

MULTI-PROJECT MANAGEMENT OF INNOVATION AND HIGH-TECH DEVELOPMENT OF NATIONAL ECONOMY

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Introduction. World experience of modern progress of the leading post-industrial countries shows that their success is based on application of an innovative model of sustainable development and harmonious management of development process and realization of strategic plans and targeted programs for upgrading and high-tech modernization of the economic complex. Today, strategic planning, programmatic targeting and project management have become standard and most effective mechanisms for managing transformation and competitive development of economic systems.

Therefore, in the conditions of low efficiency of previously implemented reforms and weakness of the national economy, it is urgent task to search and form new procedures for deep modernization of all elements and processes of domestic economy, ensuring their sustainable economic growth and competitiveness on the basis of strategic planning and multi-project management of targeted programs of innovative development of national economy, high-tech scientific and production systems (HTSPS) and powerful enterprises.

Analysis of latest sources and publications. Significant contribution to development of theoretical issues in innovation and investment management processes, economy development and its production systems have made I.T. Balabanov, V.M. Bilyakov, I.A. Blank, S.V. Valdaitsev, Z.S. Varnalii, V.O. Vasylenko, A.P. Vasilyev, G.V. Vasilkov, O.V. Vostryakov, O.V. Havryliuk, I.O. Halytsia, V.M. Heiets, N.P. Goncharova, O.M. Grebeshkova, V.F. Grinev, V.N. Gunin, M.L. Denisenko, P.N. Zavlin, M.Z. Zghurovskiy, S.M. Iliashenko, B.E. Kvasniuk, O.V. Komelina, N.V. Krasnokutskaya, A.A. Mazaraki, I.I. Mazur, I.P. Makarenko, S.M. Maksimov, B.A. Malitskiy, A.E. Nikiforov, T.N. Obolenskaya, I.V. Odotiuk, O.S. Oliinyk, V.V. Onikiienko, V.O. Onyshchenko, V.I. Pila, O.V. Povahnyi, O.S. Popovich, V.P. Seminozhenko, V.P. Solovyov, V.V. Stadnik, V.D. Stevenson, N.P. Tarnavska, O.H. Turovets, L.I. Fedulova, V.K. Haustov, M.A. Hvesik, V.V. Cherniak, V.G. Chirkov, S.M. Chistov, M.H. Chumachenko, I.A. Shovkun, J.A. Schumpeter, R.F. Jacobs etc. Features of general theory and practice of project management were studied and developed in the works by H.O. Bardysh, L.P. Batenko, I.A. Blanco, D. Bolisa, S.D. Busheva, N.S. Busheva, V.I. Voropayeva, Yu.N. Zabrodina, O.A. Zahorodnykh, A. Potion, N.I. Ilyina, H. Kertsner, D. Kendyle, D. Cleland, V.L. Kolikova, V.V. Lishchynska, T.V. Mayorova, O.M. Mykhailchenko, V.O. Onyshchenko, D.K. Pinto, M.L. Razu, O.M. Sarukhanova, V.A. Tkachenko, R.B. Tyana, S. Fahrenheit, B. I. Kholod, V.D. Shapito etc.

Despite experience of successful progress of the leading countries and world companies, considerable number of theories of providing innovative development of different economic systems, today domestic economy and its enterprises had unsatisfactory state due to the chaotic nature and inefficiency of previous transformations in government and business. That is why it can be determined that any economic development strategies and programs should be aimed at building modern types of high-tech research and production systems and powerful enterprises in Ukraine.

At the same time, it is necessary to ensure formation of a professional and effective structure and processes for managing functioning and development of socio-economic and production-economic systems, capable on the basics of creation and realization of latest high-value products and services with a high level of added value to increase competitiveness and well-being of the whole society. At the same time, it should

be emphasized that modern state policy of innovative development in Ukraine, existing mechanisms and standards of strategic planning and programmatic management of scientific and technical and high-tech progress of domestic economy and its economic entities are insufficient today and need improvement. These factors underline relevance of scientific topic, practical research in this article, which reveals its essence, characterizes main purpose and main results.

