, the accumulated amount of total debt of the country, annual deductions for national defense, decile coefficient - ratio of revenues of 10 % of the most affluent citizens to revenues of 10 % of the poorest citizens, the percentage of citizens who profess major religion, share of citizens who suffer from alcoholism, share of drug addicted citizens.

The sixth stage is evaluation of resource provision of SISODE strategy: assessment of the current goals and forecast of the resources needed to achieve their goals. Raw material resources, energy, labor, information, fi-

ancial information, techniques and technologies are estimated. Attention is focused on distribution, use, re-filling, and the coordination of resources and vital interests of population, bringing them to the optimal compliance between themselves. The central problem of this stage is to ensure the highest production efficiency and resource potential of the available businesses. This becomes important to rank the vital interests of population, on the ground of the greatest necessity, setting the priorities in meeting them. Thus, the process of harmonization of accordance of the vital interests of people and resources for their maintenance creates scientifically grounded foundation for developing appropriate programs of socially oriented industrial development.

The seventh stage includes system analysis and substantiation of investment needs for implementation of goals and objectives till 2030. It is determined during the design of adaptive dynamic model of the SISODE management system that takes into account internal and external threats of SISODE, existing and potential resources and is implemented based on software-based VisSim.

The eighth stage is selection of the type of innovation policy and developing mechanisms for International investment, financial, economic organizations and other donors involved, as appropriate.

The Law of Ukraine “On innovation activity” defines the main goal of the state innovation policy – creating socio-economic, organizational and legal conditions for effective reproduction, development and use of scientific and technological potential of the country, ensuring the implementation of modern ecologically clean, safe, energy-saving technologies, production and realization of new types of competitive products. Based on these interpretations it can be argued that **state innovation policy** is a complex of measures for development of national innovation system; a tool for implementation of an innovative model of economic development, as well as part of the overall government policy which should be systematically compared with the innovation policy of technologically developed countries, creating a national art of innovation management within the context of SISODE. Thus the state innovation policy should be an inclusive tool for ensuring the SISODE in Ukraine. Multifaceted category of “innovation policy” allows positioning it as one of the root causes of the innovative process development at the macro level. This makes it relevant to consider the peculiarities of its formation and implementation requirements from the perspective of space, time and speed. Its correct type should promote this through an integrated classification of state innovation policies. In our opinion choosing the type of innovation policy depends on the concept and model of the national economy, the current level of socioeconomic development of economy including the vital interests of majority of population, strategic goals and tasks of the government, internal and external threats, resource provision of the strategy, investment needs, and it should be provided along with the general patterns of innovation processes.

Considering the fact that determining priority for the chosen strategic course of Ukraine should be processing

and implementation of innovative public policies to confirm it as a high-tech state, for the economy of Ukraine during its reforming (taking into account the shortage of funding, the current stage of its development, and the need to observe the requirements of speed and optimality criterion) appropriate to carry out the strategy of “borrowing”, focusing on the revival of purely domestic industry and import regulations. However, with the stabilization and economic recovery, in the future it is appropriate to apply the strategy of “extension” with social orientation for socio-economic development of the country (which meets the requirements of space and time and stability criterion, i.e. consideration of 61.8 % of vital interests of population) [5]. As a result, these measures will contribute to increase in the level of the Modernized Human Development Index that meets the efficiency criterion. The choice of the type of innovation policy should be conducted on the basis of indicators that characterize the subsystem of SISODE management system models (Table 2). They are also the basis for the managed option – Modernized Human Development Index (MHDI) which also takes into account environmental (A_{CO_2} , per capita), social (A_{vi} , %) and economical ($A_{R\&D}$, %) basic parameters of subsystems of SISODE management system together with indicators generally accepted by methodology of calculating the HDI by the UN. In this way it corrects the HDI (based on the author’s methods) and allows estimating its effectiveness as a dynamic system, taking into account criteria of efficiency, optimality and stability. It is also the basis for management decisions regarding the implementation of measures to improve the level of satisfaction of population’s vital interest. The methods for MIHD calculating were disclosed by us in details in work named “Scientific and methodological approach to forecasting and estimation of efficiency of sustainable innovative society-oriented economic development management system based on modernized human development index”.

