



NATIONAL DEVELOPMENT GOALS: INNOVATION FRAMEWORK

Monograph



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**Edited by
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Vitaliy Omelyanenko**

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Monograph is devoted to the research of theoretical and practical aspects of innovation based national development issues. Different methodic approaches and economic mechanisms to provide innovation development at the regional, national and international levels are considered. Scientifically based recommendations to achieve economic, financial, social and ecological aims of the national development are given.

Keywords: institutions, national development, innovation activities, human capital, strategy, international economic relations, innovation policy, management, economic mechanisms.

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INTRODUCTION

Analysis of formation and coordination of innovation development policy is one of the most relevant areas of modern economic studies. In a number of developing countries, there are no systematic strategies of innovation development that would coordinate the actions of various government agencies to support and balance the development of the components of the «triangle of innovation success» (business environment, regulatory environment, innovation policy). This aspect also includes the optimization of resource base (maximizing the efficiency of limited resources). Despite the presence of a number of initiatives and separate sectoral strategies, the task of identification the objectives of innovation policy deals with the problem of high degree of unsystematic functioning of innovation structures and initiatives, including their intersectoral level as well as their lack in long-term plans.

Therefore monograph is devoted to the research of theoretical and practical aspects of innovation based national development issues. Different methodic approaches and economic mechanisms to provide innovation development at the regional, national and international levels are considered. Scientifically based recommendations to achieve economic, financial, social and ecological aims of the national development are given.

The monograph comprises nine parts.

In part one «**Innovation factors and policy for national development**» the significance of innovation policy in wider context through the use of political, economic and administrative instruments, was mainly aimed at improving the functioning of society, creating new sectoral segments of the national innovation system, developing the institutional environment, stimulating innovation behavior of individual firms is discussed. For practical implications authors note that it is important to emphasize the growing role of technology in the life of society makes active state regulation (through coordination and stimulation) in this area necessary. In leading countries and in a number of studies, the public-private policy is considered as a coordinated, state-funded initiative to mobilize national resources to accelerate targeted technological changes and maintain leadership in global competition through the innovations.

The second part «**International economic security management within the advanced innovative development paradigm**» deals with the development

of theoretical and methodological approach to the management of innovative progress, which allows to take into account: positive results determined by changes in the eco-destructive load on the environment and recipients; the possible cost level for the implementation of the direction (option) depending on the type of innovation, the stage of the ecological and economic cycle of innovation, which increases the level of substantiation of management decisions at the initial stages; market optimality of the direction (option), which allows to reduce investment risks at the early stages and determine its market perspective in the long and short term benefits. The theoretical and methodological approach suggested by the authors to the formation of strategies, as well as to the system of measures ensuring international economic security, allows to increase the overall level of international economic security, stimulate the government to implement measures aimed at the rational use of the national resources, the choice of optimal market for distribution of their products, as well as the choice of the kind of activity that will fully meet the existing needs of the international market.

The aim of the third part «**The impact of human capital on innovative development of society: a socio-economic analysis**» is to carry out social and economic analysis of the impact of human capital on the innovative development of society. Methods of research: generative, empirical, system-structural, methods of economic analysis and case-method. The main results: the theory of human capital is identified, the interrelation between human development concept and the theory of human capital is shown, the investment of the state in the development of human capital is characterized, the role of non-formal education is analyzed. Scientific novelty: the most effective innovative techniques and methods of social and economic analysis of the impact of human capital on innovative development of society in conditions of society reform have been formulated.

The fourth part «**Adult education as an economic priority**» deals with the adult education as a pressing issue in society as it is directly linked to the level of human capital. Lifelong learning issues and trends as an ongoing process that stimulates and empowers people to acquire all the knowledge, values and skills they will need throughout their lives and to apply them with confidence, creativity and enjoyment in all roles, circumstances and environments are considered. International experience in adult education confirms that it can be considered as an efficient direction of national competitiveness within the reorientation of the economy to human development should become a crucial

feature of the future socio-economic development.

The reform of the decentralization of power that is taking place in Ukraine makes it necessary to study the processes of ensuring innovation development at the regional level. As world experience shows, the regions contain a significant potential for innovation development and that's why the task of fifth part **«Innovation framework for the regional innovation development in Ukraine»** is to identify leverage to use this potential, considering the paradigm shifts in the global economy and transformation of regional policy in Ukraine in terms of innovation-based economy. The important conclusion deals with the fact that modern economic processes requires a change in the paradigm of national and regional innovation policies, which consists in moving away from the distribution of financial resources and the widespread creation of innovation infrastructure to stimulating activity related to the concentration of human and social capital, the formation of a favorable business climate and institutional environment, the integration of regional innovation systems into global networks. The applied aspect of regional innovation development is considered on example of regional environmental system is based on the interaction between the control and managed subsystems through the implementation of the regulation, control, stimulation, and preventive functions.

In the sixth part **«Impact of flexibility on organizational innovation and management»** the issues of permanent changing of environment, framework requirement and system conditions, which require to measure and manage all components of a production system taking into consideration that needed changes should be done fast and with the minimal efforts, are considered. Author notes, that the plurality of the definitions of flexibility creates the demands for a clear and consistent understanding of flexibility especially in understanding of quantifying flexibility. Therefore flexibility is used as a complex framework of management variables with characteristics of objective, actuating and control variable as well as with the character of dichotomy of operative and strategical management. As an intermediate step advanced knowledge is required in advanced mathematical approaches based on quantum mechanics solutions, screenplay based modelling set-up of decisions making situations, cross-functional and interdisciplinary multi methods handling in cybernetic management.

In the seventh part **«Fundamentals of the management mechanism of innovative production commercialization of industrial enterprise»** authors

present the methodological and theoretical and methodological foundations of the formation and functioning of the organizational and economic mechanism of commercialization of innovative products of industrial enterprises (OEMCIPIE). The essence and content of the OEMCIPIE components, the main functions, principles of functioning and structure, instrumental and methodological support, organizational aspects of functioning are determined. An approach to developing a market-oriented concept of an innovative product, as well as an approach to managing its commercialization strategies, are proposed and substantiated. The obtained results deepen theoretical and methodological foundations of innovations' management in terms of forming the principles of the organizational and economic mechanism of commercialization of innovative products of industrial enterprises. Further research should aim at improving the system of management tools, according to formalized procedures of strategies for commercializing innovative products.

The eighth part «**Research of conditions of tax planning of the industrial enterprise**» covers issues of improving the planning of tax transaction costs in the enterprise in the context of recognizing taxes as a type of transaction costs is a way to increase the efficiency of the enterprise. Authors underline, that planning of tax transaction costs at the enterprise provides the owners of capital and management of the enterprise with the necessary information, which fully characterizes the impact of the tax system on the internal and external environment of the enterprise and allows to make more informed management decisions.

The last part «**The development of green tourism in Ukraine on the basis of ecological marketing**» extensively covers a very important problem of the innovative mechanisms, providing solution to the problem of maintaining population health in the sphere of tourism industry and its new form – green tourism, combining outdoor activities with preservation of the natural habitat. The purpose of this part is to analyze content of green tourism in its various modifications and specifics of environmental monitoring in tourism industry. Authors note, that tourism industry is one of the largest highly profitable and most dynamically developing industries in Ukraine. Ecologically oriented green tourism is developing especially rapidly in its various forms: natural, rural, along ecological paths, confined to protected natural areas. Marketing in the tourism industry is an interconnected system of tools used by a travel company for targeted management of demand for travel services. The importance of

environmental marketing is associated with its complexity: tourism combines a complex of material and social components and therefore requires a competent and innovative approach for economic and substantial success.

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1. INNOVATION FACTORS AND POLICY FOR NATIONAL DEVELOPMENT

Kovtun Galyna, Prokopenko Olha, Omelyanenko Vitaliy

1.1 Innovation policy within the sustainable development framework

Acceleration of globalization processes and intensification of international competition at the beginning of the XXI century require the world's leading countries to seek and implement new options for innovation policy as a means of improving the quality of economic growth.

The goal of sustainable development is to make the most efficient use of limited resources and to create more compact and sustainable communities that meet security requirements¹. Sustainable development can also be defined as «creating the conditions necessary to maintain the function of the organization indefinitely»². The authors consider human capital, financing, natural resources and technology. The security approaches also consider increasing energy efficiency, reducing costs and resource consumption, as well as developing sustainable products / materials and «net-zero» energy consumption, in particular through product life cycle assessment³.

The analysis of the positions given in Resolution of the OSCE Parliamentary Assembly «Strategic forecasting in the field of science, technology and innovation in the interests of sustainable development», allows us to identify the main tasks of managing the innovation component in the context of sustainable development:

- use of new technologies, digital economy and science in solving global environmental problems;
- the use of new technologies as a tool for creating new jobs and development opportunities that increase the demand for digital skills and knowledge, which in turn creates the need to master digital skills and

¹ Goran W., Napier Th., Schneider R. and Stumpf A. Building Green. In Hartman J., Butts K., Bankus B., Carney S. (ed.). Sustainability and National Security. Center for Strategic Leadership United States Army War College Carlisle, Pennsylvania. 2012. pp. 447-482.

² Hughes K., Bankus B. Sustainability: A Lens for National Security. In Hartman J., Butts K., Bankus B., Carney S. (ed.). Sustainability and National Security. Center for Strategic Leadership United States Army War College Carlisle, Pennsylvania. 2012. pp. 29-56.

³ Cockerill K. (2012). The Department of Defense offers a Strong Offense for Promoting Sustainability. In Hartman J., Butts K., Bankus B., Carney S. (ed.). Sustainability and National Security. Center for Strategic Leadership United States Army War College Carlisle, Pennsylvania. pp. 57-84.

knowledge, so that societies can adapt and benefit from technological change;

- strategic forecasting to ensure that technologies meet the demands and needs in different areas;

- strategic forecasting and evaluation activities should assist policy makers and stakeholders in implementing the 2030 Agenda for Sustainable Development by identifying difficulties and opportunities that can be considered from a strategic point of view, and that trends in innovation should be analyzed taking into account the broader socio-economic conditions.

State innovation policy, through the use of political, economic and administrative instruments, was mainly aimed at improving the functioning of society, creating new sectoral segments of the national innovation system, developing the institutional environment, stimulating innovation behavior of individual firms.

However, modern theory and practice of state regulation states that innovation policy can not ignore economic regulation and at the same time can not be a continuation of industrial policy or policy in education and science, but is an interconnected system of measures of three policies (Fig. 1.1).

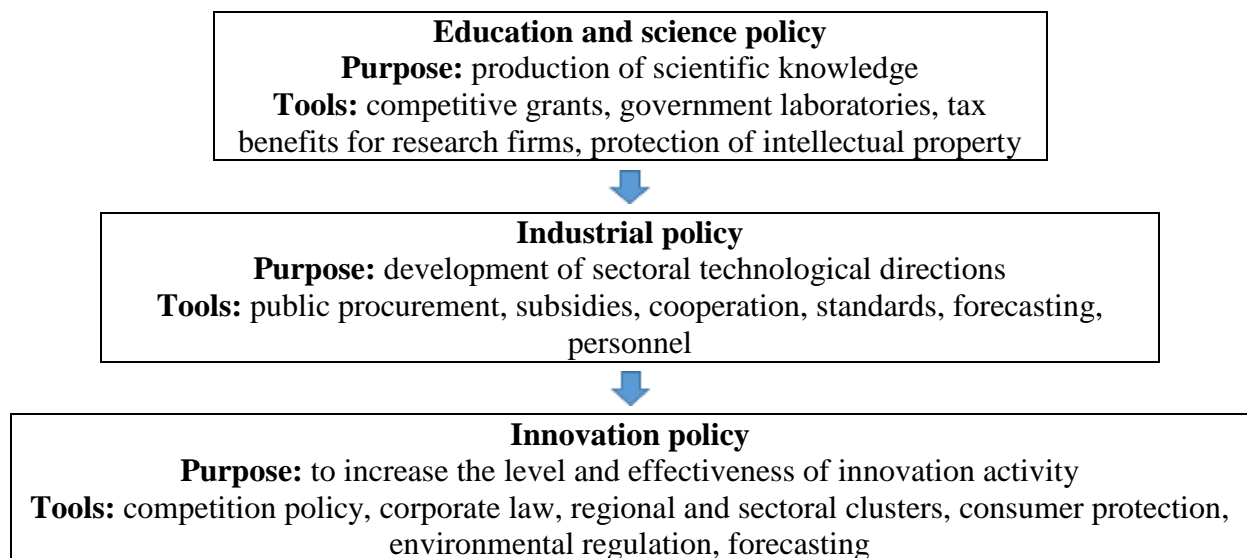


Fig. 1.1. Scheme of innovation regulation

Therefore, the development of innovation policy requires coordination and coordination of decisions between different participants in economic and social life. The implementation of a balanced set of measures within the three components of innovation regulation is an important task of state regulation of innovation development depending on the socio-economic challenges facing the

country and a key condition for efficiency. In the light of modern challenges of innovative development, the center of gravity in the complex of state regulation in Ukraine is shifting towards technological (or industrial) policy.

Innovation policy in the narrow sense is a set of government decisions that directly stimulate innovation processes in the business sector of the economy. It involves the use of mechanisms such as:

- state financial assistance to enterprises through the provision of grants, loans, subsidies for the development of innovative products, technologies, services;
- financing of programs or projects designed for the development of cooperation and interaction of participants in the innovation process, and, consequently, to improve the functioning of the national innovation system as a whole;
- simplification of access and dissemination of information on specific aspects of the national innovation system (development of sectoral, sectoral, regional strategies, forecasts, dissemination, replication of the experience of the best innovation enterprises, etc.);
- improving the legislative support of innovation (the right to intellectual property, legislative regulation of the creation and operation of innovative firms, tax incentives, etc.);
- financing of innovation infrastructure (innovation centers, business incubators, technology transfer centers, etc.).

But these measures of the state and instruments of its influence alone, without taking into account the economic climate in the country, the level of development and the relationship between science and industry, etc., can not lead to the expected results. The coordination of the interests of all participants in the innovation process is often solved by developing a national program, i.e. development strategy, and then there is a process of embedding various mechanisms to achieve these national goals in the policy of each ministry or agency. In Ukraine, the order of the Cabinet of Ministers of Ukraine of July 10, 2019 approved the Strategy for the development of innovation for the period up to 2030, which identifies the main barriers to innovation in Ukraine, formulates directions and ways to solve problems, outlines the timing and expected results and an assessment of the implementation of the Strategy¹.

¹ On approval of the Strategy for the development of innovation for the period up to 2030 Order of the Cabinet of Ministers of Ukraine № 526-r of July 10, 2019. <https://zakon.rada.gov.ua/laws/show/526-2019-%D1%80>

Another problem of innovation policy is to determine the responsibility of various participants, which ensure the dynamic nature of innovative development and the introduction of new methods of interaction between business and the state. It is important in this process to bring domestic business, both large and small, to the realization of the need for more active participation in the innovation process as a whole, including research. Thus, the creation of a favorable business environment is seen as a prerequisite for stimulating innovation.

Due to the revision of the principles and philosophy of innovation policy, a more rational attitude to priorities in the context of limited budget resources in most developed countries there is a reduction in the role of large, expensive government programs, and sometimes a complete abandonment of them in favor of supporting institutions and mechanisms participants in the innovation process: scientists, inventors, entrepreneurs, managers. The role of the system of financial and economic incentives that ensure the mutual interest of producers and consumers of innovations in national innovation systems is increasing. This course is achieved by a set of measures of industrial and policy in the field of science, as well as selective impact on certain infrastructural elements of the technological process. Government instruments for influencing technological trends are not so much the proclamation of priorities as government procurement with a large share of IP in industries that meet government needs, direct and indirect subsidies to socially significant science and education, support for fundamental interdisciplinary projects, forecasting, economic and political support for national high-tech manufacturers.

In particular, the priority should be given to the development of basic research, which is a component of public policy not only in developed but also in dynamically developing countries. The responsibility of the state's political institutions for the development of science is connected both with its mainly budgetary funding, which has historically tended to grow, and with the significant multiplier effect of research results that determine long-term progress in all spheres of life. An example of the implementation of the priority of basic research is the public policy of China, where the growth rate of spending on science was twice as high as GDP growth. Due to significant financial infusions, as well as increasing requirements for basic and applied science in China (publications in international journals, international cooperation, etc.), there has been a strengthening of many scientific areas and in general – the role of China

in world science. 16,2% – China's share in global nominal GDP in 2019 (IMF estimate), which is 95 times higher than in Ukraine and almost 7 times higher than Russia's GDP¹.