Main purpose of the work is to develop organizational and methodological bases and practical recommendations for strategic, multi-project (program-targeted) and project management of innovative development of national economy, its high-tech scientific-production systems and enterprises, capable of creating high-quality science-based and competitive products.

Basic material and results. It should be noted that existing Ukraine's system of strategic and project management application in the planning and implementation of state and non-state targeted programs of innovative development has practically no officially recognized national legal, regulatory and methodological support. This is especially true for organizational and technological sequence of bringing innovative investment programs and processes to the final concrete results in the form of:

- new scientific and high-tech competitive innovative products (innovations, developments, technologies, etc.) with a high level of added value;
- development of modern powerful innovation systems, including their extensive infrastructure;
- technical development of high-tech production, including creation of a new and modernization of existing technical and technological base in industry, research and development organizations and other sectors of economy;
- other opportunities for innovative economic development.

The outlined scope and need to apply a program-based approach to effective implementation of innovative development in Ukraine determine need for formation a new organizational structure for our country, which can be called a high-tech scientific and production system (HTSPS). It is capable of performing turnkey complete innovation cycle of new products creation, technologies and production systems, as well as to provide industrial production and sale of these competitive products. At its core, HTSPS is a program-oriented flexible organizational structure that harmoniously integrates (in an innovation program or project) and synergistically enhances all benefits of individual elements of the innovation system and modern high-tech (industrial) production, as well as directs them to fruitful cooperation (for everyone) unique result – innovative products with high added value. In the course of the cycle-continuous implementation (common to all participants) of program of innovative-investment commercial projects, at the same time all elements and business processes concerning HTSPS and its newest products are harmoniously developed.

Some of the most successful examples of modern HTSPS are individual industrially and technologically advanced countries (Japan, Singapore, Germany, USA) and leading innovative high-tech multinational companies (HTMC): Sony, Toyota, BMW, Boeing, Aerobas and others. In addition, HTSPS can (in various combinations) cover: innovative cluster and scientific-production corporate systems, scientific-technical and financial-industrial alliances, consortia, joint ventures, technopoles and techno parks, venture business, powerful academic and university science, state and non-state science institutions. HTSPS can form the so-called centers (territories) of innovation and economic growth, where complexes of national and regional targeted innovation and investment programs are implemented

Similar systems (HTSPS) should be created in the coming years in Ukraine. At the same time, they have to be organized (and function in the future) from very beginning on the basis of modern standards of multi-project and project management. For this purpose it is expedient to determine at once conceptual model of architectural and technological construction of complex mechanism of strategic, multi-project and project management of innovation and economic progress of Ukraine, national economy, its HTSPS and enterprises.

One of modern type the hallmarks of post-industrial countries development is intensification of intellectualization process and formation of a new type of society – Knowledge Based Society, which is based on advanced scientific knowledge and high technologies of activity, distinguished by a progressive innovative and intellectual level of development [3]. In our opinion, in the current economic conditions, given country's sufficiently high level of scientific, technical and intellectual potential, Ukraine can use concepts of “catch-up development” and “high-quality innovation and high-tech leap”, based on innovative re-engineering. For practical implementation of these concepts in the work it is proposed to apply model of organization, functioning and continuous development of different types of high-tech scientific production systems (HTSPS). The general scheme is shown in Fig. 1.