Scientifically reasoned formation and effective implementation of the state innovation policy of Ukraine

with regard to the requirements of time, space and a given speed as the stage of formation and implementation of SISODE strategy in Ukraine will ensure the successful implementation of a new development model of economy and will revive the processes of European integration.

The ninth stage of the algorithm of formation and implementation of SISODE strategies in Ukraine is *reconciliation of innovative government policy with the formed development goals of the national economy and basic industries under the hierarchy of vital interests in Ukraine.*

Industry is one of the leading sectors of production of goods where the tools and the vast majority of the objects of labor, and consumer products are produced. Industries that are responsible for energy production – “the blood of the economy”, including mining industry are to launch the revival of promising industries, to be one of the drivers of the national economy.

Considering global trends of reduced use of nuclear power in the long term, demand for coal will increase over the next 20–30 years. Thus, coal consumption will increase with an average annual rate of 1.4–1.6 %. From the perspective of the development of the mining industry we believe it makes sense to use the scheme of concept of its innovative development in the context of solving the problems of energy security of Ukraine such as: “1) the purpose – sustainable innovative socially oriented economy of Ukraine; 2) problematic situation – energy problem in the country; 3) crisis condition – unused opportunities of mining industry; 4) management solution – innovative development of perspective fields of the mining industry as drivers of the national economy: a) development of petroleum and natural gas industry; b) development of the coal industry” [7].

Usage of own deposits of coal and gas will allow implementing energy-saving and environmental technologies for saved money which will help to satisfy the vital interests of the person, society and state much better.

To some extent the strategic objectives of development of the industry during the modern period are de-

Table 2

Composition of subsystems and indicators characterizing the type of innovative policy of SISODE model

Indicators characterizing the subsystems of model of management system of sustainable innovative society-oriented economic development	Type of innovative policy		
	Market orientations (“Transfer” Strategies)	Structural changes with social orientation (“Borrowing” Strategy)	Technological impulse with social orientation (“Extension” Strategy)
The tendency of population change (Npc, persons) (<i>Social subsystem</i>)	N pc min	(N pc max + N pc min)/2	N pc max (max – compared with growth tendencies in developed countries)
A_{vi} – actual value of vital interests, %, i.e. the relative number of people, whose vital interests are not satisfied (<i>Social subsystem</i>)	0.20–0.382	0.382–0.618	0.618–0.80
$A_{R\&D}$, % The actual level of R&D costs of GDP (<i>Economic subsystem</i>)	$A_{R\&D}$ min	($A_{R\&D}$ max + $A_{R\&D}$ min)/2	$A_{R\&D}$ max
A_{CO_2} , t/person (the actual value of CO ₂ per capita, which is due to global warming) (<i>Environmental subsystem</i>)	A_{CO_2} max	(A_{CO_2} max + A_{CO_2} min)/2	A_{CO_2} min

terminated in the Concept of reforming Ukraine's coal industry and the Concept of innovative development of coal industry of Ukraine. From scientific and practical standpoint while choosing the latest technologies, priorities should be determined reasonably, i.e. in inter-connection with the existing potential and strategy of the country's socio-economic development.

Therefore, speaking about the future of Ukraine, it is advisable to rely primarily on the development of technical and technological modes and aspects of starting the country – existing and not exported resources. The ratio of present and future in the context of exhaustible and renewable (alternative) energy sources, according to the law of “golden section” is to be 1 : 3 initially and then 3 : 1.