With the intensification of global rivalry in all spheres of world development – from economics and politics to values and ideology, demography and the environment – the influence of external factors that shape the functioning of national innovation systems is growing.

Until recently, for the advanced countries of the world – the leaders of innovative development, the task of strengthening their own competitive advantages was solved either nationally or in cooperation with developed countries with similar social and institutional foundations of science and technology. In the new environment, when industry, science, technology, information and even management become global, there are conflicts and contradictions of a fundamentally new nature. And these contradictions are not always removed by traditional methods of innovation policy.

Thus, any state must adapt its national innovation system from «national» policy to the rapidly changing realities of globalization, strengthen its own non-state key advantages for «asymmetric» response to competitors, link «open innovation» strategies with new mechanisms to support its own radical innovations, compensation for «failures» of both the market and the state itself. The sooner this complex adaptation occurs, the greater the potential risk and possible success. The current stage of development is characterized by fierce competition of national policies, the effectiveness or failure of which depends not so much on internal factors, but largely on external conditions of development.

1.2 European experience of development and implementation of innovation policies for the development of economic systems

Today's globalized world continues to face significant social, economic and environmental challenges, and the economy encourages governments to seek new approaches to innovation. A key condition for the accelerated socio-economic development of countries in the XXI century is an effective

¹ Mishin O. Ukraine's place on the map of China: a comparative analysis of GDP. Retrieved from https://zik.ua/blogs/mistse_ukrainy_na_karti_kytaiu_porivnialnyi_analiz_pokaznykiv_vvp_966742.

innovation policy, the ultimate goal of which is to implement scientific and technological progress (priority fundamental and applied R&D, invention), new, advanced, revolutionary technologies, technology, new forms of labor organization and management, innovative inventions.

Every developing country, including Ukraine, now faces an innovative challenge. The share of expenditures for scientific and scientific-technical work in the gross domestic product of Ukraine in 2017 was only 0,45%¹. Today there is a choice: either the reduction of economic, industrial and production potential of the country will be compensated at a high scientific, technical and technological level, i.e. due to a sharp increase in innovation activity, or the country will be pushed back not only by GDP but also by technological capabilities. by the level of economic development from highly developed countries. Therefore, the study of positive European experience in the development and implementation of innovative policies for economic systems is appropriate and important to reduce the vulnerability of the domestic economy to global challenges such as depletion of natural energy resources, aging populations, increasing income differentiation, environmental degradation. These challenges require rational response measures at the level of innovation policy, the launch of fundamentally new innovative strategies for the development of the national economy.

The share of the world's leading leaders in R&D spending, which is defined in dollar purchasing power parity, which reflects the real value of investment and allows for greater comparability by eliminating differences in price levels between countries, is shown in Fig. 1.2.

In the 1980s, the countries of the European Union proclaimed a policy of closing the innovation gap between Europe, America and Japan. However, according to experts, they did not achieve real results even with the existence of a significant number of programs for the development of basic science in these countries, the mechanism of transforming scientific ideas into commercial products in demand by markets did not work. EU countries have paid considerable attention to the development of basic science, contrary to the process of innovation that existed in Japan and the United States. The policy of technological protectionism has led to the exact opposite results. According to

¹ On approval of the Strategy for the development of innovation for the period up to 2030. Order of the Cabinet of Ministers of Ukraine. № 526-r. July 10, 2019. Retrieved from <https://zakon.rada.gov.ua/laws/show/526-2019-%D1%80>

experts from the National Academy of Engineering, Europe is 2 times behind the pace of renewal of US production processes, Japan – 3 times¹.

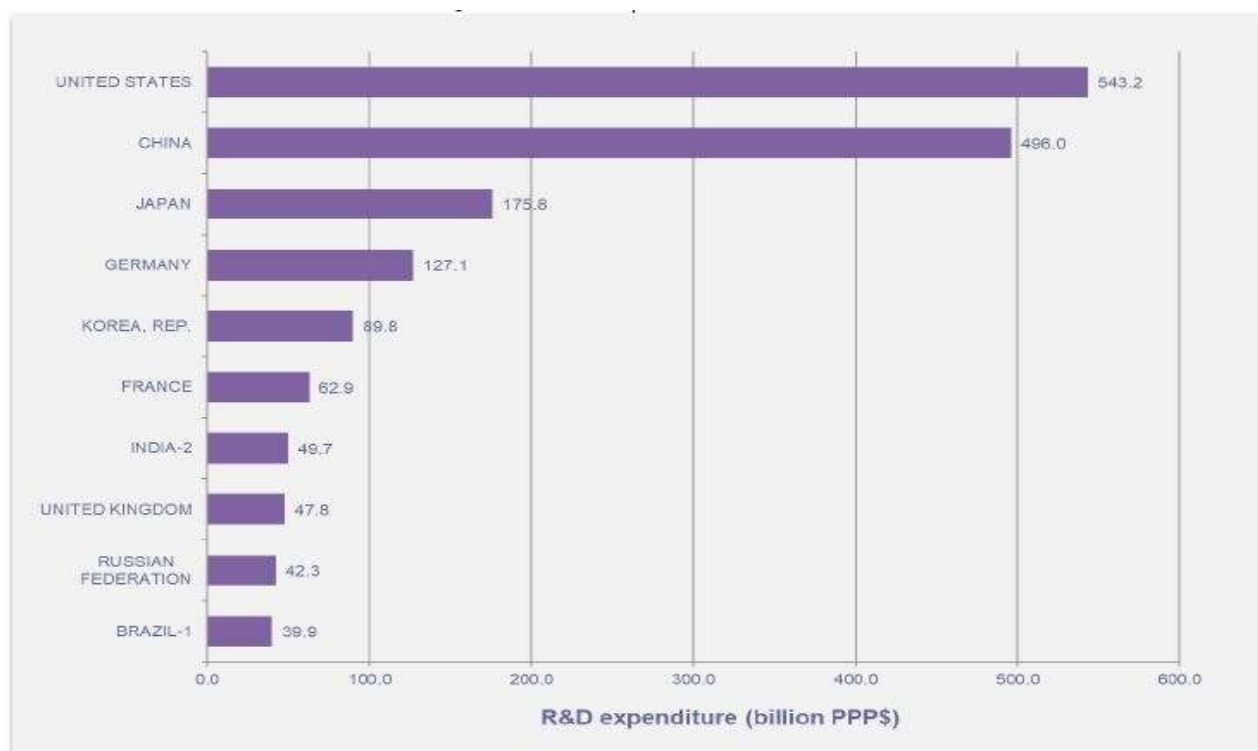


Fig. 1.2. Ranking of 10 world leaders in R&D investment in 2017 (billion, USD)

Table 1.1. The share of expenditures for scientific and scientific-technical work in the gross domestic product in 2016²

Regions of the world	Weight, %
Countries of North America and Western Europe	2,4
Countries of East Asia and the Pacific	2,1
Countries in the world	1,7
Central and Eastern European countries	1,0
Latin America and the Caribbean	0,7
Arab countries	0,6
Countries of South and West Asia	0,5
Southern Sahara countries	0,4
Central Asian countries	0,2

¹ Nikonova Ya.I. Innovation policy in the system of state regulation of sustainable development of the national economy. Novosibirsk: NGTU Publishing House, 2010.

² Global Investments in R&D. UIS Fact Sheet No. 54. June 2019. Retrieved from <http://uis.unesco.org/sites/default/files/documents/fs54-global-investments-rd-2019-en.pdf>.

By the way, in Europe less than in the USA and Japan, small venture business is developed and the ideology of centralized (state and banking) support dominates. For banks that finance, as a rule, individual industries, the possibility of project failure is unacceptable.

Thus, the lack of significant progress in innovation development, the backwardness of the main competitors in terms of R&D expenditures (USA, Japan), the problems associated with EU enlargement, population aging - these factors have formed the basis for a competitive innovation economy. At the EU summit in Lisbon in 2000, the «European Innovation Policy» was formulated for the first time, setting out priorities for innovation¹:

- improving the innovation environment by strengthening the innovation component of all areas of national policy and their integration;
- stimulating market demand for innovation and the use of the concept of «leading» markets, which provides support for markets that are most receptive to innovation;
- stimulating innovation in the public sector, overcoming the bureaucratic conservatism of the state administration;
- strengthening regional innovation policy.

Among the principles of the Lisbon innovation reform, the most important provisions are:

- development of services in the field of technology dissemination and transfer;
- development of cooperation between different subjects of the national innovation system with the creation of growth points and networks;
- development of the system of international knowledge transfer;
- development of broad public support for the purchase of innovative products and services;
- facilitating access to internal and external financing;
- strict observance of intellectual property rights;
- strengthening the innovation potential of SMEs.

New strands of the EU's innovation policy strategy are reflected in the Sixth R&D Framework Program, which aims to create a dynamic and competitive intellectual economy in Europe. The program identified 7 priorities:

¹ European Trend Chart on Innovation. 2002 European Innovation Scoreboard: Technical Paper No 3. EU Regions. November 28, 2002. Retrieved from https://ec.europa.eu/regional_policy/archive/innovation/pdf/library/trendchart_en.pdf.

- creation of an information society;
- nanotechnologies and nanoscience, multifunctional materials, new devices and production processes;
- quality and safety of food;
- protection of the environment and creation of ecosystems;
- the population of large cities and the problems of knowledge-based management in society.

Thus, innovation reforms have been aimed at developing a «knowledge economy» in Europe by stimulating research, improving education policy, developing information technology and creating a favorable innovation climate. In addition, the goal of innovation policy is to liberalize the European system of services, transport and energy markets. At the same time, the main emphasis is on the need to modernize the European model of social security, increase employment, reform the social security system and reduce social benefits. The task of achieving sustainable development was further included in the agenda of the Stockholm Summit in March 2001. At the Barcelona Summit in March 2002, EU leaders formulated a number of specific tasks in the field of stimulating innovation development, which were set out in 2003 in the European Commission's Communication «Innovation Policy: Modern Approaches in the Context of the Lisbon Strategy» and decided that investment in R&D, as a share of GDP, should increase from 1,9% in 2000 to 3% in 2010¹.

In the EU countries, the European Research Area (ERA) was created in 2000 as part of innovation policy, as a system of research programs that combine the scientific resources of the European Union. ERA includes European technology platforms through which industry and other stakeholders develop joint long-term visions and strategic research programs in areas of interest to business.

Framework programs for research and technology development are a powerful tool for implementing innovation policy within the ERA. Funding volumes and mechanisms for the implementation of framework programs provide ample opportunities for international cooperation with non-EU countries to participate in program competitions in order to obtain funding for joint research projects in all thematic sections and areas.

One of the key mechanisms for implementing the Europe 2020 program is

¹ Innovation policy: updating the Union's approach in the context of the Lisbon strategy. https://ec.europa.eu/growth/content/innovation-policy-updating-unions-approach-context-lisbon-strategy-0_en.

the framework programs, which include basic research and commercial technological development (pre-competitive research), which combine the components of R&D. Each of the eight Framework Programs of the European Union has specific objectives and measures for their implementation.

At the beginning of the 21st century, EU countries have succeeded in implementing the Lisbon Strategy. The next step towards the creation of a single European Research Area was the European Union's Seventh Framework Program for Research, Technological Development and Innovation (2007-2013), which used the experience of previous framework programs and aimed to increase the impact of knowledge on Europe's economy and society. . The European Commission published a Green Paper in 2007 entitled «The European Research Area: New Perspectives»¹, which contains six priority areas for the development of the European Research Area:

- joint use of knowledge (open access of scientists to the results of other scientific research), first of all applied research of commercial direction;

- development of the state infrastructure of world-class scientific research (improvement of the legislation for the purpose of increase of volumes of investments);

- strengthening of state research institutions (increase of financing, autonomy, improvement of legislative and normative norms of cooperation with the private sector);

- optimization of European research programs and priorities (simplification of normative rules and procedures of EU research funding systems, harmonization of national funding programs, etc.);

- openness of the world: international cooperation (formation of common research priorities for all EU countries and improvement of cooperation conditions for researchers from non-EU countries).

- formation of a single European labor market for researchers from different countries (improvement of conditions in order to increase the level of mobility of research potential).

On January 1, 2014, the implementation of the eighth Framework Program Horizon 2020 began, the budget of which is about 80 billion euros. The program provides for the implementation of measures in the following priority areas:

- 1) generation of advanced knowledge to strengthen the position of the

¹ The European Research Area: New Perspectives. Green paper. Brussels, 2007. <https://eur-lex.europa.eu/legal-content/GA/TXT/?uri=celex:52007DC0161>

European Union among the world's leading scientific powers (funding by 2020 – 24,4 billion euros);

2) achieving industrial leadership and business support, including small and medium-sized enterprises and innovation (funding – 17 billion euros);

3) solving social problems in response to modern challenges (funding – 29,7 billion euros);

4) research related to non-nuclear energy, «low-carbon economy», «green energy» (funding – 1,6 billion euros)¹.

The Horizon 2020 Framework Program aims to strengthen Europe's global competitiveness, economic growth and job creation.

In addition, the EU program has new features compared to the previous ones, in particular:

- simplification of the program structure, development of one set of rules, reduction of bureaucratic red tape due to a simple reimbursement scheme, introduction of a single approach for participants, etc. with the general goal to reduce the average grant period to 100 days;

- interaction of research and innovations by providing funding from idea to market entry;

- increasing support for innovation and activities close to the market, leading to direct economic stimulation;

- focus on developing business opportunities related to societal challenges;
- providing greater opportunities for new participants and young promising scientists to promote their ideas and obtain funding².

Global competition is intensifying and Europe needs to deepen its innovation and risk-taking capability to compete on a market increasingly defined by new technologies.

That is why the Juncker Commission is introducing a European Innovation Council to turn Europe's scientific discoveries into businesses that can scale up faster. Currently in its pilot phase, the European Innovation Council will become a full-fledged reality from 2021 under the next EU research and innovation programme Horizon Europe.

The Commission launched in 2017 the pilot phase of the European Innovation Council, introducing open competitions and face-to-face interviews

¹ Strategic plan 2016–2020. Joint Research Centre. Retrieved from https://ec.europa.eu/info/publications/strategic-plan-2016-2020-joint-research-centre_en

² Horizon 2020: EU Research and Innovation Framework Program. Retrieved from <https://www.kmu.gov.ua/storage/app/media/uploaded-files/broshura-gorizont-2020-1201.pdf>

to identify and fund Europe's most innovative start-ups and SMEs. Since then, 1276 highly innovative projects have already benefitted from an overall funding of over €730 million.

Today the Commission announces important steps that will ramp up the remaining two years of the pilot phase of the European Innovation Council:

- over €2 billion of funding in 2019-2020: covering the innovation chain: «pathfinder» projects to support advanced technologies from the research base (opens tomorrow); and «accelerator» funding to support startups and SMEs develop and scale up innovations to the stage where they can attract private investment (open in June). Under the «accelerator» funding companies will be able to access blended financing (grants and equity) of up to €15 million.

- Commission will appoint 15 to 20 innovation leaders to an European Innovation Council Advisory Board to oversee the European Innovation Council pilot, prepare the future European Innovation Council, and champion the European Innovation Council globally. Innovators from across the ecosystem are invited to come forward by 10 May.

- Commission will recruit a first set of «programme managers» with leading expertise in new technologies to provide full-time, hands-on support for projects. The call for recruitment will be published shortly.

- also today, the Commission announces 68 additional startups and SMEs selected for an overall funding of €120 million under the existing European Innovation Council pilot. The companies are for instance developing a blockchain-based online payment technology, new energy efficient screens and a solution to fight traffic noise (breakdown of beneficiaries per country and sector).

Given the growing economic importance of breakthrough and disruptive innovation, and based on the early success of the European Innovation Council pilot, the Commission has proposed to dedicate €10 billion to the European Innovation Council under Horizon Europe, the EU research and innovation funding programme for 2021-2027¹.

Thus, the goal of innovation policy is to transform the EU into a leader in research, change the structure of public-private sector interaction by creating innovation partnerships, creating an internal market for patents, venture capital, innovation, developing standards for rapid market introduction.

¹ European-innovation-council. Empowering European innovators/ Retrieved from https://ec.europa.eu/commission/news/european-innovation-council-2019-mar-18_en.

On March 20, 2015, Ukraine signed an Agreement on Associate Participation in Horizon 2020¹, which will allow our country to reach a new level of partnership with the EU in the field of science and technology and significantly increase the involvement of domestic scientists, universities, research organizations and institutions. to joint European research, as well as create a basis for structural reforms in the field of research and innovation in Ukraine.