Strategic development of the state

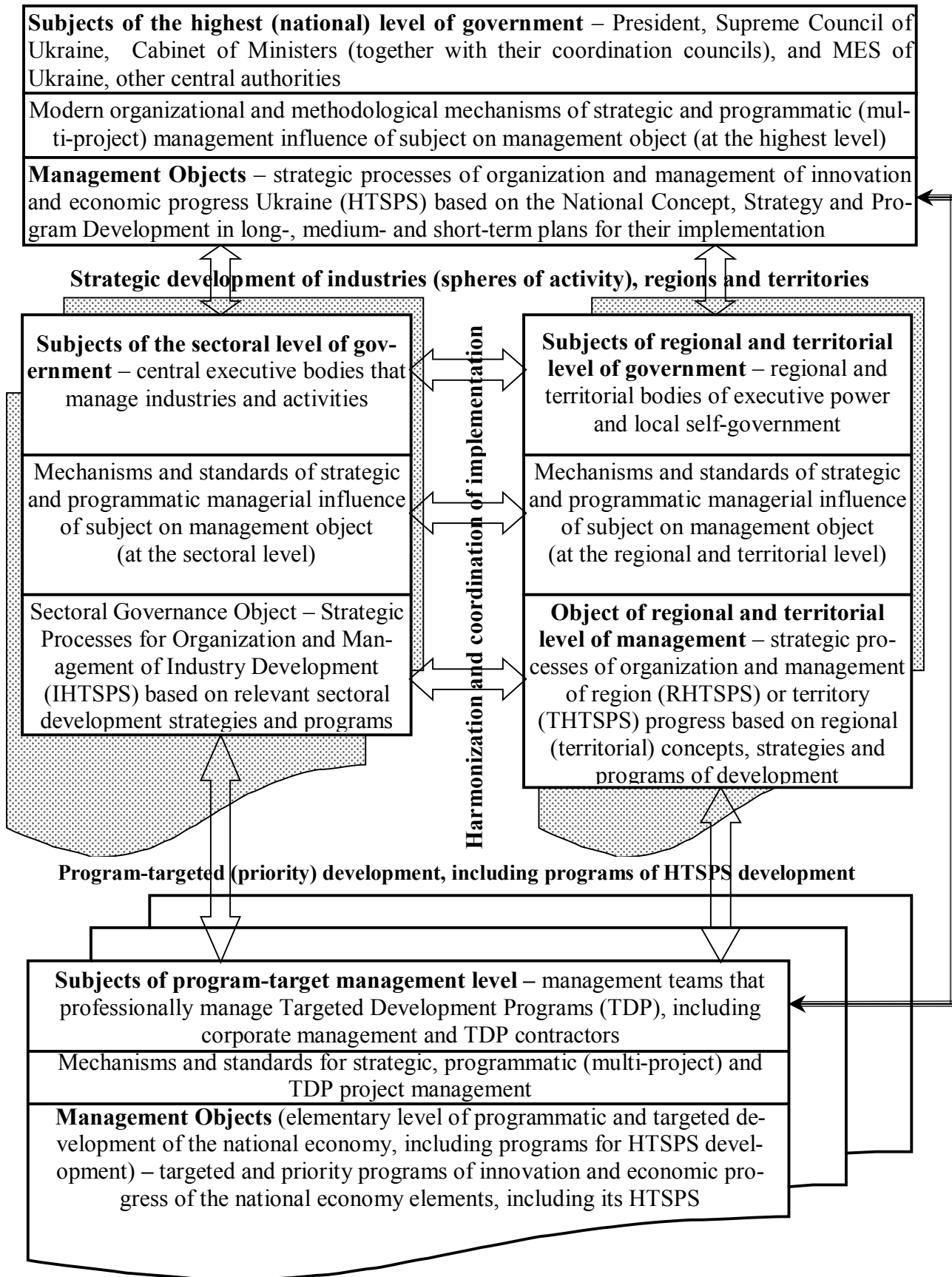


Fig 1. Model of strategic and multi-project management of national economy in innovative development and its HTSPS

In order to apply this model, it is first necessary to determine specific characteristics of HTSPS types that related to respective types of state economic systems. It is known, that economic system is a complex of different elements that form economic basis of society and totality of all types people's economic activities, aimed at creating, producing, exchanging, distributing, consuming goods and services, as well as regulating economic relations [3]. Economic system of the state includes: branches of economy and types of economic activity, regions, their economic subsystems and elements to which business entities belong, various programs and projects. Accordingly, it can be defined that a high-tech scientific-production system (HTSPS) is formed within economic system (or its subsystems and elements) complex of modern scientific and technical, engineering organizations, higher educational establishments and universities, high-tech industries and enterprises, innovative companies, institutions of technical and technological transfer, various infrastructural objects, united among themselves and with external economic entities, contractual, software and other relations, as well as mechanisms of their organization, management and interaction. These mechanisms are aimed at generation, formation, accumulation, dissemination, production-commercial and socio-economic use of scientific and technical knowledge and the latest technologies, production of competitive high-tech products with high added value. On the basis of development of the whole complex HTSPS is grounded modern innovative model of sustainable economic progress of post-industrial society, at the same time increases its competitiveness, socio-economic standard of living and well-being of the whole population.