In order to develop the mining industry it is advisable to intensify efforts to replace Russian natural gas with domestic coal, due to rising gas prices and increased interest in coal at the beginning of the 21st century. We believe that the strategic direction on the development of coal gasification technologies in Coal-Water Slurry Fuel chosen by the government will save state funds and gradually move to the ratio of 3 : 1 keeping the ratio of 1 : 3 in the context of exhaustible and renewable (alternative) energy sources. This will contribute to transition to the new technological way formed by developing nanotechnologies and biotechnologies which will be the first step in resolving issues of Ukraine's environmental safety from 2021 [7].

The tendency of necessity of searching for financing sources for strategic (groundbreaking) innovations as a factor of competitiveness and basis for constructing of the new economy in developing countries stands out. And this gives grounds to speak about expediency of applying strategic innovations – nanotechnologies for enterprises of the mining industry as the basis of improved energy efficiency and energy security issues.

It is reasonable to implement nanotechnologies in mining enterprises as an instrument of renewal and development of the national industry and the formation of crisis management measures such as: implementation of planetary mills in mining industry (instead of currently used rotary spherical ones) will reduce the energy consumption of ore grinding process twice. Moreover, the output of useful component of processed ores can come nearer to 100 % that rarely exceeds 70 % currently. It is necessary to point out the chain effect of this proposal. So it may provoke a revolution not only in the mining industry but also in the chemical and metallurgical ones as well as in cement, ceramic and lacquer production.

Along with it one of the promising uses of nanotechnology achievements in the mining industry may be the introduction of technical means such as “electronic nose”, designed to identify and analyze the vapors of oil and gas while searching and monitoring the fields, rapid identification of minerals, etc., that meets modern trends in SMART-materials constructing and the next 3–10 years may be a key direction of the security industry development. Thus, the use of the proposed measures will contribute to implementing the SISODE strategy and satisfying the interests of Ukraine's energy security [7].

The tenth stage of the formation and implementation of SISODE strategies in Ukraine is creation of development programs of national industry sectors.

Nowadays the highest national economic interest of sustainable socially oriented state which coincides with the constitutionally enshrined higher national value, is ensuring people's development, sustainable growth of level and quality of their life and well-being based on respect for their rights and freedoms and security, motivation of their responsibility; democratic development. This is the foundation of forming strategic objectives of economic policy in the country. Their content is to be the quintessence of vital interests of population. However, a hierarchy of national economic interests, their temporal and spatial parameters may be changed along with amendment of internal and external conditions. Yet it is expedient to propose the SISODE programs according to the classification of vital interests based on priorities considering the realities of the present (Table 3).

The eleventh stage is development and realization of projects in the context of SISODE.

The twelfth stage includes formation and implementation of SISODE strategies in Ukraine – estimation and monitoring of its results.

Conclusions. The flowchart model of formation and implementation of the SISODE strategy of Ukraine has been developed, as well as the structure of subsystems and indicators characterizing the type of innovative policy of the SISODE model and the list of priorities that determine objectives in the SISODE. Moreover, recommendations are proposed in context of development of the mining areas as the main driver of the national industry to promote the timely reforming the economy, the transition to a new technological structure, maximum satisfaction of vital interests of majority of the population, social stability and solving the problems of energy security of Ukraine. In particular, the authors formed and proposed the following: 1) the structure of subsystems and indicators characterizing the type of innovative policy of the SISODE model, which is based on the basic criteria for calculating Modernized Human Development Index, economic substance of which is strict regulation of the standard of living, and determines the most efficient choice of the type of innovation policy, that meets specified time period, location and capabilities of speed of implementation planned objectives; 2) the list of priorities that determine the system of targets in the SISODE management is based on a logical chain of “information – knowledge – innovation – satisfying the vital interests of population”, and each of its components corresponds to a certain type of economy such as informational one, knowledge economy and innovative both by causing mutually diffusive influence on one another. Also it allows generating an appropriate system of goals and indicators that describe each of its main factors of development the most comprehensively; 3) the list of SISODE programs and the indexes of their assessment according to the vital interest classification by priorities will distribute investments by purpose and control their targeted use reasonably carefully. Conse-