The German economy is investing more and more in innovative products and services. In 2017, allocations for research and development increased by 9,3 percent year on year to 68.6 billion euros².

In 2016, the federal government and German business spent 92.2 billion. euros for investment in research and development. This is 2,94% of German gross domestic product (GDP). For comparison: 28 countries of the European Union used research and development on average 2,03% of their GDP. By 2025, Germany will invest 3.5% of GDP annually in science and development.

In terms of the number of patents introduced on the market per one million inhabitants, Germany was ahead of the United States and China in 2015 (371 against 200 and 27, respectively), behind Switzerland (612), Sweden (445) and Japan (387). Investments of German companies in 2016 amounted to 158.8 billion euros. The industrial sector accounted for more than 3/4 of this volume³.

Thus, innovation plays a key role in a globalizing world, and in order to build an innovative economy, the EU is developing an innovation policy aimed at ensuring sustainable socio-economic development and a high level of national competitiveness. under the influence of a high level of competition.

Europe, as a result of the creation and enlargement of the European Union, is gradually losing its heterogeneity, but convergence at the level of institutions and strategic plans is still quite slow. Despite the fact that new forms and methods of stimulating innovative development have been tested over the last 20 years, innovation policy has become comprehensive, systematic and long-term

¹ On ratification of the Agreement between Ukraine and the European Union on Ukraine's participation in the European Union Framework Program for Research and Innovation "Horizon 2020". Law of Ukraine, 2015, №604-VIII. Retrieved from <https://zakon.rada.gov.ua/laws/show/604-19>

² German economy increases investment in innovation. Retrieved from <https://www.dw.com/ru/%D0%BD%D0%B5%D0%BC%D0%B5%D1%86%D0%BA%D0%B0%D1%8F-%D1%8D%D0%BA%D0%BE%D0%BD%D0%BE%D0%BC%D0%B8%D0%BA%D0%B0-%D1%83%D0%B2%D0%B5%D0%BB%D0%B8%D1%87%D0%B8%D0%B2%D0%B0%D0%B5%D1%82-%D0%B8%D0%BD%D0%B2%D0%B5%D1%81%D1%82%D0%B8%D1%86%D0%B8%D0%B8-%D0%B2-%D0%B8%D0%BD%D0%BD%D0%BE%D0%B2%D0%B0%D1%86%D0%B8%D0%B8/a-46257141>

³ Johannes G. Five reasons for the innovative success of Germany. 07.25.2018. Retrieved from <https://www.deutschland.de/ru/topic/ekonomika/innovacii-v-germanii-pat-vaznyh-faktorov>

with clear quantitative and qualitative guidelines, and a single EU innovation policy has become a «locomotive» for national governments and private businesses. .

Well-planned innovation policy at all levels (regional, national and supranational) will allow EU countries to increase the competitiveness of products on the world market, will produce goods and services in line with scientific and technological progress and informatization, and will achieve the EU's main goal – to create favorable environment for the introduction of innovations in various sectors of the economy. As a result, the EU will be able to create a single pan-European innovation space with a flexible governance and coordination structure.

1.3 Applied aspects of innovation policy development

Biloshkurska Nataliia, Biloshkurskyi Mykola, Nagornyi Ievgenyi

For practical implications of innovation policy development it is important to emphasize the growing role of technology in the life of society makes active state regulation (through coordination and stimulation) in this area necessary. In leading countries and in a number of studies, the public-private policy is considered as a coordinated, state-funded initiative to mobilize national resources to accelerate targeted technological changes and maintain leadership in global competition through the innovations¹.

Thus, our thesis is that there are a number of factors that prove the necessity of integrated assessment of the industrial production technological development. The proposed practical implications are based on the hypothesis about the necessity to adapt the institutional management mechanisms to the main trends (technological trajectory) in the innovation sector (open innovation process, strengthening the processes of intersectoral technology transfer and business processes virtualization). This leads to the creation of a huge number of organizations and systems, that have a significant potential for development; development of innovation systems, including national and regional, deepening and expanding various forms of integration; the formation of national innovation system as a complex multilevel and intersectoral structure.

¹ Kudrina, O., Omelyanenko, V. (2018). Research framework for system security of technological & innovation systems. *Baltic Journal of Economic Studies*, 4(1), 248–254. DOI: 10.30525/2256-0742/2018-4-1-248-254.

Cervantes M. & Meissner D. (2014)¹ describe the latest trends the knowledge and technology transfer from universities and public organizations to industry. The authors also underline that in recent times the requirements for state policy have significantly increased, as global competition changes the usual state of policy. It is necessary to strengthen national and regional innovation systems by supporting the development of small and medium-sized enterprises, which are more difficult to compete with international corporations. This requires the framework conditions for innovation that contribute to effective investment. Our approach can be used for applied purposes considered in studies of Marks & Gerrits (2017)² and Gajdzik & Gawlik (2018)³.

So it is also necessary to take into account the idea that the development of high technologies is inextricably linked with a strong industrial base and an active industrial policy based on the unification of science, production and education into a single system. Under these circumstances, the main challenge is to create inter-sector interaction tools and jointly direct the overall move towards faster modernization of industry by massively and rapidly implementing new technologies.

As a result of the analysis, we can note the lack of domestic practice-oriented research concerning the harmonization of innovation policy and the strategy of ensuring the national security in developing countries (innovation-synergetic methodology), which makes the studies in this field relevant and focused on a real scientific and practical tasks.

Fig. 1.3 illustrates how integrated assessment of the industrial production technological development can be used within the innovation policy management.

The differences of methodology of formation of innovation-technological systems deal with such points, that are based on assessment of the industrial production technological development.

First is connected with the availability of significant volumes of analysis data, which allows us to identify and assess the impact of technological

¹ Cervantes, M., Meissner, D. (2014). Commercialising Public Research under the Open Innovation Model: New Trends. *Foresight*, 8(3), 70–81.

² Marks, P., Gerrits, L. (2017). Evaluating technological progress in public policies: the case of the high-speed railways in the Netherlands. *Complexity, Governance & Networks – Special Issue: Complexity Innovation and Policy*, 48–62. DOI: 10.20377/cgn-42.

³ Gajdzik, B., Gawlik, R. (2018). Choosing the Production Function Model for an Optimal Measurement of the Restructuring Efficiency of the Polish Metallurgical Sector in Years 2000–2015. *Metals*, 8, 23. DOI: 10.3390/met8010023.

trajectory factors, that were not previously subjected to direct measurement methods.

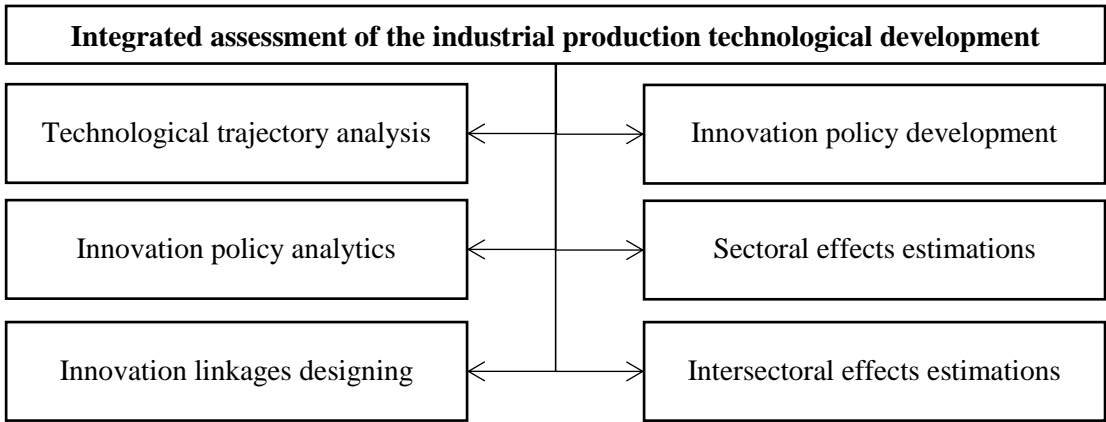


Fig. 1.3. Integrated assessment of the industrial production technological development application (author’s development)

Secondly, the emergence of new economic models and approaches, such as innovation networks, venture financing, energy service contracts, various technological development programs, innovation initiatives, scientific and educational projects, etc.

Within the third point we propose to consider synergetic effects within the technological trajectory (dynamics of industrial production technological development) as the most important factor of accelerated development in economic systems and the main task of management in the current conditions is connected with development the competences in technologies of the synergistic effects formation.

These tools affect both the process of substantiating the innovation policy and the sources of funding for programs.

From the theoretical point of view, these ideas are in line with the latest trends in the development of world economic theory and applied economics, reflecting the transition from a fragmentary study of certain aspects and objects of the economy in general and the innovation system in particular, which is the neoclassical tradition characteristic, to systematic study of their mutual impacts, which is characteristic of institutional, evolutionary and systemic economic theory. Thus, comparing with existing analogues the authors approach is systemic and takes into account the specificity of modern innovation activities and cover the whole spectrum of tasks for management the innovation networks development at different levels.

Proposed methodology can be an addition to some investigations, e.g. the relationship between technological progress in the energy sector and carbon emissions based on Environment Kuznets Curve (Jin, Duan, Shi, Ju, 2017)¹. This study is based on research and development investment in energy industry as the quantitative indicator of its technological progress. Our results allow to consider the other factors of technological progress, which is based on the understanding the technology as a factor which unites economic resources.

New approaches for technological trajectory analytics additionally to technology development gives new possibilities to manage innovation projects based on infrastructure, informational, scientific and technological, infrastructural and producing elements to solve technologies development and transfer. Technological trajectory analysis creates an effective field of innovation communications, the main task of which is to stimulate the dialogue of innovation activity stakeholders and their cooperation with the help of specialized approaches.

In summary, technological trends analytics and analytics-based management can be implemented to provide the transition from an extensive export-raw material model of economic development to a model of ecologically balanced (adapted) modernization of economic development. So the practical application of proposed of technological development assessment methodology will allow more coherently coordinate the implementation of national innovation priorities and enhance the competitive advantages in the «development-security» system on the basis of synergy.

¹ Jin, L., Duan, K., Shi, C., Ju, X. (2017). The Impact of Technological Progress in the Energy Sector on Carbon Emissions: An Empirical Analysis from China. *International journal of environmental research and public health*, 14(12), 1505. DOI: 10.3390/ijerph14121505.

2. INTERNATIONAL ECONOMIC SECURITY MANAGEMENT WITHIN THE ADVANCED INNOVATIVE DEVELOPMENT PARADIGM¹

*Shkola Viktoriia, Domashenko Maryna, Kasianenko Tetiana,
Shcherbachenko Viktoriia*

2.1 Paradigm of advanced innovative development

The fourth industrial revolution and new technologies stimulate the development of new production technologies and business models that fundamentally transform production. The speed and scale of technological changes, coupled with the emergence of other trends, complicate the task of developing and implementing industrial strategies that promote productivity and inclusive growth. Moreover, recent changes have identified the paradigm of low-cost export competitiveness as a vehicle for growth and development at risk. Awareness of this causes the need to address the issue of strengthening existing market positions and support long-term competitive advantages in its activities of a country in this new production paradigm. Besides, the study of the factors and conditions that have the greatest impact on the transformation of production systems, further evaluating their readiness for the future, will enable appropriate measures to be taken to overcome potential gaps in their readiness for future production, increase their competitiveness in the future and increase the level of international economic security.

Consequently, taking into account all of the above, ensuring international competitiveness of the country^{2,3} is possible provided the continuous and steady implementation of various types of innovations, that is, the fact at the expense of a leading innovative development of the country. In the research⁴, leading development is defined as a radical, innovative and cyclical process of

¹ This part is prepared as a part of the research projects «Innovation management of energy efficient and resource saving technologies in Ukraine» (№ 0118U003571), «Innovative drivers of national economic security: structural modeling and forecasting» (№ 0117U003922), «Formation of the environmentally safe long-acting fertilizers based on the phosphate raw material» (№ 15.01.09-20/22 GP-01), «Small energy-saving modules with the application of multifunction devices with intensive hydrodynamics for production, modification and encapsulation of granules» (№ 0119U100834)

² Mulatu, A. (2016). On the concept of 'competitiveness' and its usefulness for policy. *Structural Change and Economic Dynamics*, 36, 50-62. DOI: 10.1016/j.strueco.2015.11.001

³ Porter, M.E. (2018). On thinking about deregulation and competition. *The Telecommunications Revolution: Past, Present and Future*, 39-44. DOI: 10.4324/9781351115704

⁴ Illyashenko, N.S. (2018). *Vyperedzhaiuchy innovatsiyni rozvytok: teoriia, metodyka, praktyka* [Advanced innovative development: theory, methodic, practice]. Trytoria, Sumy. [in Ukrainian]

continuous improvement of the potential of the country, as well as the search for promising directions of its realization, which results in radical changes of the national economy.

It should be noted separately that in view of the fact that Ukraine, like most other countries of the world, has accepted the course on ensuring sustainable development, it is expedient to introduce innovations that at all stages of their life cycle there will not be ecologically destructive impact on the environment or there will be an ecologically constructive impact. Taking into account this, another important characteristic of the advanced innovative development is its compliance with the principles of the Concept of Sustainable Development.

Consequently, advanced innovative development will be considered as a process of introducing innovations that are ahead of scientific and technological development, the formation on this basis of the country's production system, including business portfolio of goods and services, which are at different stages of the life cycle and satisfy not only the existing, but also potential needs that in general will ensure the stability of the country competitive position in the international market and the possibility of their growth, high level of country's international competitiveness, as well as its economic and ecological security. Comprehensive approach to providing ecological security are explored in paper¹. Issues of enterprise's economic security management at the foreign marketing are considered in the article². Issues of global economic security in terms of the fuzzy concept of worth are examined in the papers^{3,4}.

According to the report⁵, the countries' success in the conditions of the current production changes is determined by the production drivers that are explained as the key factors that position the country to take advantages of the fourth industrial revolution for accelerating the transformation of national production systems.

The main factors that position the state for using new technologies and opportunities in the future are technologies and innovations, human capital,

¹ Domashenko, M., Kotenko, O., Shkola, V.Y., Kuchmiyov A. (2017). Innovative marketing strategies to provide ecological safety at regional and global levels. *Marketing and Management of Innovations*, 4, 367-373. DOI: 10.21272/mmi.2017.4-33

² Prokopenko, O., Domashenko, M., Shkola, V. (2014). Management features of economic security of foreign economic activity of Ukrainian machine-building enterprises. *Actual problems of economics*, 10 (160), 188-194

³ Orrell, D. (2020). The value of value: A quantum approach to economics, security and international relations. *Security Dialogue*. DOI: 10.1177/0967010620901910

⁴ Der Derian, J., Wendt, A. (2020). 'Quantizing international relations': The case for quantum approaches to international theory and security practice. *Security Dialogue*.

⁵ The Readiness for the Future of Production Report 2018. <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>

global trade and investments, institutional frameworks, stable resources and demand environment¹.

Technologies and innovations reflect the level of innovations implementation and commercialization that are potentially used in production, as well as the level of development and infrastructure security to support the new technologies implementation in production.

Human capital is the ability to respond to changes in the labor market caused by the Fourth Industrial Revolution, considering both the current workforce and the long-term ability to develop skills and talent in future workforce.

Global trade and investments is the participation in the international trade for facilitating the exchange of products, knowledge and technologies; the establishment of global connections, the existence of financial resources for development investment related to production, as well as the infrastructure quality for the activity provision connected to production.

Institutional structure is effectiveness of state institutions, rules and regulations in the field of technological development, new enterprises and leading production. Especially it should be delighted the role of institutions in field of environment protection and waste management including hazardous waste (in more detail see Brauweiler H.-Chr., Shkola V.Y. and Markova O.O.²).

Sustainable resource is the production impact on the environment, including the usage of natural resources and alternative energy sources.

The demand environment is access to external and local demand for production, the complexity of the consumer base, as it can lead to diverse activities of industry and new products. It is agriculture and the food industry that are the most sensitive branches of economy to this group of factors, as it has been exposed due to the challenge, the modern society has faced – the corona virus outbreak, and its effect on food security^{3,4,1,2}.