For the purpose of implementation in the activity of executive authorities of multi-project management for ensuring economy development on the basis of conceptual model of formation HTSPS in Ukraine, scheme of which is shown in Fig. 1, it is first advisable to determine structural and hierarchical architecture of this management organization. To do this, in Fig. 1 was proposed a model for construction such architecture, which not only summarizes results of pre-survey, but also allows use of this scheme to further improve system of state management of innovation and economic development of economy, which is proposed for realization in Ukraine. According to this model, national high-tech research and production system (HTSPS) will integrate progress of following subsystems in the course of its strategic and programmatic development:

a) industry high-tech scientific production systems (IHTSPS), which operate and develop within a certain branch or sphere of the national economy economic activity;

b) regional and territorial high-tech scientific and production systems (RHTSPS and THTSPS) operating within certain regions and territories of realization of innovative technological and economic development;

c) corporate and other HTSPS, which unite, function and develop within specific targeted and priority programs of innovation and economic development of national economy and its elements. These programs and project-oriented HTSPS are foundation of the whole pyramid of organization and management of Ukraine's innovation and economic development (Fig. 1). Organizational structure of HTSPS, features and mechanisms of its design, creation, operation and development on the basis of project and programmatic (multi-project) management are considered in [1].

It should be added that in scientific works of I.B. Chychkalo-Kondratska were examined methodological aspects of formation and implementation of regional innovation policy on the example of regional scientific and production systems (RSPS), namely: theoretical and methodological foundations of RSPS development; problems and prospects of this development; regional policy on RSPS; strategic directions of innovative development of RSPS and infrastructure mechanism of its implementation on the basis of technology transfer to Ukraine's regions [3]. These studies are also used by authors of this paper to develop effective mechanisms for implementation of targeted programs of innovative and high-tech development for national economy of Ukraine.

Based on conceptual model of organization of strategic and program-targeted (multi-project) management of Ukraine's development (its economic sectors and regions) and summarizing results of conducted researches it is possible to determine that main areas and varieties of multi-project management in the system of strategic planning, programming and project management of national and targeted development programs implementation in Ukraine are:

- sphere of conceptual and strategic planning of Ukraine's development, where strategic multi-project (program-portfolio) management is used, connected with management of processes development and implementation of strategic plan (National Concept and Strategy) of state development;

- sphere of strategic programming of Ukraine's development – multi-project management related to management of process development of the National Program of State Development, that is, procedure for realization of strategic plan (National Concept and Strategy) of Ukrainian society progress;

- sphere of target programming and design of priority directions of Ukraine's development and provision of realization these targeted (and priority) program-project measures – multi-project (program-target) and project management on development and implementation of target programs and priority projects of state development.

According to these spheres and levels of multi-project management of country development and its elements (branches of economy, regions and economic entities), management personnel of different levels of executive power and corporate sector (implementing strategic program and project development) in their activity should have following professional multi-project management skills:

- defining values system for strategic plan (program or project) for their profile in all activities in form of the main goal (mission), objectives and development priorities;

- procedure for profiling the main goal (mission), which should provide justification of potential (prospective) value of strategic plan (program, project), prerequisite of which is complexity of strategic development tasks for state (or its elements) and variety of scenarios for managing architecture of these strategic measures (plans, programs and projects);

- order of architecture formation development and management of the chain of strategic decisions development: concept – strategy (strategic plan) – program and projects of its (its) implementation – process of development realization and obtaining target results. In this case, in general, national (sectoral and regional) concepts, strategies (strategic plans), as a rule, define and form portfolios of targeted and priority programs (and projects), development and implementation of which are managed by relevant executive authorities. One of the main goals of their management is the maximum achievement of planned value (results) from implementation of relevant strategic measures (plans, programs and projects);