Table 3

SISODE programs and indicators for their evaluation according to classification of vital interests based on priorities

№	Vital interests	Possibility of vital interest satisfaction	Activities and development programs	Indicators of vital interests evaluation
1.	Personal safety, freedom of speech and press, access to information	Possibility of speech and press, access to	1. Revision of the Constitution, as well as the National Security Strategy	<p>Internal criteria: 1) the number of dissatisfied people in society; 2) the proportion of Internet users, % of population; 3) availability of legal and regulatory documents to protect freedom of speech. External evaluation: 1) Press Freedom Index; 2) Democracy Index; 3) rating of failed states</p>
2.	Health (preservation, disease prevention, treatment)	Production of medicines, medical equipment	2. State program "Health": nospheric information automated systems and health technologies	<p>Internal criteria: 1) conditional depopulation ratio (the ratio of death rate to the number of births). 2) Treatment: The number of sanatoriums and resort hotels with treatment 3) Disease prevention: The number of resort and treatment centers 4) Preservation: a) The number of rest homes and boarding houses; b) the number of recreational centers and other facilities; c) the number of children's health camps; External evaluation: 1) Life expectancy, years (basic); 2) country rating by level of mortality</p>
3.	Housing	Production of building materials, production equipment for productivity growth of construction works, etc., new construction technologies	3. State program "Housing"	<p>Ratio of housing for a year = the number of families and individuals who have housing ths. / number of families and individuals who have been registered by the end of the year, ths. The share of expenses of the population on housing and utilities, % = costs for housing and utilities, (\$) / average salary, (\$) * 100 % (the author's own method) External evaluation: no</p>
4.	Nutrition	Food production, agricultural production on an industrial basis (APC)	4. Food security	<p>Internal evaluation: 1) the rate of consumed calories per day 2) the minimum living wage per day (<i>the author's own method</i>) External evaluation: no</p>
5.	Employment	Increasing the employment	5. State program "The total employment"	<p>Internal evaluation: 1) Providing workplaces (%); 2) Unemployment rate (%); 3) Level of shadow economy (%) External evaluation: Opacity Index</p>

6.	Material status, including financial position (revenues, salary)	Increased labour productivity, rapid development of production of consumer goods	6. In the five-year and annual plans for socio-economic development: increasing salaries, faster production of consumer goods compared with the means of production	<p>Internal evaluation:</p> <p>1) hourly wages (by purchasing power parity terms in Hryvnias);</p> <p>2) the Gini coefficient – an index of income concentration;</p> <p>3) decile coefficient (Index of income differentiation, i.e. the difference in incomes of the richest 10 % of families and 10% of the poorest);</p> <p>4) inflation rate, %</p> <p>5) optimal stratification structure of population (%) (basic rate)</p> <p>External evaluation:</p> <p>The GDP per capita in US dollars by PPP – an indicator of human welfare</p>
7.	Ecology of the living environment	Reduction of the risk of diseases, waste recycling, use of local raw materials, etc.	7. State program “Environment”; holding a referendum on using of shale gas, the development of the mining industry based on nanotechnologies, etc.	<p>The coefficients of anthropogenic load: 1) emissions of hazardous substances (tons per 1 km² of the territory) in the atmosphere (the crisis) \$; 2) emissions of hazardous substances (tons per 1 km² of the territory) in the atmosphere (pre-crisis situation);</p> <p>3) discharge of polluted water (%) in crisis situation; 4) discharge of polluted water (%) in pre-crisis situation; 5) storing toxic industrial wastes with the violation (ton by 1 km²) in crisis; 6) storing toxic industrial wastes with the violation of rules (ton by 1 km²) in pre-crisis situation; 7) production of environmentally clean products (%); 8) energy intensity of GDP, the energy efficiency of GDP.</p> <p>External evaluation: 1) the cost of CO₂ emissions per capita, EUR; 2) natural resource rent in % of GDP</p>
8.	Education and science	Reproduction of professional staff for high technology development of V and VI technological modes	8. Reform of increasing the share of state financing of education and science	<p>Internal evaluation: expenses on science and education, % of GDP</p> <p>External evaluation: 1) EIS innovation index (European Innovation Scoreboard); 2) The Global Competitiveness Index</p>
9.	Terms of recreation, leisure	The infrastructure of recreation, tourism, sports	9. State program “Logistics, tourism, and sports”	<p>Internal evaluation:</p> <p>1) The availability of the required amount of funding to make trips and recreation by choice; 2) the number of tourist trips which were made outside the country (proposed by the author), and 3) the amount of free time from the main work, hours</p> <p>External evaluation ratings of the country regarding tourists visits (proposed by author)</p>
10.	Success in life (achieving life goals), satisfaction of vital interest, including religious	Creating a society both morally and physically healthy, dignified personalities	10. State program “Sustainable innovative social and economic development of Ukraine”	<p>Internal evaluation: level of satisfied members of a society in the country</p> <p>External evaluation: 1) Satisfaction with Life Index, SWL; 2) Happy Planet Index; 3) human development index (HDI); 4) World Ranking of charity</p>