¹ The Readiness for the Future of Production Report 2018. <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>

² Brauweiler, H.-Chr., Shkola, V.Y., Markova, O.O. (2017). Economic and legal mechanisms of waste management in Ukraine. *Marketing and Management of Innovations*, 2, 359-368. DOI: 10.21272/mmi.2017.2-33

³ Tarasuk, V., Fafard St-Germain, A.-A., Loopstra, R. (2019). The relationship between food banks and food security: Insights from Canada. *Voluntas*. DOI: 10.1007/s11266-019-00092-w

⁴ Deaton, B. James, Deaton, Brady J. (2020). Food security and Canada's agricultural system challenged by COVID-19. *Canadian Journal of Agricultural Economics-revue Canadienne d'Agroeconomie*. DOI: 10.1111/cjag.12227

Besides above mentioned factors, on authors thought, the crucial driver of innovative development is competition. As it is explored in paper³, competition has a positive effect on long-term economic growth. In conditions of growing competition those economies which follow the strategy of leading innovative development are in a stronger market position.

Advanced development involves the production transformation to meet the consumers' needs and demands at the international markets in the conditions of global competition, which will ensure its economic security.

Model of production transformation from the study phase of the economies' flexibility for changing, which is determined on the basis of the archetype matrix, till the implementation of the changes in the contry, presented by the author in Fig. 2.1, shows the role of the management system in ensuring its development, and consequently the growth of its ecological and economic efficiency.

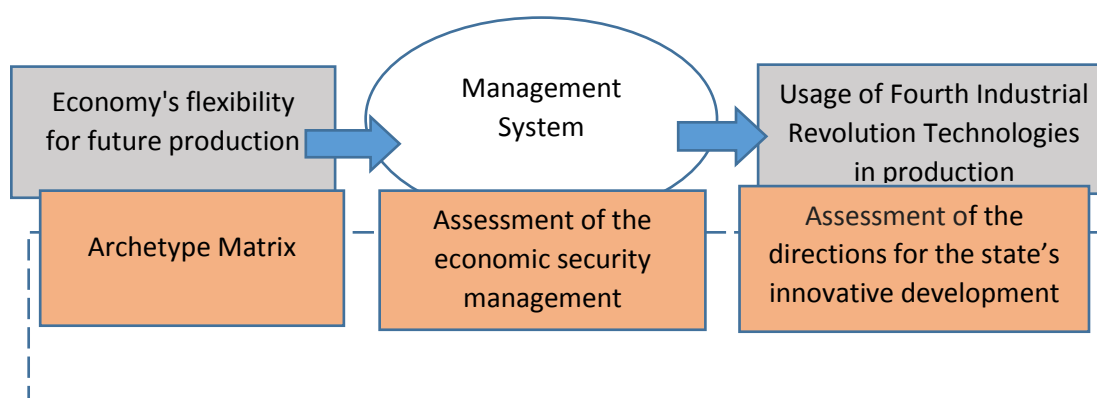


Fig. 2.1. Model of production transformation
(author's development)

In the given model, the management system is the key link between the production system and the market, and therefore it is considered to be the ability of the country to ensure its constant competitiveness on the basis of: quality management and production organization and marketing as a whole; effective usage of human capital; application of the latest marketing tools; rational usage

¹ Glauber, J., Laborde, D., Martin, W. (2020). COVID-19: Trade restrictions are worst possible response to safeguard food security. IFPRI Blog: Issue Post, March 27. Retrieved from <https://www.ifpri.org/blog/covid-19-trade-restrictions-are-worst-possible-response-safeguard-food-security>

² Sachs, Goldman (2020). Goldman Sachs Economics Research. US Daily: A sudden stop for the US economy, March 20. Retrieved from <https://www.goldmansachs.com/insights/pages/gs-research/us-daily-20-mar-2020/report.pdf>

³ Charles, V., Zegarra, L.F. (2014). Measuring regional competitiveness through Data Envelopment Analysis: A Peruvian case. Expert Systems with Applications, Volume 41, Issue 11, 5371-5381 DOI: 10.1016/j.eswa.2014.03.003

of available financial and material resources.

The management system, which has the task to ensure the international competitiveness in the future under the current conditions, is represented by the factor of «*Human Capital*».

A detailed Ukrainian profile¹, which allows identifying concrete opportunities and challenges for countries, as they are oriented towards the production future, was allowed to conclude that human resources and human capital are a strong position of Ukraine. At the same time, the possibility of using other growth factors depends on the efficiency of the management system of the economic system and its marketing potential. Taking into account the fact that the enterprise is the basic unit of the national production system, in our opinion, it is appropriate to study the key factors of the enterprise efficiency growth.

We suggest implementation of the assessment of the economic security management mechanism based on the marketing principles by means of correlating changes in the environmental safety level (as a result of this mechanism functioning) with the costs of forming, the operation maintenance, as well as the mechanism development. Target function and restrictions that correspond to the above-described description concerning mechanism assessment of the economic security management, are presented as a system:

$$\begin{cases} \sum_{j=1}^m \frac{R_j}{C_{1j}+C_{2j}+C_{3j}} \rightarrow \max, \\ R_j = f(\Delta K_{nj}, UC_j, \Delta K_s), \\ 0 \leq \Delta K_{nj} \leq 1 \end{cases} \quad (1)$$

where R_j – the result of the economic security management mechanism according to the j-type activity ($j=1,...,m$)), currency unit; C_{1j} , C_{2j} , C_{3j} – the mechanism action costs (respectively: functioning, operation maintenance, development) according to the j-type activity ($j=1,...,m$)), currency unit; ΔK_{nj} – change indicator of the economic security level according to j-type activity; UC_j – unit costs caused by changes of the economic security level to the elementary measurement unit on the scale $0 \leq \Delta K_{nj} \leq 1$, currency unit / production unit; ΔK_s – change indicator of the economic security level caused by the synergetic effect of this mechanism.

¹ The Readiness for the Future of Production Report 2018. <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>

2.2 Mechanism of international economic security management

Regarding international economic security as the ability of state to protect and develop its economy, as well as defend its citizens against the crises by means of cooperation of countries¹, managing of international economic security includes the structure of the organizational and economic mechanism of management, functions, management decisions, which all together lead to the fulfillment of the main task – an efficient and uninterrupted governing.

Under the mechanism, that ensures economic security is proposed to consider a component of the state management system. It is based on the purpose, selected by authorities in order to support and enhance the level of economic security by using the existing capacity of the country. The component of management system ensures the implementation of the purpose and results in a stable and efficient operation of the country.

The scheme of formation of organizational and economic mechanism of international economic security is shown in Fig. 2.2.

The basic principles of management, which are priority rules for country's foreign economic activity, make it possible to identify the main objectives of the activity and the tasks of their achievements, requesting the government to perform one of its administrative functions, such as planning. The primary task of the planning function is to determine the current economic situation of the country, to establish potential and desired results and to identify ways to achieve them.

Based on the notion of economic security as aspect of the most effective usage of its resources for sustainable operation and development of the international market and the ability to withstand the influence of hazardous factors in the external and internal environment to ensure effective relationship between the undertakings on the territory of Ukraine, and beyond it, management of economic security is supposed to be based on the most efficient usage of resources of the country. That is why, setting objectives and tasks, the government analyzes available resources and distributes them so as to achieve these objectives.

On basis of the analysis of resources, the government distributes them in

¹ Silvers, Roger (2020). Cross-border cooperation between securities regulators. Journal of Accounting and Economics, Volume 69, Issue 2-3, UNSP 101301. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0165410120300033?via%3Dihub>

such a way as to unlock its potential at best. As a result of these actions, another management function, namely – organizational one, are implemented. This is why, its effectiveness depends on the proper organization of economic activity. Taking into account resources availability, the most appropriate management methods are selected and implemented by using management resources.

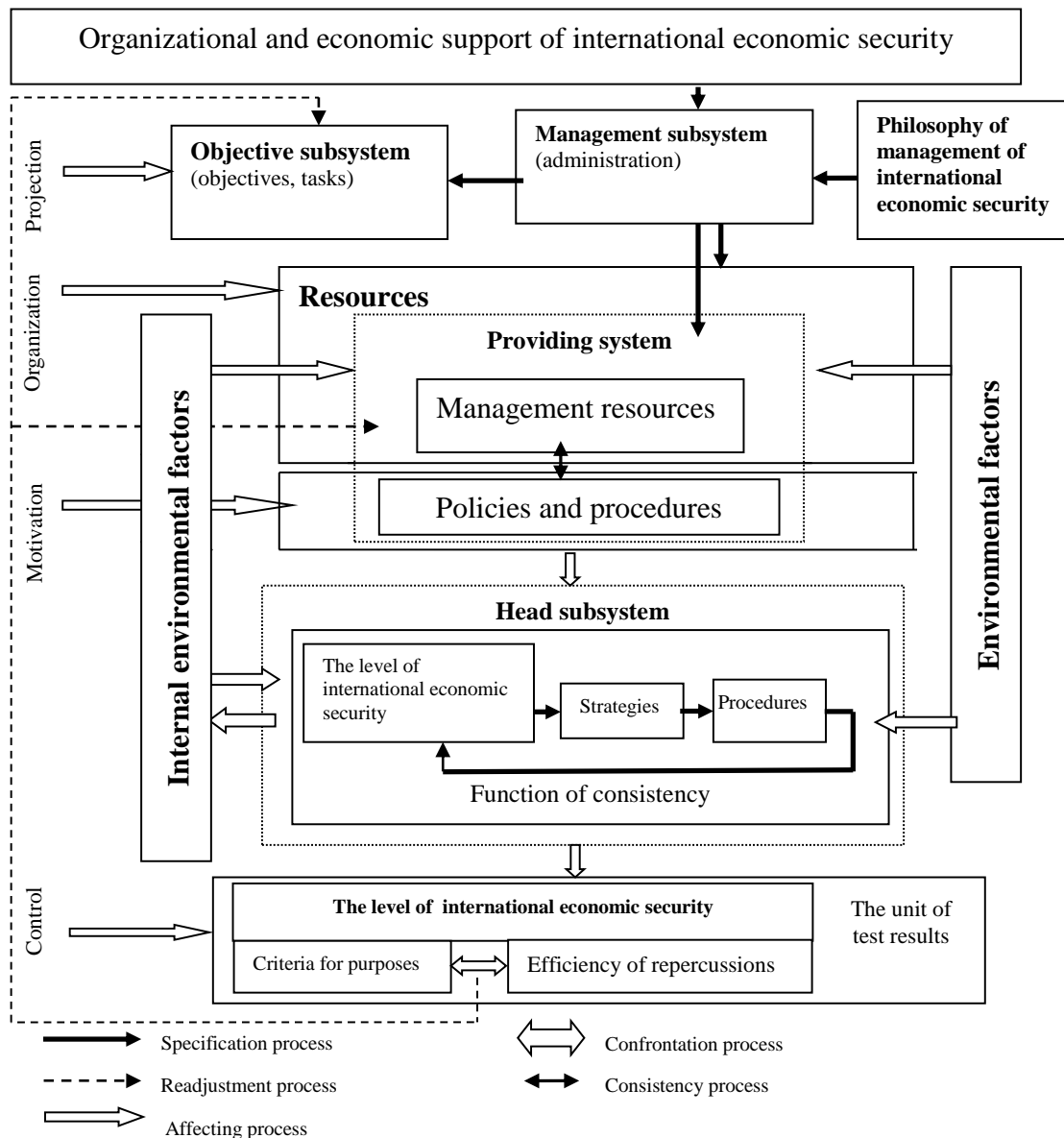


Fig. 2.2. The structure of the organizational and economic mechanism of international economic security management¹

The sequence of ensuring economic security is shown in the Fig. 2.3.

¹ Prokopenko O., Domashenko M., Shkola V. (2014). Management features of economic security of foreign economic activity of Ukrainian machine-building enterprises. Actual problems of economics, № 10 (160), 188-194

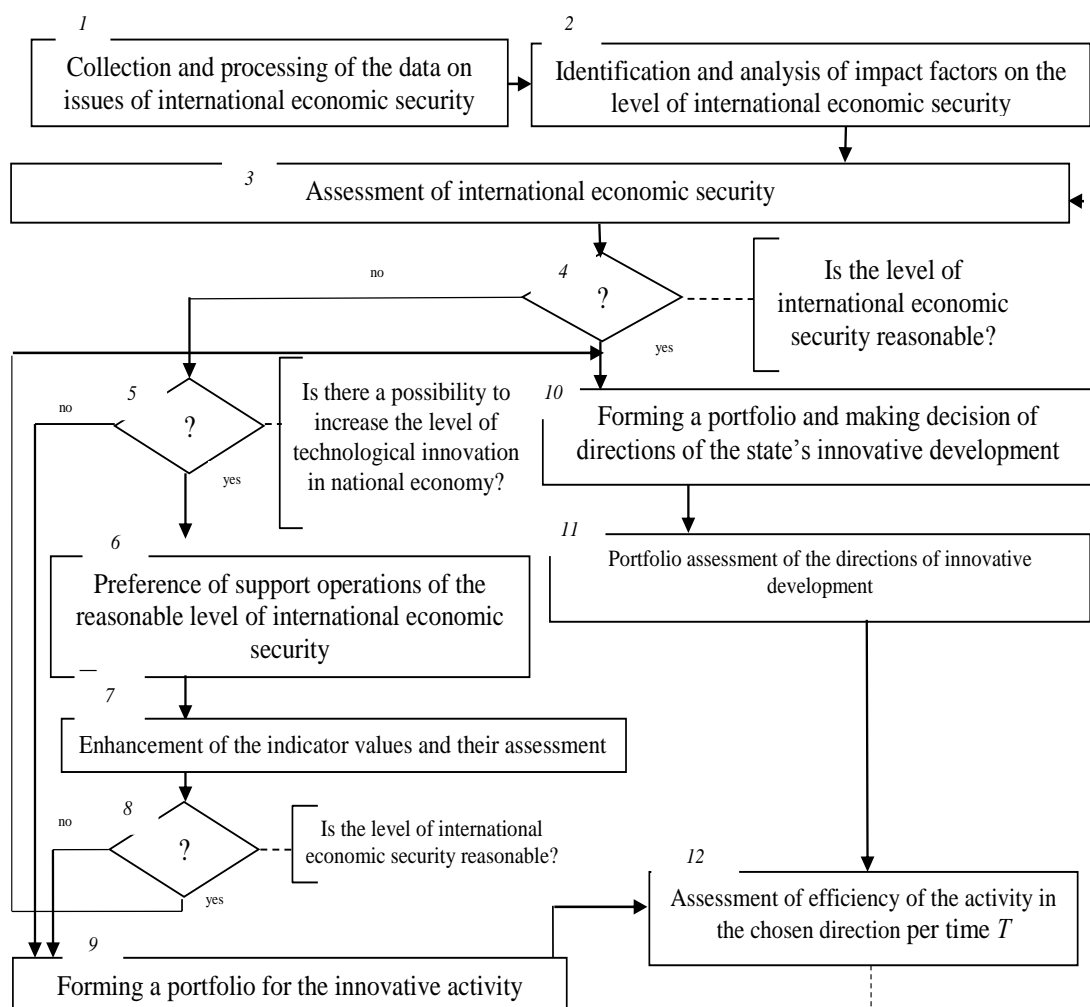


Fig. 2.3. Escalated flowchart of the management process of international economic security¹

Stages in the management process of international economic security, represented in the diagram, are divided into two main components – analysis of the economic security and measures for its enhancement and support.

Analysis of international economic security involves the collection and processing of data on the major aspects of economic security, the quantitative and qualitative analysis.

Measures, aimed at enhancement and maintenance of international economic security, provide choice and justification of the maximum allowable level of international economic security, selection of tools for improving and maintaining its level, forming management decisions.

¹ Prokopenko O., Domashenko M., Shkola V. (2014). Management features of economic security of foreign economic activity of Ukrainian machine-building enterprises. Actual problems of economics, № 10 (160), 188-194

Stage 1. The first stage in the management process of international economic security is the collection and processing of the data of all aspects of international economic security as it involves acquisition, processing, transmission and practical use of various kinds of information.

Obtained at this stage, the information should be accurate, complete and well-timed. The list of such information may include data on financial stability and solvency of partners, customers, competitors, data on the political and economic situation of the country, which it is planned to work with, in the direction of foreign economic activity; probability of various risks, market conditions, marketing conditions.

Data from the previous experience, various analytical reviews, expert opinion, and data of specialized companies (such as Berry Company or other rating agencies) may be the sources of such information.