- preparation and implementation of appropriate strategies for implementation listed above measures;

- substantiation, formation and development of organizational structure of executive bodies and other participants in implementation of strategic and program-design (multi-project) management of state development;

- formation of conceptual (common) standards of their professional multi-project management activities;

- defining criteria for assessing level and quality of achievement planned value (target results) of development, which are determined separately for different levels and life periods of implementation of strategic plans, programs and projects of state development and its elements;

- managing of environment and community that determine economic and intellectual space of strategic activities. Such management aims to exert an effective influence in the general context of strategic and tactical activities implementation (strategies, plans, programs and projects) on integration and coordination of stakeholders' actions from different organizations with different fields of activity and interests in their participation and results of implementation of all activities. That is, multi-project management should ensure continuous (in time and space, resources and other management parameters) integration of all elements of state development process.

Integration management and development of standards for multi-project management of strategic and program-project activities for Ukraine's development should cover gradual "transformation" of the following three standard (standardized) models of strategic plans, programs and projects transformation:

- conceptual (schematic) – to create their preliminary concept and preliminary plan for future implementation;

- systematic – for detailed planning (programming or design) of strategic measures and transformations and definition of individual (more specific) standards of multi-project (program and project) management for implementation of these measures;

- organizational and service model for implementation of strategic plans and programs of the state and its elements development. It should ensure processes management of creating real target results, both in the subject and financial and economic spheres of development. The internal effectiveness of multi-project management mechanisms should be aimed at obtaining real maximum value of these results both immediately after implementation of relevant programs and projects and in the future (future potential value, for example, through implementation of development projects and programs of continuous innovative development of national economy and its elements).

Expanding the scope of project management (through its mutual integration with strategic and portfolio program management and through transition of personnel management to the principles of multi-project management in development management) in the world practice (and in WMC, P2M standards, etc.) is achieved through implementation in sphere and scope program management of the new (additional) standards and portfolio management, which include: program and project strategy management; managing their investment support, financing and strategic costs (budget); managing programs system and projects (in time, by their resources and quality of implementation); managing communications of programs and projects; managing development goals and priorities (programs and projects); managing results and their value.

For successful implementation of multi-project management in the processes of ensuring socio-economic and innovative development of Ukraine it is proposed:

- evaluation competencies of managers and other management and executive staff who must develop and implement turnkey relevant strategic development plans, programs and projects;
- ensure development of professionals aimed at achieving desired results through introduction of a new level of education and professional skills in project management of development programs and projects;
- direct activity of all management and executive staff, who continuously realizes development of the national economy and other spheres of social life, to create real values defined in strategic plans, programs and projects on the way of forming in Ukraine highly developed, civilized, socially oriented and competitive post-industrial society European model.

Conclusions and suggestions. In our opinion, use of standards of project and multi-project management will not only eliminate disadvantages of traditional public administration on the basis of existing methodology of strategic program-targeted method of economic development, but will also promote introduction of a new innovative mechanism for organization of scientific and technical and technological progress of domestic economy sustainable development of the whole society. Moderators and practical mechanisms for implementing this development will be high-tech scientific and production systems (HTSPS) and similar powerful enterprises that are able to create and produce the latest high-tech technology and competitive products with high added value.

REFERENCES:

1. Strategic and project management of the national economy innovative development, its high-tech research and production systems and enterprises: [monograph] / O.V. Redkin, D.M. Tolkachov. – Poltava: PoltNTU, 2019. – 334 p.
2. Redkin O.V. Implementation of the new mechanism of strategic and project management of the national economy innovative development / O.V. Redkin, D.M. Tolkachov // “Economy and Region”. – Poltava: PoltNTU, 2016. – No. 3 (58). – PP. 49 – 61.
3. Chychkalo-Kondratska I.B. Factors and prerequisites for innovative development of research and production structures in Ukraine’s regions [electronic resource]. – e-mail: k56@pntu.edu.ua
4. Cleland Dirk. Project Management Strategic Design and Implementation / Dirk I. Cleland, Editor. – McGraw-Hill, Inc., New York, 2015. – 440 p.