quently, the proposals meet the basic world trends of economic development and take into account the real possibilities of correcting condition of the national economy through the correction of its structure.

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Мета. Розроблення блок-схеми моделі формування та реалізації стратегії сталого інноваційного соціально орієнтованого розвитку економіки (СІСОРЕ) в контексті розв'язання проблем енергетичної безпеки України.

Методика. Реалізація поставленої мети здійснена за допомогою методів: 1) узагальнення, аналізу,

синтезу й дедукції – при обґрунтуванні складу підсистем і показників, що характеризують тип інноваційної політики та дозволяють здійснити адекватний її вибір як одного з етапів процесу формування стратегії СІСОРЕ, а також формуванні переліку пріоритетів, що визначають систему цілей в управлінні СІСОРЕ; 2) системного аналізу, комплексного, системного й міждисциплінарного підходів – при розробці блок-схеми моделі формування й реалізації стратегії СІСОРЕ України; 3) аналізу ієрархій і діалектичного методу наукового пізнання – під час прийняття рішення щодо розробки програм і проектів СІСОРЕ України.

Результати. Розроблена блок-схема моделі формування й реалізації стратегії СІСОРЕ України, основу якої мають становити життєво важливі інтереси (ЖВІ) людини, суспільства, держави. У контексті необхідності адекватної оцінки інноваційної політики країни як одного з етапів формування та реалізації стратегії СІСОРЕ виділені показники, що характеризують тип інноваційної політики. Сформовано перелік пріоритетів, що визначають систему цілей в управлінні СІСОРЕ. Позичено розвиток галузей гірничодобувної промисловості як драйверів СІСОРЕ, що дозволить розв'язати проблему енергетичної безпеки України. Розроблені й запропоновані програми СІСОРЕ відповідно до класифікації ЖВІ за пріоритетами та критеріями їх оцінки.

Наукова новизна. Розроблена блок-схема моделі формування й реалізації стратегії СІСОРЕ України, що відповідає критеріям оптимальності, ефективності й стійкості розвитку динамічних систем. При цьому основним керуванням параметром виступає модернізований індекс людського розвитку, що одночасно є індикатором гідного рівня життя людини та добробуту країни загалом. У контексті реалізації етапів стратегії СІСОРЕ обґрунтовані показники, що дозволяють обрати відповідний тип інноваційної політики, сформований перелік пріоритетів, які визначають систему цілей, візуалізовані програми СІСОРЕ та критерії їх оцінки.

Практична значимість. Результати дослідження можуть використовуватися органами державного управління для формування й реалізації концепцій, стратегій і програм СІСОРЕ України.