Stage 2. Information in the process of qualitative analysis of impact factors on the level of international economic security is especially important. Qualitative analysis involves identifying the sources of the violation of international economic security. In the process of qualitative analysis, it is important not only to establish the source of the violation of economic security, but also to identify possible loss of resources upon the occurrence of hazardous events. During the qualitative analysis large group of factors that have a negative impact on international economic security can be isolated. These may be as organizational and economic factors, as political ones and factors of force majeure, which are not always possible to predict and prevent. The results of the qualitative analysis are required for quantitative assessment.

Stage 3. Quantitative assessment of the level of international economic security provides numerous definitions of current and future condition of economic security. At this stage the quantitative assessment of the economic security and its adequate level is estimated and set depending on the situation. Methods of assessing the level of economic security are considered below.

Stage 4. Development of foreign economic activity, based on technological innovation, in Ukraine is vital. However, the high level of risk concerning innovations could impair the overall level of international economic security. Hence, it is required to carefully determine the feasibility of the directions of innovative development.

Stage 5. As it is indicated in the figure 3, initially the country analyzes its activities for data. The last twelvemonths are proposed to consider, as the period

of the report, because during this period the country does its own cycle of activity that enables to make well-founded conclusions. It is reasonable to choose twelvemonths as an examination period of the effectiveness of the activity in the chosen direction – time T.

It should be noted that analysis of the activity should be based on the determination of the actual values of net income and comparing the obtained values with those of previous years. It is necessary to take appropriate management decisions to regulate the methods of achieving this goal on the basis of the obtained values.

However, before making the decision of changing the direction of innovative activity it is suggested to consider the opportunity of enhancement of the assessed values by using tools to ensure an adequate level of international economic security, the selection of which is shown below. The current direction of the innovative activity is possible after elimination of negative factors.

2.3 Assessment of the directions for the state's innovative development

An important criterion for selecting areas, and within them, for innovation development options is the efficiency level during the ecological and economic cycle of innovation that covers the life cycle of innovation (LCI) and customization cycle of innovation (CCI), which is proposed to be determined by the indicators of expected environmental and economic efficiency for enterprises, consumers and society as a whole, as well as the expected commercial efficiency of the innovation development direction.

The expected environmental and economic efficiency should be determined in the assessment of the directions, reflecting the results of innovation activities for the manufacturer, consumers and society as a whole, and the expected commercial efficiency given the market optimality, taking into account the interests and economic benefits of the innovative enterprise.

The authors propose to consider the ecological and economic efficiency *E* as a indicators system which reflects the general results and costs for the implementation of the chosen innovation development direction for innovative enterprises, consumers and society in general, including both direct results and costs, and external effects in related sectors of the economy, including environmental and social eco-innovations during the ecological and economic

cycle. The following formula is proposed for its calculation:

$$E = \frac{\sum_{t=1}^T (R_{Et} \cdot g_t - E_{Et} \cdot k_t) \cdot s_t^m \cdot (1+r)^{-t}}{\sum_{t=1}^T E_{Et} \cdot k_t \cdot (1+r)^{-t}}, \quad (2)$$

where R_{Et} – the expected direct (variant) ecological and economic result of the innovative activity in the t-period, currency unit; E_{Et} – expected expenses of the t-period for realization of measures in the direction (variant) under consideration, currency unit; r – discount rate, relative unit; k_t – correction coefficient taking into account the level of expenses change for measures implementation within the innovation development direction depending on the type of implemented innovation, the corresponding stage of its evolutionary development and the priority ecologization concept of the innovation activity; g_t – coefficient of society's flexibility for the innovation acceptance; s_t^m – coefficient that takes into account the synergy of social, economic and environmental effects and the synergy of adding the ecological and economic effect in each t-period to the previous ones (with the intensifying nature of action m takes on a meaning +1, with the decreasing one goes to -1); T – the ecological and economic cycle duration, years. The value of the s_t , k_t , g_t coefficients and m index are established on the basis of empirical analysis of the output data. It was developed the table of values for the k_t , g_t coefficient, the application of which allows to increase the accuracy of predictive calculations taking into account exo– and endogenous factors.

The expected commercial efficiency of the innovation development direction (variant) is determined by the criterion of the market optimality and by the indicators of net present value NPV, internal rate of return IRR, profitability index PI and payback period PP taking into account risk in three forecast variants (pessimistic, most probable and optimistic).

The NPV calculation taking into account the R_t risk is proposed to be carried out according to the formula:

$$NPV = \sum_{t=1}^T \left(\frac{E_t}{(1+r)^t} - \sum_{j=1}^d \frac{RV_{tj}}{(1+r)^t} \right), \quad (3)$$

where E_t – the expected effect from the direction (variant) realization in the t-period, currency unit; RV_{tj} – the expected absolute value of the loss from the j

risk type in the period $t, j \in [1; d]$, currency unit; r – discount rate, relative unit; t – the realization period of the direction taking into account the eco-economic innovation cycle (T), the year. The methodology for risk assessment of innovation activity is presented in works^{1,2}. The calculation of IRR, PI, PP is carried out according to the procedure outlined in works^{3,4}.

The market optimality of the variant is based on the comparison of the evolutionary development stages of innovation (S_1), enterprise (S_2) and market (S_3) (see in more detail work⁵).

The matrix for combination of the innovation, enterprise and market development stages (Table 2.1) has been developed to determine the market optimality of the innovation development variant.

It allows determining the realizing country possibility of the investigated variant and the expediency of investing investment resources taking into account possible refinement and approximation to the existing market situation and possible scenarios of its development based on forecasting changes in the marketing environment and market conditions.

Establishment of absolute market optimality (segment A of Table 2.1) allows you to go directly to the assessment of the commercial effectiveness of the option, taking into account the risks identified in accordance with the specificity of the analyzed version and implemented innovation.

When the combination of the «innovation-enterprise-market» system is unacceptable (segment E of Table 2.1), it is necessary to determine which of the components makes it impossible to implement the investigated variant and determine the possibility of its adjustment.

The presence of certain opportunities for the enterprise to implement the research variant (segments B, C, D of Table 2.1) necessitates an additional analysis based on the specific risks of the analyzed variant and the implemented innovations.

¹ Illyashenko, S.M. (2004). *Ekonomichnyi ryzyk [Economic Risk]*. Kyiv: Center for Educational Literature. [in Ukrainian]

² Illyashenko, S.M. (2010). *Innovatsiyni menedzhment [Innovative management]*. Sumy: Publishing Company “University Book” [in Ukrainian]

³ Kozmenko, S. (2005). *Investitsionnye resheniya i upravlenie NTP [Investment decisions and management of scientific and technical progress]*. Sumy: Publishing Company University Book, LLC “Consulting Publishing Company “Business Perspectives”. [in Russian]

⁴ Lipsits, I.V., Kosov, V.V. (1996). *Investitsionnyy proekt: metody podgotovki i analiza [Investment project: preparation and analysis methods]*. Moscow: Publisher BEK. [in Russian]

⁵ Kasyanenko, T. V. (2012). *Ekonomichne obgruntuvannia ekolohichno spriamovanoho innovatsiinoho rozvytku [Economic justification of ecologically oriented innovative development]*. Candidate’s thesis. Donetsk: Donetsk State University of Management [in Ukrainian]

Table 2.1. The matrix for combination of «the innovation, enterprise and market system» (developed by the authors)

S (S ₁ , S ₂ , S ₃)		The development stage of innovation, S ₁											
		I			II			III			IV		
		The development stage of enterprise, S ₂											
		I	II	III	I	II	III	I	II	III	I	II	III
The development stage of market, S ₃	0	A	A	C	E	E	E	E	E	E	E	E	E
	I	C	C	C	C	B	C	C	B	C	E	E	E
	II	E	E	E	D	B	B	D	B	B	D	B	B
	III	E	E	E	D	D	D	D	C	A	D	C	A
	IV	E	E	E	E	E	E	D	B	A	C	A	A

Legend: A – the combination is absolutely market-optimal; B – the combination is market-optimal provided compliance with additional recommendations; C – the combination may be optimal under certain conditions and provided compliance with certain recommendations; D – the combination is acceptable under certain conditions; E – combination is unacceptable.

2.4 Estimation of economic security

For the complex consideration of internal and external factors influencing the international economic security when entering the international market, a three-component indicator of the level of international economic security K_{nj} is proposed:

$$K_{nj} = f(I, P_n, D_j),$$

$$I, P_n, D_j = \begin{cases} 1, & \text{if } I, P_n, D_j \geq I_{suf}, P_{suf}, D_{suf}, \\ 0, & \text{if } I, P_n, D_j < I_{suf}, P_{suf}, D_{suf}, \end{cases} \quad (4)$$

where I – value of estimating the potential of national economy; P_n – country's risk level for a country n ; D_j – indicator of the level of market opportunities of the country for the implementation of j type of activity; I_{suf} , P_{suf} , D_{suf} – sufficient value of indicators I , P_n , D_j (see Table 2.2 where area of the sufficient indicators is highlighted by the eclipse).

The value of the indicator I is proposed to be determined by the formula:

$$I = \sum_{i=1}^n B_i \cdot \frac{F_i}{G_i}, \quad (5)$$

where B_i – the ponderability coefficient of the i security component; F_i – actual

value of the i security component; G_i – sufficient value of the i security component; n – the number of security components.

Table 2.2. Values of indicators for assessing the level of international economic security (developed by the authors)

The level of potential, I		Country risk level, P_n		Level of market opportunities, D_j	
Value	Characteristic	Value	Characteristic	Value	Characteristic
$0,95 \leq I \leq 1$	Absolutely safe	$75 < P_n \leq 100$	Low	$0,75 \leq D_j \leq 1$	High
$0,75 \leq I < 0,95$	Acceptable	$30 < P_n \leq 75$	Middle	$0,5 \leq D_j < 0,75$	Middle
$0,5 \leq I < 0,75$	Unstable				
$0,25 \leq I < 0,5$	Low	$0 \leq P_n \leq 30$	High	$0 \leq D_j < 0,5$	Low
$0 \leq I < 0,25$	Inadmissible				

The main components of potential I : financial (characterizes the financial sustainability); industrial-technical (characterizes the efficiency of using the main production assets); intellectually-cadre (shows the efficiency of the labor resource usage); marketing (reflects the stability of the country in the sectoral market); legal (characterizes the degree of the country interests and its workers protection); interface (characterizes the reliability of interaction with contractors); innovative-technological (defines the technological potential of the country); raw materials and energy (reflects the supply of raw materials and energy resources); ecological (characterizes the ability of the national economy to carry out production activities in accordance with environmental standards).

The country risk level P_n is determined on the basis of the BERI index, which is calculated four times per year using the expert judgement estimation method. The structure of the analyzed parts of the indicator includes: efficiency of the economy; level of political risk; level of indebtedness; availability of bank loans; availability of short-term financing; availability of long-term loan capital; likelihood of the occurrence of force majeure circumstances; the level of creditworthiness of the country; the amount of outstanding debt repayment obligations¹.

There are a number of methodological approaches, the most common of

¹ Dolzhansky, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. Upravlinnya rozvy`tkom – Development Management, 8, 20-22 [in Ukrainian]

which are: SWOT-analysis^{1,2}, M. Porter's strategies model^{3,4,5,6}, Peter T. FitzRoy's competitive advantage matrix, Boston Consulting Group (BCG) matrix^{7,8}, the GE-McKinsey matrix^{9,10}, the Gap-analysis^{11,12}, the Shell-DPM matrix¹³, the matrix of R. Cooper¹⁴. The analysis of their advantages and disadvantages has allowed to reveal insufficiently complete objectivity of the results obtained on their basis, since all of them are based on qualitative or quantitative estimates of individual components of the competitiveness of the country itself and its closest competitors. In order to solve this problem, the authors offered a methodology for assessing the market opportunities, based on the comprehensive study of the system «product – market – consumer» (see Fig. 2.2).

Characteristics of the levels of the market opportunities, allocated using the corresponding matrix (see Fig. 2.4), is presented in Table 2.3.

Theoretically possible there are 8 values of the three-component index K_{nj} corresponding to the four zones of international economic security (Table 2.3).

¹ Dolzhanskyy, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. Upravlinnya rozvytkom – Development Management, 8, 20-22 [in Ukrainian]

² Ilyashenko, S. (2005). Upravlinnia innovatsiynym rozvytkom [Management of innovative development]. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

³ Ilyashenko, S. (2005). Upravlinnia innovatsiynym rozvytkom [Management of innovative development]. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

⁴ Porter, M.E.: Competitive Advantage of Nations. Competitive Intelligence Review, Volume 1, Issue 1, 14-14 (1990) DOI: 10.1002/cir.3880010112

⁵ Porter, M.E. (2008). The five competitive forces that shape strategy. Harvard Business Review, Volume 86, Issue 1, 79-93.

⁶ Ilyashenko, S., Olefirenko, O. (2008). Management of a portfolio of orders of the research-and-production enterprise [Upravlinnia portfelem zamovlen naukovo-vyrobnychoho pidpryemstva]. Sumy: Publishing Company “University Book” [in Ukrainian]

⁷ Dolzhanskyy, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. Upravlinnya rozvytkom – Development Management, 8, 20-22 [in Ukrainian]

⁸ Ilyashenko, S. (2005). Upravlinnia innovatsiynym rozvytkom [Management of innovative development]. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

⁹ Ilyashenko, S. (2005). Upravlinnia innovatsiynym rozvytkom [Management of innovative development]. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

¹⁰ Osnovy menedjmenta

¹¹ Dolzhanskyy, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. Upravlinnya rozvytkom – Development Management, 8, 20-22 [in Ukrainian]

¹² Ilyashenko, S. (2005). Upravlinnia innovatsiynym rozvytkom [Management of innovative development]. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

¹³ Ilyashenko, S. (2005). Upravlinnia innovatsiynym rozvytkom [Management of innovative development]. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

¹⁴ Ilyashenko, S. (2005). Upravlinnia innovatsiynym rozvytkom [Management of innovative development]. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

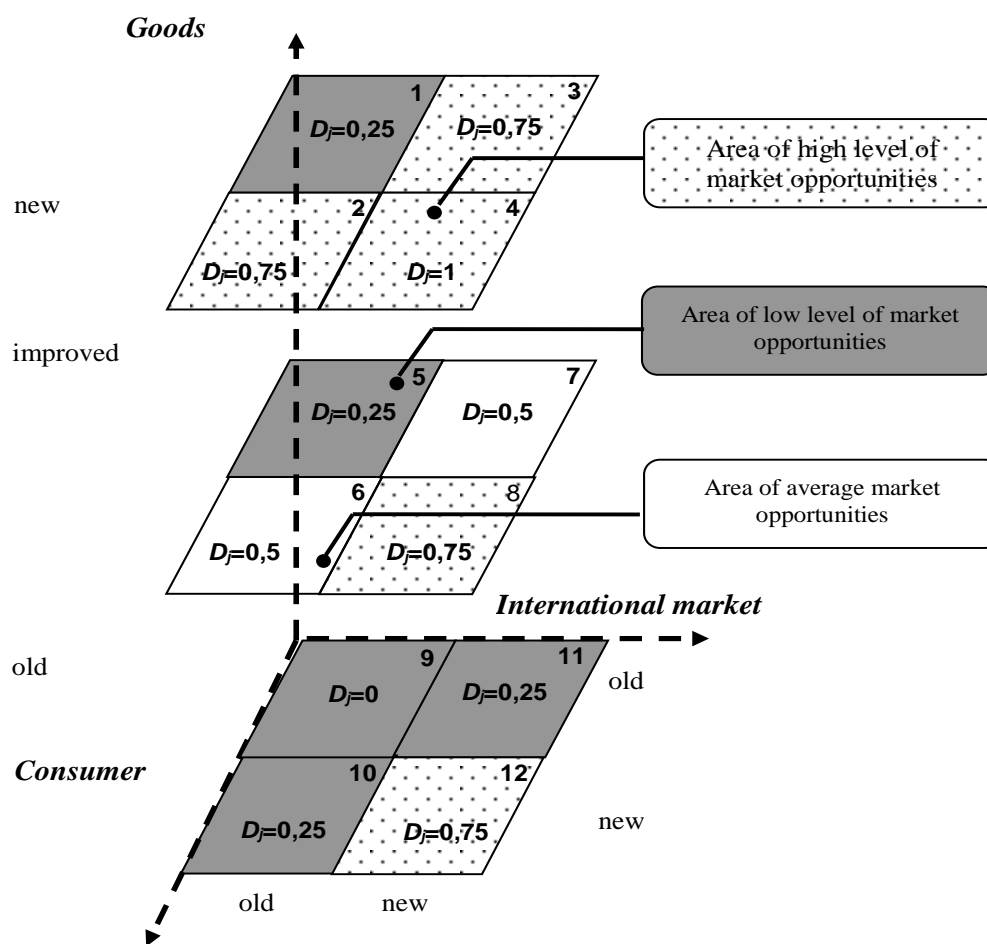


Fig. 2.4. The matrix of levels of market opportunities (author's development)

For each of the selected zones of economic security, competitive strategies are proposed. Their characteristics are given in Table 2.4.