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JEL: O11, O31, O32

Редкін Олександр Васильович, кандидат технічних наук. **Чайкіна Аліна Олександрівна**, кандидат економічних наук. Полтавський національний технічний університет імені Юрія Кондратюка. **Мультипроектне управління інноваційним і високотехнологічним розвитком національного господарства.** На основі аналізу передового досвіду і думки вчених щодо сучасного прогресу провідних постіндустріальних країн і компаній світу встановлено, що їх успіх ґрунтується на застосуванні інноваційної моделі сталого розвитку і гармонійному управлінні процесами розроблення та реалізації стратегічних планів і цільових програм оновлення та високотехнологічної модернізації господарського комплексу цих країн і компаній. Обґрунтовано актуальність, новизну й практичну цінність теми дослідження для економіки та підприємств України. Визначено сферу використання стратегічного, мультипроектного й проектного управління для формування нового механізму забезпечення інноваційного розвитку вітчизняного господарства. Таким механізмом є реалізація «під ключ» стратегічних програм створення в Україні високотехнологічних науково-виробничих систем (ВНВС). У світі аналогами ВНВС є передові компанії та країни, такі як «Соні», «БМВ», «Боїнг», а також США, Німеччина, Японія, Сінгапур тощо. Запропоновано модель і алгоритм

організації мультипроектного управління інноваційним розвитком національного господарства та його ВНВС. Їх ключовими системами, підсистемами й елементами є: національна (загальнодержавна) високотехнологічна науково-виробнича система; галузеві, регіональні та територіальні високотехнологічні системи; корпоративні ВНВС. Наведено рекомендації щодо впровадження мультипроектного управління в загальнодержавні та цільові програми розвитку передових галузей економіки, науки і техніки. Визначено перелік професійних навичок керівного персоналу щодо успішного впровадження та застосування світових стандартів стратегічного, мультипроектного й проектного менеджменту в програмах і проектах розвитку вітчизняного господарства та підприємств України. Використання наведених пропозицій має усунути не тільки існуючі вади традиційної форми державного управління на основі прийнятої методології стратегічного програмно-цільового підходу до розвитку вітчизняної економіки, а й буде сприяти впровадженню нового інноваційного механізму організації науково-технічного та високотехнологічного прогресу України.

Ключові слова: інноваційний і високотехнологічний розвиток, стандарти стратегічного, мультипроектного та проектного управління.

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Redkin Oleksandr, PhD in Technical Sciences.

Chaikina Alina, PhD in Economics. Poltava National Technical Yuri Kondratyuk University. **Multi-Project Management of Innovation and High-Tech Development of National Economy.** Mechanism of ensuring dynamic and modern development of national economy and its enterprises was determined in the article. Such mechanism is the “turnkey” implementation of strategic programs and projects for creation in Ukraine of high-tech research and production systems. A model and algorithm for implementation of this mechanism based on world standards for strategic, multi-project and project management of scientific, technical and high-tech progress in advanced sectors of Ukraine’s economy, its regions, companies and so on were proposed.

Key words: innovative and high-tech development, standards of strategic, multi-project and project management.

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Мультипроектное управление инновационным и високотехнологичным развитием

национального хозяйства. Определен механизм

обеспечения динамического и современного

развития отечественной экономики и ее

предприятий. Таким механизмом является

реализация «под ключ» стратегических программ и

проектов создания в Украине високотехнологичных

научно-производственных систем. Предложены

модель и алгоритм реализации этого механизма на

основе мировых стандартов стратегического,

мультипроектного и проектного управления научно-

техническим и високотехнологичным прогрессом в

передовых отраслях экономики Украины, ее

регионов, компаний и тому подобное.

Ключевые слова: инновационное и

високотехнологичное развитие, стандарты

стратегического, мультипроектного и проектного

управления.