Ключові слова: стратегія розвитку економіки, критерій стійкості, життєво важливі інтереси, національна економіка, енергетична безпека

Цель. Разработка блок-схемы модели формирования и реализации стратегии устойчивого инновационного социально ориентированного развития экономики (УИСОРЭ) в контексте решения проблемы энергетической безопасности Украины.

Методика. Реализация поставленной цели осуществлена с помощью методов: 1) обобщения, анализа, синтеза и дедукции – при обосновании показателей, характеризующих тип инновационной политики, что позволит осуществить адекватный ее выбор, как одного из этапов процесса раз-

работки стратегии УИСОРЭ, а также формирования перечня приоритетов, определяющих систему целей в управлении УИСОРЭ; 2) системного анализа, комплексного, системного и междисциплинарного подходов – при разработке блок-схемы модели формирования и реализации УИСОРЭ Украины; 3) анализа иерархий и диалектического метода научного познания – при принятии решения по разработке программ и проектов УИСОРЭ Украины.

Результаты. Разработана и предложена блок-схема модели формирования и реализации стратегии УИСОРЭ Украины, основу которой составляют жизненно важные интересы (ЖВИ) человека, общества, государства. В контексте необходимости адекватной оценки инновационной политики страны как одного из этапов по формированию и реализации стратегии УИСОРЭ выделены показатели, характеризующие тип инновационной политики. Сформирован перечень приоритетов, определяющих систему целей в управлении УИСОРЭ. Позиционировано развитие отраслей горнодобывающей промышленности как драйверов УИСОРЭ, что способствует решению проблемы энергетической безопасности Украины. Разработаны и предложены программы УИСОРЭ согласно классификации ЖВИ по приоритетам и критерии их оценки.

Научная новизна. Разработана блок-схема модели формирования и реализации стратегии УИСОРЭ Украины, которая соответствует критериям оптимальности, эффективности и устойчивости развития динамических систем. При этом основным управляемым параметром выступает модернизированный индекс человеческого развития, который одновременно является индикатором достойного уровня жизни человека и благосостояния страны в целом. В контексте реализации этапов стратегии УИСОРЭ обоснованы показатели, которые позволяют выбрать подходящий тип инновационной политики, сформирован перечень приоритетов, определяющих систему целей, визуализированы программы УИСОРЭ и критерии их оценки.

Практическая значимость. Результаты исследования могут использоваться органами государственного управления для формирования и реализации концепций, стратегий и программ УИСОРЭ страны.

Ключевые слова: стратегия развития экономики, критерий устойчивости, жизненно важные интересы, национальная экономика, энергетическая безопасность

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THEORETICAL ASPECTS OF THE SYSTEM DECOMPOSITION OF THE LOGISTICS SYSTEM ELEMENTS

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ТЕОРЕТИЧНІ АСПЕКТИ СИСТЕМНОЇ ДЕКОМПОЗИЦІЇ ЕЛЕМЕНТІВ ЛОГІСТИЧНОЇ СИСТЕМИ

Purpose. Decomposition of the logistics system into the system elements is an important and necessary step in the theoretical studies, the results of which are used in establishing or improving the logistics system in order to increase the efficiency of the company and gain additional competitive advantages by forming unique competences.

Methodology. A systematic approach to defining the elements of the logistics system has been applied. The method of scientific abstraction has been used to reveal the properties of logistics systems which allow identifying the core features of the investigated categories.

Findings. Implementation of the system decomposition of the logistics system allows identifying its main components and revealing the relationships between its elements. Results of the study confirm that the system decomposition of the logistics system elements includes conditions, properties, features, goals, subjects and objects.

Originality. The scientific novelty of the research is a systematic approach to defining the elements of the logistics system and their properties (viz. integration, structuration, hierarchy, development, emergentivity, goal orientation, synergy, and modeling) through the method of scientific abstraction.