The groups of activities that has relevance to the Book Index are formed within the framework of each strategy (Table 2.5). The implementation of these groups can be complex or prioritized, based on the country financial capabilities. It should be noted that the country can apply different strategies at different markets and for different activities simultaneously.

The choice of measures aimed at ensuring an adequate level of international economic security is proposed to be carried out in the following sequence:

- 1) identification of indicators for assessing the level of economic security (see Table 2.2);
- 2) determination of zones of economic security based on the values of the three-component indicator (see Table 2.4);
- 3) choice of strategies for ensuring economic security in the world market (see Table 2.5);

4) selection and implementation of measures to ensure the economic security (see Table 2.5);


5) assessment of the effectiveness of measures to ensure the economic security.


Table 2.3. Characteristics of market opportunities (author's development)

Characteristics	Area of market opportunities		
	High	Middle	Low
	Quadrant 2, 3, 4, 8, 12	Quadrant 6, 7	Quadrant 1, 5, 9, 10, 11
Purpose of marketing policy	Optimization of the sales network abroad	Optimization and sales intensification	Sales optimization
Purpose of commodity policy	Extension of the range, basic innovation	Improved modifications, a wide range of models	Elimination of overweight
Purpose of the promotion policy	Consumers' belief in the need to purchase products	Maximum consumer awareness	Maintaining the distinctive advantages of products
Pricing strategy	Establishing a price at the level of compensation of cost and contractual prices	Setting the price at the level of cost, sliding falling and contract prices	Setting of contract prices, flexible prices and preferential prices. Price elasticity

Table 2.4. Zones of international economic security (author's development)

(I, P_n, D_j)		The level of potential, I			
		sufficient		insufficient	
		Country risk level, P_n			
		sufficient	insufficient	sufficient	insufficient
Level of market opportunities, D_j	sufficient	(1;1;1)	(1;1;0)	(1;0;1)	(1;0;0)
	insufficient	(0;1;1)	(0;1;1)	(0;0;1)	(0;0;0)

 – Zone I (absolute security);

 – Zone III (unstable security);

 – Zone II (acceptable security);

 – Zone IV (inadmissible security).

Table 2.5. Strategies for ensuring international economic security (author's development)

Zone	Strategy	Characteristics of the strategy	K_{nj}	Action groups
Zone I	Support	Maintaining a sufficient level of economic security, preventing the emergence of threats to the economic interests of the country	(1;1;1)	1. Support for core production assets; 2. Effective use of resources; 3. Attraction of investments; 4. Preparation of foreign trade agreements; 5. Supporting a sufficient amount of sales and ensuring its stable growth; 6. R & D support; 7. Improvement of conditions for trade in export goods
		Conduct measures to strengthen one of the indicators of a three-component indicator of international economic security whose value is insufficient	(1;1;0)	1. Analysis of market opportunities; 2. Formation of own sales network abroad; 3. Market monitoring; 4. Improving the quality of goods; 5. Extension of product range; 6. Development of foreign trade ties
Zone II	Strengthening		(1;0;1)	1. Risk Insurance; 2. Search for new sales markets
			(0;1;1)	1. Modernization of production; 2. Motivation of the personnel; 3. Reduced resource costs; 4. Increasing the competitiveness of products; 5. Increase sales; 6. Involvement of new resource providers on more favorable terms
Zone III	Adaptation	Adaptation of the type of activity to a certain market and vice versa, as well as adaptation of the components of economic security to the requirements of the environment	(1;0;0)	1. Search for other sales markets; 2. Updating the product range; 3. Improving product quality; 4. Drawing up of new contracts
			(0;0;1)	1. Improvement of results of financial and economic activity; 2. Budget financing; 3. Search for other sales markets; 4. Risk Insurance
Zone IV	Change		(0;0;1)	1. Improvement of the results of financial and economic activity; 2. Adaptation of main productive assets to the type of activity of the country; 3. Promotion of product sales for export; 4. Tax privileges; 5. Budget financing; 6. Increasing the competitiveness of products; 7. Involvement of new suppliers of material resources at more favorable conditions for the country
		Conduct changes in the type of activity and the external market	(0;0;0)	1. Formation of a new portfolio of options for Foreign Economic Activity; 2. Search for new sales markets

The developed theoretical and methodological approach to the management of innovative progress allows to take into account: positive results determined by changes in the eco-destructive load on the environment and recipients; the possible cost level for the implementation of the direction (option) depending on the type of innovation, the stage of the ecological and economic cycle of innovation, which increases the level of substantiation of management decisions at the initial stages; market optimality of the direction (option), which allows to reduce investment risks at the early stages and determine its market perspective in the long and short term benefits.

The theoretical and methodological approach suggested by the authors to the formation of strategies, as well as to the system of measures ensuring international economic security, allows to increase the overall level of international economic security, stimulate the government to implement measures aimed at the rational use of the national resources, the choice of optimal market for distribution of their products, as well as the choice of the kind of activity that will fully meet the existing needs of the international market. Further research should be aimed at developing approaches to assessing the effectiveness of the proposed strategies and measures to ensure the international economic security.

3. THE IMPACT OF HUMAN CAPITAL ON INNOVATIVE DEVELOPMENT OF SOCIETY: A SOCIO-ECONOMIC ANALYSIS

Inna Semenets-Orlova, Alla Klochko, Tetiana Shkoda

3.1 Interrelation of human development and human capital

Modern social and economic development of the state depends on the main wealth of society – human capital. Just a person with his or her individual values, abilities, skills and capabilities is the basis for the formation of an innovative society. Under such circumstances, the issue of investment in human capital and its effective use is becoming increasingly urgent.

Non-formal or lifelong education worldwide is becoming an increasingly important area of educational services^{1,2,3}. It allows individual to adapt to changes in society. Since the knowledge of a graduate of the university already after some time requires significant updates, therefore the organization of trainings, seminars and online courses helps to solve the problem, but requires significant investments. Institutions of higher education should provide adults with a set of educational services appropriate to the level of development of society and the economy.

The theory of the development and formation of human capital is an actual topic of the study of scientists W. Petty, A. Smith, D. Ricardo. The big contribution to development of the theory of investment of the human capital was made to the different periods by such scientists as G. Becker, F. Makhlop, L. Thurow, Th. Schultz.

The problematics of non-formal education has been reflected in a number of works by Ukrainian and foreign researchers. The modern technologies of adult education have been analyzed in the collective «Adult Education in the Perspective of Change: Innovations, Technologies, Forecasts»⁴. the experience

¹ Semenets-Orlova, I., Klochko, A., Nestulya, S., Mykhailych O. and Omelyanenko V. (2019). Readiness of the education manager to provide the organizational development of institutions (based on the sociological research). Problems and Perspectives in Management, 17(3), 132-142. doi:10.21511/ppm.17(3).2019.11.

² Semenets-Orlova, I. (2017). Regular support of education changes in Ukraine, Theory and practice of public management, vol. 3, <http://www.kbuapa.kharkov.ua/e-book/tpdu/2017-3/doc/2/04.pdf>.

³ Semenets-Orlova, I. (2015). Productive leadership in the process of education change management, Bulletin of the National Academy of Leadership under the President of Ukraine, Series: Public Administration, vol. 4, http://nbuv.gov.ua/UJRN/Vnadu_2015_4_18.

⁴ Vasilyuk, A. & Stogovsky, A. (2017). Adult Education in the Perspective of Change: Innovations, Technologies, Forecasts, Nizhyn: Lysenko Publisher, <http://lib.iitta.gov.ua/718885/1/%D0%9C%D0%BE%D0%BD%D0%BE%D.pdf>.

in the development of non-formal education in the Republic of Poland has been given.

According to R. Inglehart and Ch. Welzel's theory, social development can be achieved by influencing the three components of human development listed below in Table 3.1¹.

Table 3.1. Components of human development / development of human potential according to R. Inglehart and Ch. Welzel

	Economic component	Cultural component	Institutional component
Measuring the components of human development	Resources	Liberal aspiration	Civil rights
Areas of human development components	Social and economic structure	Political culture	Institutes of the mode
Processes that form the components of human development	Economic development	Change of values	Democratization
Contribution of the component to the development of society	Development of individual possibilities mediated by increased access to resources	Development of individual possibilities mediated by claims growth	Development of individual possibilities mediated expansion of rights
Causal priorities in component building	Access to resources	Claims	Individual opportunities
The focal point of convergence of all components	Development of individual opportunities at the mass level = level of human development within a certain society		

Source: composed by the authors based on²

The concept of man as the main factor of production began to be formed in the works of classics of political economy – A. Smith³, D. Ricardo⁴, K. Marx⁵, who made attempts to attribute knowledge, skills and skills of employees to the main capital.

¹ Welzel, K. (2012). Distribution of connections between culture and institutions on the example of the emancipation of mankind, *Journal of Sociology and Social Anthropology*, 15 (4), 12-16.

² Welzel, K. (2012). Distribution of connections between culture and institutions on the example of the emancipation of mankind, *Journal of Sociology and Social Anthropology*, 15 (4), 12-16.

³ Smith, A. (2001). *Welfare of nations. Research on the nature and causes of welfare of nations*, Kiev: Port-Royal.

⁴ Ricardo, D. (2000). *The beginnings of political economy. Classics of Economic Thought: Works*. Moscow: EXMSO-Press.

⁵ Marx, K. (1973). *Capital. Criticism of political economy*, Vol.1. Moscow: Political Issue.

The theory of human capital was formed by Th. Schultz¹, who proved the crucial role of the quality characteristics of the labor force in the economic development of society.

However, representatives of the Chicago Scientific School Th. Schultz² and G. Becker³ contributed most to the development of modern theory of human capital and human potential. They worked on formulating practical recommendations to regulate the production of human potential oriented towards harmonious human development and the effective use of human capital.

D. Bychenko analyzed various groups of human potential concepts and concluded that they can be divided into three paradigm groups: general-theoretical, social and economic and sociological⁴.

Within the framework of the general theory of social progress, human potential is a set of human abilities to realize social action in the process of activity (Aristotle, Zombart, Zimmel). Human capacity-building is therefore identified with the process of human development.

The modern theory of human capital identifies⁵ the imperative of human development⁶ as the core of the reflexive-knowledge paradigm of strategic management of human capital, and also relates the concept of human development to development theories within the scientific concept of strategic management of human capital. Besides, according to the categorical matrix of the modern theory of human capital⁷ human development is related to the methodological level of scientific analysis and to the macrotheory of human capital. Also, within the practical level of scientific analysis, the human development concept interacts most of all with the theory of human capital precisely at the stages of formation and reproduction of human capital.

¹ Schultz, T. (1971). *Investment in human capital: the role of education and of research*. Free Press.

² Schultz, T. (1971). *Investment in human capital: the role of education and of research*. Free Press.

³ Becker G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis*. N.Y.

⁴ Bychenko, D. (2011). Methodological bases of research of human potential, *Izvestija Saratovskogo universiteta, Ser. Sociology. Politics*, Vol. 2, pp. 56-60.

⁵ Shkoda, T. (2018). *Strategic Management of Human Capital of Air Transport Enterprises*. The dissertation for obtaining a scientific degree of the Doctor of Economic Sciences majoring in 08.00.04 – Economics and Management of Enterprises (by Types of Economic Activity) and 08.00.07 – Demography, Labour Economics, Social Economics and Policy. Kyiv, SHEE “Kyiv National Economic University named after Vadym Hetman”.

⁶ Shkoda, T. (2016). Modeling the imperative of human development in the context of strategic management of human capital. *Rynok pratsi ta zaiiatist naselennia*, 1(46), pp. 37-41.

⁷ Shkoda, T. (2018). *Strategic Management of Human Capital of Air Transport Enterprises*. The dissertation for obtaining a scientific degree of the Doctor of Economic Sciences majoring in 08.00.04 – Economics and Management of Enterprises (by Types of Economic Activity) and 08.00.07 – Demography, Labour Economics, Social Economics and Policy. Kyiv, SHEE “Kyiv National Economic University named after Vadym Hetman”.

3.2 Human capital as a driver of a country's competitiveness

Today, Ukraine faces a difficult task: how to turn its powerful educational potential into real achievements in the field of material and intangible production, as well as to significantly improve the sphere of social protection in order to enable its citizens to live a long and healthy life.

According to the World Bank elements of a world national wealth are human, natural (the natural resources involved in production activity) and physical capital. The same elements shape the national wealth of separate countries (Fig. 3.1).

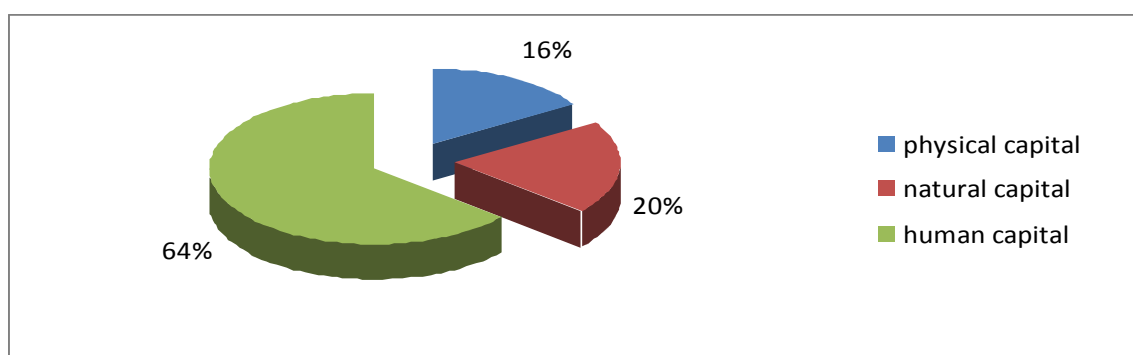


Fig. 3.1. The structure of national wealth

Source: composed by the authors based on¹

The ratio of the three elements of national wealth mentioned for separate countries differs from the world averages. And there is a pattern: most part of the human capital in the structure of national wealth is inherent in countries with a high level of development. In particular, for developed countries such as France and Switzerland, it is approaching 80%. After all, it is the quality and magnitude of the country's human capital that determine the country's capabilities and ability to conquer new high technologies. Unlike highly developed countries, in Ukraine only 15% of GDP growth is achieved only at the expense of human capital, and 85% – at the expense of physical and natural capitals.

The noted pattern of the structure of national wealth gives grounds for the conclusion that the accumulation of human capital is the most important

¹ The World Bank (2017), April 3, Human Capital: The Greatest Asset of Economies on the Rise, <https://www.worldbank.org/en/news/opinion/2017/04/03/human-capital-the-greatest-asset-of-economies-on-the-rise>.

prerequisite for success in achieving the goal of well-being of own citizens and competitiveness of the national economy. It explains the special attention of governments of the developed countries to education and medicine.

The efficiency of the use of natural and financial capital determines human capital, in turn affects the competitive advantage of the country and determines the nature of economic growth.

Taking care of the future, the country must invest in its own human capital. The common state of financing the development of human capital today is weakening its competitive position.

Innovative economic development requires an appropriate level of intellectual human development. New demands are being made for the formation and development of human capital. The emphasis are shifting to social and productive factors, where education becomes paramount.

Among the important components that form the measurement of the human development index and is a stimulating factor is the education level index. The growth of measurement of this indicator has begun in Ukraine since 1995. The Ukrainian Education Index was 0,92 in 2000 and 0,93 in 2001. The level of education which varies between 0,92 and 0,95 and corresponds to the level of highly developed countries. To a large extent almost total literacy of the population of Ukraine, which forms an education index by 2/3, is a consequence of compulsory secondary education in Soviet times. It should be noted that the index of education level in the developed countries of Europe reaches 0,99¹.

As for Ukraine, despite the relative growth of indices in 2009 – 2012, the dynamics of the rating has deteriorated on the contrary. In 2010 Ukraine belonged to the 69th position, in 2011 – 76th with the indicator of 0,737, in 2012 – 78th. According to 2014 Ukraine ranked 83, in 2016 – 84, in 2017 – 88². Despite the fact that European analysts rated Ukraine as a «country with a high level of human development» the Ukrainian indicator is the lowest among European states³.

The problems in the education system were primarily due to insufficient financial resources to ensure its dynamic development and the provision of quality educational services and quality education.

¹ United Nations Development Programme (UNDP). (2019). Human Development Reports (HDR) 2000-2019, Statistical Update, <http://hdr.undp.org/en>.

² United Nations Development Programme (UNDP). (2019). Human Development Reports (HDR) 2000-2019, Statistical Update, <http://hdr.undp.org/en>.

³ United Nations Development Programme (UNDP). (2019). Human Development Reports (HDR) 2000-2019, Statistical Update, <http://hdr.undp.org/en>.

The enhancement of human functions and capabilities, the accumulation of human potential and its use in expanded social reproduction for the benefit of every member of society is an important element of strategic plans for the development of democratic states. The competitive pressure of globalization makes it urgent to build a knowledge-based economy capable of achieving sustained economic growth while providing people with a great number of better jobs and supporting greater social cohesion.

In order to achieve this goal, it is necessary to invest in education and skills development, as well as to accelerate progress in the fundamental task of modernizing the national education system so that everyone can acquire the new knowledge and skills that will be needed in lifelong learning.

Today in Ukraine there is a decrease in state expenditures on human capital development (as a percentage) in the total expenditures of the State budget. While education spending in 2010 was 21,13% of budget spending, it fell to 6,2% in 2019. There is also a decline in funding for science – almost 0,23% of GIP. The low level of financing of human capital is one of the factors that significantly weakens the country's competitive position.

It is noted in the sustainable development strategy «Europe 2020»¹ that the core of human capital is knowledge and innovation, and the level of financing of these components of the total aggregate GIP of the EU is 3%. According to the Strategy almost 40% young people should have higher education, and the main emphasis is on learning over the course of their lives.

The development of the educational sphere becomes the priority interest of the country in the developed countries of the world. States monitor the education of the population and become the main investor and encourage investment in the education of enterprises and individuals. In these countries a mechanism has been established for close cooperation between the state and enterprises in the direction of training and retraining of personnel and contributes to the effective employment of human capital.

Knowledge is a strategic resource of the country, creating favorable conditions for generation of new ideas, creation of new technologies ensuring growth of competitive advantages for the economy of the country, therefore an increase the level of quality of education is the priority task today for Ukraine.

¹ European Commission (EC). (2010). Europe 2020. A strategy for smart, sustainable and inclusive growth. <https://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf>.

3.3 Impact of investments in education on innovative development of human capital in Ukraine

Achieving the goal of improving the quality of educational services and the quality of education, its innovative development of creative development of native educational achievements, requires synchronous fulfillment of the tasks arising from all its components. At the same time the main priorities are: the European level of quality and accessibility of education; spiritual ancestors of education; democracy in education; raising the social status of teachers; development of society based on new knowledge.

Higher education plays a major role in the development of productive forces. The quality of education and European integration are systemic factors in the modernization of Ukraine's education.

The urgent need to eliminate certain shortcomings, in particular the higher school of Ukraine, requires conceptual improvement of education and professional training of specialists in the following areas:

- building attitudes towards the human being as a goal of social progress, not a means;
- overcoming neglect of differences in psycho physiological and intellectual capabilities of different people;
- orientation towards the activation of human capital in education and vocational training, based on the concept of harmonious human development as a purposeful system, a product of socialization, a subject of activity and a commodity in the labor market;
- developing in the process of training deep professional competence and social responsibility in solving the problems of scientific and technological progress, social and cultural development.

Of course, the organization and implementation of research in this field has a special place in the establishment of an organizational and economic mechanism for the development of human resources. The difficulty of solving this problem lies primarily in the fact that practical achievements in this field, which would be adequate to modern market conditions, are not yet available in Ukraine to the extent that it is possible to speak with a certain probability of its wide application. According to it the main functions providing the solution of this task have to become: development of target scientific and scientific and technical programs and projects on creation of new forms and methods of

retraining of personnel, forecasting of the market of professions, forecasting of problems and development of methods of their decision in the sphere of employment of able-bodied population; study of living standards, income, working conditions, research and development of human resources.

Investment in education contributes to the formation and development of knowledge and the efficiency of the economy. Knowledge and skills are factors in economic development and competitiveness. Investments in education contribute to the formation of highly qualified specialists in society, whose work affects the economic development of the country.

According to the World's Global Innovation Index ranking in 2018, Ukraine ranks 127 among the 50 countries in the world that participated in the innovation study, and the Global Innovation Index is 37,62¹. This data shows a lack of use of resources and innovative capacity of the country. Developed countries such as Switzerland, Sweden, the Netherlands, the United States, the United Kingdom are the world leaders in the Global Innovation Index, which has a score of more than 60 points.

According to the World Economic Forum², Ukraine's economy is much inferior to others in terms of innovative development. The reason for this is the low capacity to innovate and invest in human capital development while other highly developed countries are moving towards an innovative society, building an economy based on creative thinking, the ability to adapt to changes in the economic environment and making effective decisions.

Ukraine's orientation towards the international economic space requires new approaches to the formation of quality human capital and its development, it is the main criterion for improving competitiveness and developing an innovative economy³. The issue of the restoration and further development of the system of training of personnel in the workplace, as an essential factor in improving the quality of the labor force, has now become particularly acute in Ukraine. According to a sample social and demographic survey conducted by the State Committee on Statistics of Ukraine, the majority of respondents felt their own need for training and advanced training. However, 47% of working respondents hoped to be able to obtain new professional knowledge at work.

¹ United Nations Development Programme (UNDP) (2019). Human Development Reports (HDR) 2000-2019, Statistical Update, <http://hdr.undp.org/en>.

² World Economic Forum (WEF) (2018). Global Competitiveness Report (2017-2018), <https://www.weforum.org/reports/the-global-competitiveness-report-2017-2018>.

³ Vasina, A. (2015). The development of human capital in the context of securing the structural economy of the economy, Science News of Uzhgorod University. Seriya "Economy", 1 (45), 255.

In order not to lose in global competition, it is relevant for Ukraine today to establish continuous education – an effective system of vocational training throughout its working life. Although realistically, as the author's observation shows, the population stops raising its educational training to 35 years.

Educated and competent citizens are capital and a component of the social and economic development of the state. Important steps towards recognizing the importance of lifelong education for human development led to the modernization of European education policies at the beginning of the twenty-first century. March 2000 Lisbon Summit of the Council of Europe has adopted a «Memorandum of Education in a Lifetime»¹.

Accordingly, non-formal education should be a development priority in any country. In Ukraine there is a development of the legislation for functioning of education for adults, in particular, the Order of MESU of 12.01.2018 No. 30 «About creation of the working group on development of the bill of Ukraine «About education of adults»² is adopted. Today, work continues on this problem, but for too long.

Considerable popularity in Ukraine has entered the public project of mass available online courses «Prometheus». The project was founded in 2014, and today «Prometheus» has an audience of hundreds of thousands of listeners, offers dozens of free online courses, to improve acquired knowledge and competences but also to get new ones. At the same time, there is a problem with the financing of the project and the appeal to citizens to support it favourably.

In Ukraine, the reform of the New Ukrainian School continues³, which requires the re-qualification of a significant number of teachers. The mechanism of this is to establish a fixed amount of hours in postgraduate training (150 hours) and to give teachers the right to choose the place and method of professional improvement.

Researcher L. Martynets emphasizes that adult education should be a process of continuous, as a social self-defence and necessity, where everyone, without taking into account his or her material position and religious outlook, is

¹ Commission of the European Communities (CEC). (2000). Memorandum on Lifelong Learning, , http://arhiv.acs.si/dokumenti/Memorandum_on_Lifelong_Learning.pdf

² Ministry of Education and Science of Ukraine (MESU). (2018). Order of MESU of 12.01.2018 No. 30 “About creation of the working group on development of the bill of Ukraine “About education of adults” <https://mon.gov.ua/ua/npa/pro-utvorenniya-robochoyi-grupi-z-rozroblennya-proektu-zakonu-ukrayini-pro-osvitu-doroslih>.

³ Ministry of Science and Education of Ukraine (MESU). (2020). New Ukrainian School, <https://mon.gov.ua/ua/tag/nova-ukrainska-shkola>.

entitled to his or her own path of education from childhood to late old age, as a way of intellectual and professional renewal¹. Compliance with this principle will contribute to the economic growth of society, overcoming unemployment and quickly solving crisis phenomena etc.

Funding for adult education is a key challenge. The question arises: the state or the citizens themselves? Thus, in Germany, money is allocated from the land budgets for the training of citizens, provided that the citizens themselves make a partial contribution. In Denmark, adult education centers are supported by income from the National Lottery. Successful countries have realized the need to develop adult education. Ukraine, unfortunately, does not². However, the first steps towards the introduction of non-formal education have already been taken. The experience of other countries, such as France, should be drawn upon in that regard. In this country, there is a prevalence of «free students» – adults, for symbolic fees (for use of libraries, laboratories, etc.) can attend academic programs of universities at their own request, but without the right to take examinations and receive a diploma of higher education³.

It should be noted that there is training of employees of large companies in Ukraine, but mass character is not yet present.

In Ukraine, decentralization is being reformed, local self-government bodies and united territorial communities (ITCs), which intend to invest in adult education, but face insufficient legislative support for the process, and the Treasury rejects such funds because there is no relevant law. However, only thanks to Grants from the European Union, it is partially possible to solve the problem of budgeting non-formal education. Quite often the Institute of Political Education in Ukraine provides training to deputies of local councils. The Women's Professional League also deals with adult education. An example is the seminar «Adult Education Policy as a Way to Realize European Integration of Ukraine and the Goal of Sustainable Development»⁴.

An important characteristic by consideration the educational activity of Ukrainian enterprises is the spending of funds on the training of their employees. Staff development for an enterprise is an essential element of

¹ Martynets, L. (2015). Adult Education: Forms and Content, <http://otr.iod.gov.ua/images/pdf/2015/6/05.pdf>.

² Andreev, M. (2019). Why Adult Education Saves Ukraine. <https://osvita.ua/blogs/65306/>.

³ Tesla, R. (2015). Adult education in France: history, experience, prospects for implementation in the Ukrainian education system, https://seanewdim.com/uploads/3/2/1/3/3213611/teslya_r._education_of_adults_in_france_history_experience_prospects_for_implementation_in_the_ukrainian_system_of_education.pdf.

⁴ Women's Professional League (WPL). (2019). http://lpw.org.ua/en/adult_education/events/Workshop_Report/.

productive investment and it is often the enterprises that become efficient producers of human capital. As the experience of developed countries and leading native enterprises shows, the optimal costs for vocational training in the amount of 3–4% of the wage fund. The practice of successful native and foreign companies shows that investments in personnel, creation of conditions for professional growth of employees and improvement of their readiness to solve problems give high return.

The priority for Ukraine is to establish a system for the reproduction of human capital, taking into account the experience of foreign countries, in particular, an increasing the state expenditures in the development of human capital and concentration the resources on priority areas of education development. Programmes should be developed to attract investment in human capital.

Thus, in conditions of war Ukraine has significant human potential. It is understandable that the growth of human educational needs, the accelerated development of the economy, all this cannot provide traditional education. In this context, therefore, the role of non-formal education is increasing. The implementation of the project education during life is important for modern Ukraine, although there are many challenges for its model, including investment, and also lack of standards. Non-formal education at the national level should be defined as full alongside traditional and educational field with appropriate attention to quality control and verification, ensuring recognition of different forms of education.

4. ADULT EDUCATION AS AN ECONOMIC PRIORITY

Onopriienko Kateryna

4.1 Adult education as a topical issue of global economy

Adult education is a pressing issue in society as it is directly linked to the level of human capital. At present, this indicator is especially important and the education of an adult is one of the main factors for its growth. Therefore, adults have a continuing need for continuing education. Nowadays, the topic is becoming more relevant as the world has begun to focus not only on production but also on its quality, and adult education and the level of human capital are a top priority. Therefore, there is a need to explore adult education as a factor in influencing human capital.

Adult education topics are devoted to publications by national scientists as Grishnova O.A., Markozova O.O., Rykovska O.V. In particular, Grishnova O.A. examines issues of education as a factor of economic growth of Ukraine. Markozova O.O. analyzes the essence of the concept of lifelong learning and proves that the main resource for self-realization of the individual in the information society is educational capital¹. Rykovska O.V. summarizes the European experience of formalizing adult education, emphasizes the economic and social feasibility of adult education as an important factor in the development of human capital and its quality improvement². Also, the topic of lifelong learning in the context of human capital is addressed by such foreign authors: Hendricks L., Kim Jin, Muscle D., and others. Hendricks L. and Muscle D. highlight the benefits of adult education for economic growth and raising human capital. Kim Jin, in turn, argues for the need for human development and lifelong learning. However, the issue of adult education as a factor affecting human capital is undervalued and needs further study and justification³.

Knowledge-based economies, new technologies, the increasing pace of technological change and globalization all affect the needs for improving the skills and competences of the population.

¹ Markozova, O.O. (2013). Life-long learning is a necessary prerequisite for achieving life success. *Vis. international. Slavs. un-tu. Kharkiv. Series "Sociological Sciences"*, 16 (1), 5–13.

² Rykovska, O.V. (2016). Adult education as a factor in human capital development: European experience and Ukrainian trends. *Economic Sciences*. 22, 96-101.

³ Kim Jim Yong (2018). The Human Capital Gap: Getting Governments to Invest in People. *Foreign Affairs* . 192.

Lifelong learning covers the whole range of learning, including: formal, non-formal and informal learning. It also includes the skills, knowledge, attitudes, and behaviors that people acquire in their daily experiences.

Lifelong learning is the continuous formation of skills and knowledge throughout a person's life. Not only does this increase social inclusion, active citizenship and personal development, but also competitiveness and efficiency. Lifelong learning helps people achieve other goals, such as taking an active part in civic life, leading a more sustainable lifestyle, and improving their health and well-being. It also benefits society by reducing unemployment and encouraging community action.

Adult education is part of the lifelong learning system, its relatively separate unit, whose mission is to promote the full development of the adult. Adult education is a direction that addresses the educational needs of those engaged in professional activities.

The globalization and growth of a rapidly changing knowledge economy mean that people need to improve their skills throughout adulthood in order to cope with modern technologies, both in their work and in their private lives. In our time, an increasingly important basic skill in the ever-changing technological universe has been the ability to learn new skills and adapt to the fact that life will have to be learned if one is to be sought after professionally and as a member of society.

At the present stage of socio-economic development, the strategic goal of the state is the formation of an innovative economy and raising the level of human capital, which requires another type of worker with a high level of social, cultural and professional education. As the experience of European countries shows, the sustainable development of the economic system becomes possible with the achievement of a certain «critical mass» of workers (up to 35%) that will meet the needs of production.

The experience of foreign countries in the development of adult education in the context of lifelong learning shows that by expanding and improving adult education it is possible to significantly alleviate the social tensions in a society that has arisen due to the emergence of unemployment, and to solve other socio-economic problems.

Regarding age-related parameters, approximately half (56) of the 129 countries reporting indicate that their policies address adult learners across the full age spectrum. This includes groups in which learners are identified from a

certain age (mostly 15+), or where the entire workforce age cohort is targeted (i.e., 15–65). A smaller share of countries specifies a closed age cohort (e.g., 15–45 years)¹.

Analyzing the percentage of employment in adult education, we can cite the following data: in the United States, 22.5% of the working age population is employed in the adult education system (excluding formal education). It is estimated that up to 50% of American adults study in one form or another in the country. Every fifth adult in Canada is enrolled in Canada; in Sweden – almost 80% of the population. Adult education, organized in Latin America, gives you the opportunity to graduate from elementary and high school (this is a «second chance education» function) for those who are 18 years old (in elementary school) and 21 years old (for high school, additional education and vocational training) improvement, acquisition of skills of useful leisure (cultural and educational activities).

Lifelong learning is an ongoing process that stimulates and empowers people to acquire all the knowledge, values and skills they will need throughout their lives and to apply them with confidence, creativity and enjoyment in all roles, circumstances and environments.

In the context of our study, this analysis aims to identify the phenomenon of «adult», which is crucial in the development of andragogy, understanding the needs and goals of adult learning. As American andragogues Sharan Merriam and Rosemary Caffarella point out, «the essence of adults as students and the characteristics of the adult learning process distinguish adult education from other types of education. In order to optimize the learning process, it is especially important to know what an adult learner is. «However, given the multifaceted nature of these concepts, science does not have a single perspective on who should be considered an adult.

The Russian scientist S. Zmeyerov writes as follows: «... in the theory and practice of teaching there is still debate over the definition of an adult from a sociological, psychological, pedagogical point of view. This is because, depending on the subject's own understanding of the learning process, both the theory of learning and its organization are built». The ambiguity of this concept is also emphasized by the domestic researcher O. Ogienko, who draws attention to the fact that «...age limits are determined by social and economic factors,

¹ European Union. Council Resolution on a Renewed European Agenda for Adult Learning (2011)/ Brussels, Council of the European Union. Retrieved from: <http://eur-lex.europa.eu>

historical events, ethnicity and the environment in which a person lives and develops». This approach to the understanding of «adult» is also reflected in the definition of adult education proposed by UNESCO, which states in particular that adults are «people who are considered adults in the society to which they belong»¹.

Leading American scholars, L. Marjan and R. Caffarell, hold the same view, saying: «Adulthood is now considered a socio-cultural concept, that is, the answer to the question of who is an adult is interpreted by a particular society and culture at a particular time».

In America, the term «adult» emerged after the Civil War, and came into use only in the early XX century. In Colonial America, the concept of adulthood was based on customary English law, at which age men were fourteen, and women were twelve.

There is no single approach to adulthood in the United States today. There are various definitions, some of which take into account the level of human formation, and others – its age.

According to the first government regulation on basic adult education and literacy, namely the 1966 Adult Education Act, which was as part of the Economic Opportunity Act of 1964, as amended, adults under the age of eighteen were classified as adults. In accordance with the amendments made to this Act in 1970, they began to believe that adulthood came at the age of sixteen when a person left school. This position remains unchanged even now, since it is individuals who are sixteen who are eligible to participate in programs funded by the Adult Education and Family Literacy Act, which is Title II of the 1998 Investment in Human Resources Act, the main legal instrument. , which regulates US adult education. American scientists look at the problem of adulthood in various fields: physiological, psychological, social, etc. One of the first and, in our view, the most comprehensive definitions was formulated by M. Knowles, who paid much attention to the disclosure of the essence of the concept. His approach to adulthood, starting with one of his early works, «Non-formal Adult Education: A Guide for Administrators, Leaders, and Teachers» and ending with one of his most recent works, «Adult Learner: The Forgotten Kind» was based not on age but on the maturity level of the individual. At the same time, the maturity of the scientist was associated with the study, during

¹ Grishnova, O.A. (2012). Efficiency of education as a factor of motivation of investment in human capital. Regional perspectives, 3–4 (22–23), 69–72.

which the individual reaches a higher level of development¹.

Thus, the study allows to conclude that according to M. Knowles:

- there are four definitions of adulthood: biological, legal, social and psychological, but in terms of learning the most important scientist considers social and

psychological definition, because they are based not on age but on the level of maturity of a person;

- a person becomes an adult socially when he or she begins to perform adult roles: worker, wife or husband, father or mother, citizen; a person becomes an adult psychologically when he or she has self-consciousness, responsibility for one's life, independence;

- the most fundamental needs and goals for the achievement of human self-fulfillment in the learning process are the prevention of aging, the achievement of identity and the development of maturity;

- The mission of the andragogue is to help the adult student reach all goals and meet all needs, which ultimately means helping to find meaninglife².

4.2 Adult education as a factor in improving human capital

We live in a world where people have to interpret and process different information, be computer and financially competent. Consequently, it is difficult to underestimate the importance of adult education in the economic perspective. In the course of the work, the benefits of lifelong learning were identified as a factor influencing the economic development of the country (Fig. 4.1).

Employees create and discover new abilities and ideas. In our knowledge-based economy and society, change is constant in the workplace. Therefore, people who are constantly learning new and facing new challenges can better cope with the needs and changes of the workplace.

The strong growth of the economy in Vietnam, China, Korea and Japan began with the fruits of globalization – the export of manufactured goods that were highly competitive due to the low cost of labor. These countries opted for investment in infrastructure, special economic zones and, above all, human

¹ Marjan, L. & Peyman S. (2012). Lifelong learning; why do we need it? *Procedia – Social and Behavioral Sciences*, 31, 399–403.

² Leonidova, G.V., Ustinova, K.A. (2012). Continuing education as a condition for the formation of human capital. *Economic and social changes: facts, trends, forecast*, 6 (24), 55-62.

capital, which created a highly skilled workforce connected with the outside world.

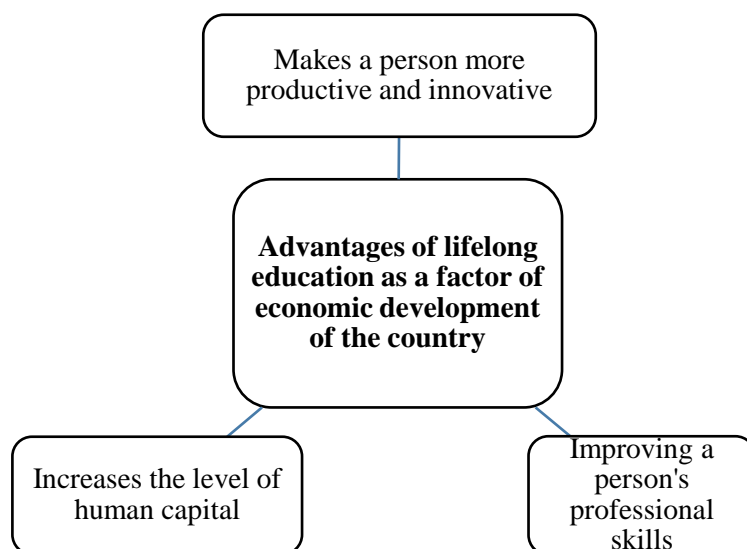


Fig. 4.1. Benefits of lifelong learning for the country's economic development

A significant contribution to the formation of the modern concept of human capital was made by the American scientist G. Becker, who views human capital as an available supply of knowledge, abilities and motivations that everyone has. It is generated by investing in people, which include spending on training, on-the-job training, healthcare costs, migration, and the search for pricing and income. In addition, he compared the return on investment and the cost of education and determined in some way the return on investment per person. This approach can be considered investment, because human capital is seen as a set of different investment objects (education, healthcare, mobility, etc.).

Grishnova O.A. views human capital as an «economic category, which characterizes the aggregate of productive abilities, personal traits and motivations of individuals who are in their property, used in economic activity, contribute to the growth of labor productivity and, consequently, influence productivity. Growth of income (earnings) of its owner and national income»¹.

Human capital is the knowledge, skills and health that people accumulate throughout their lives, which allows them to realize their potential as useful members of society. It brings tremendous returns to people, society and

¹ Grishnova, O.A (2012). Efficiency of education as a factor of motivation of investment in human capital. Regional perspectives, 3-4 (22-23), 69-72.

countries. In the 1700s, the Scottish economist Adam Smith wrote: «Acquiring abilities during education, training or apprenticeship always requires real costs, which are fixed capital, which is, as it were, realized in an individual. These abilities, being part of the state of such a person, also become part of the wealth of the whole society». These words were true then; they are still true in 2018.

Lifelong learning provides people with the knowledge, skills, values, attitudes, and understandings they will need in both everyday and professional life.

The more knowledge and skills people develop, the greater the level of human capital and overall potential in the economy. A stronger economy means that citizens are better off earning more, living better and promoting the economic system.

There is a close relationship between investment and capital, as follows: «Capital, on the one hand, as a certain stock, wealth or money, is the basis of investment, and on the other, investment is a condition for its normal functioning, reproduction and multiplication».

It can be argued that the benefits of lifelong learning include a number of points, which include raising human capital.

Hildebrand D. S. noted the benefits of adult education in the context of improving human capital (Fig. 4.2)¹.

As you grow older, lifelong learning helps to keep your mind clear and improve memory. It is a known fact that learning generally has a beneficial effect on the brain. Studies have shown that people with higher education are less likely to have memory problems in old age, and thus longer can perform their professional responsibilities.

When a person does not go out of his way for a while, a world where every day invents something new can be a serious challenge for the person, and education has the effect of increasing the person's confidence. In the process of lifelong learning, this fear is easier to overcome because one will adapt².

Being able to communicate can help greatly improve our interpersonal connections in the age of gadgets and social networks when it is uncomfortable to have a conversation with a stranger on the street, share information live, present a project, etc.

¹ Hildebrand, D. S. (2011). The powerful benefits of lifelong learning. Winnetka, California, USA. Retrieved from: <http://www.officearrow.com/training/the-powerful-benefits-of-lifelong-learning-oaiur-861/view.html>

² Hendricks, L., Schoellman T. (2017). Human Capital and Development Accounting: New Evidence from Wage Gains at Migration. *Quarterly Journal of Economics*, 133 (2), 665-700.

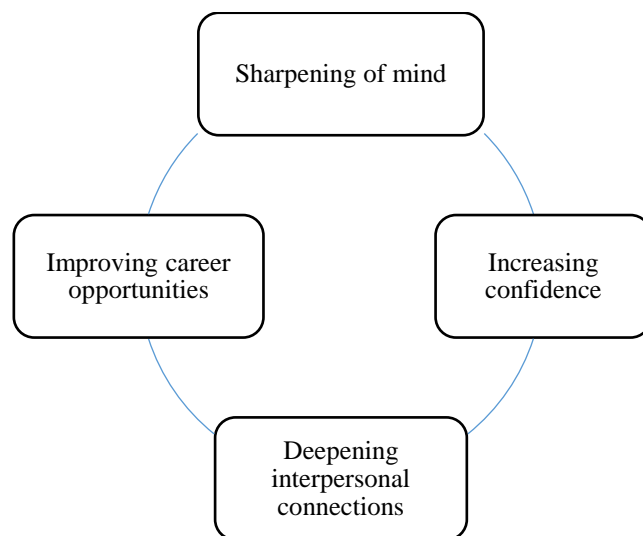


Fig. 4.2. Advantages of adult education in the context of improving human capital by Hildebrand D.S.

For anyone who is looking to move their careers to the next level, or whatever it may sound like, to hold on to the same position, lifelong learning will be a necessary point to pursue. That is, in the process of education an adult enhances his career opportunities. Therefore, human capital must not deteriorate as a matter of priority and, with proper and continuing education, be improved.

A learning society is a vision of a society that recognizes the opportunities to educate everyone, wherever they may be, and whatever their age. The pace of technological change in the knowledge economy is increasing, which means that we need a flexible and adaptable workforce that is ready to retrain and retrain to keep up with economic, technical and linguistic needs.

Masclé D., lists the benefits of adult education as follows: (Fig. 4.3).

First, it is the prospect of a higher salary. «Action» is for smart people who keep up with the latest information and technology. It is simply a vital incentive to freshen up and retrain yourself in the workplace¹.

Secondly, it is heightened self-esteem when meeting new goals, taking on tough challenges and taking it to a whole new level. The third is the freedom given to adult learners. Adults share ideas and teach each other. In the learning process, tasks can be completed by a group project or program. Fourth is the transition to training 24/7 and long distance or online methods. Computer training allows you to stay home and study without paying for travel and food

¹ Masclé, D. (2017). No Adult Left Behind: Big Benefits of Lifelong Learning. Article Alley, UK. Retrieved from: <http://deannamasclé.articlealley.com/no-adult-left-behind-big-benefits-of-lifelong-learning-139607.html>.

from a student and rent from a service provider. It is also a time saver.

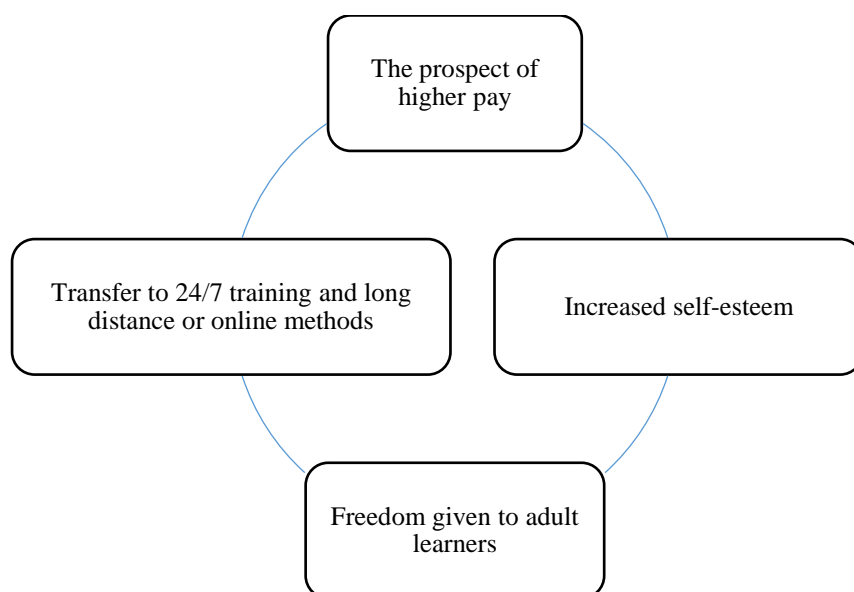


Fig. 4.3. Advantages of Adult Education by Mascle D.

One of the socio-economic indicators that includes the education level of the population is the human capital index. According to the World Bank, in 2019, Ukraine ranked 50th with 157th in terms of quality of human capital. The score varies from 0 to 1. Ukraine scored 0.68 points. We had countries like Bahrain, United Arab Emirates, China. Singapore's leader has a score of 0.88, Chad has the lowest score of 0.26 (Fig. 4.4).

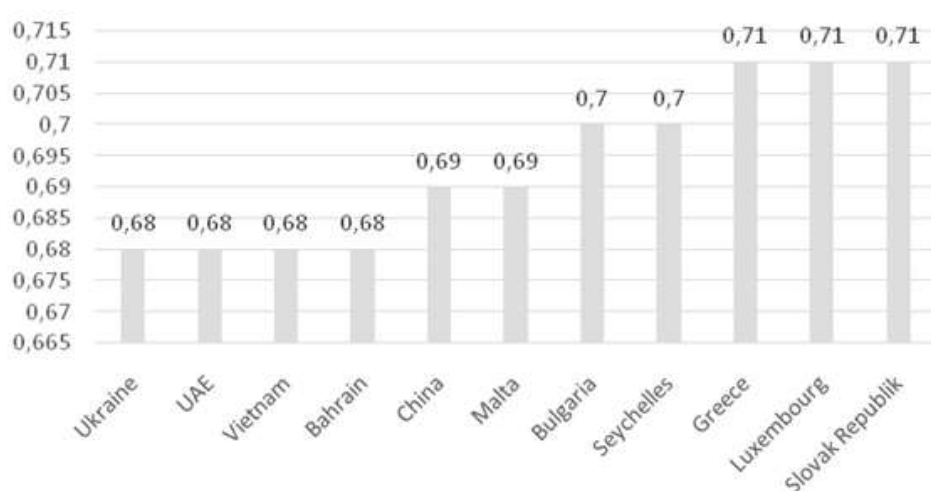


Fig. 4.4. Rating of Ukraine by the Human Capital Index 2019

In 2018, Ukraine is among the top 6 countries to take part in the World Bank Pilot Project on the Human Capital Index. Therefore, it can be argued that participation in the project will provide an incentive to improve the indicator.

Undoubtedly, adult education has a number of benefits for both the individual and the economy of the country. A lifelong learner will go in with the community, staying abreast of changes in areas such as technology, political, economic, professional trends, or issues of finance, money, and culture. Lifelong learners will look for opportunities to introduce new technologies and thus change their approach to work, cultural and financial enrichment, and education as a whole.

4.3 International experience in adult education

There is evidence of the positive role of adult education in different countries. However, most countries do not correlate them with government spending. Many governments allocate less than 1% of their state budgets to adult education. The exception is Finland. It devotes about 10% of its state budget to education adults. The adult Finnish population also has one of the highest levels of basic literacy skills, namely the ability to count and problem-solving skills (Organization for Economic Cooperation and Development, 2013), as well as the highest level of investment in adult education on employment-related issues¹.

Due attention is given to adult education in Japan. Japanese understand learning as a constant process of life, as consuming food, as something that brings pleasure. In Japan, it is believed that any non-governmental organization can become a place of study (libraries, theaters, museums, cultural centers, youth and even sports clubs).

Studies by Japanese scholars have consistently emphasized that politics should not affect the continuing education of people, which should enrich, rather than complicate daily life and leisure. In Japan, the development of education is closely linked to industry, and various forms of personnel training at enterprises, firms and institutions are part of the corporate policy of corporations.

In China, adult education has several functions: it provides a «second

¹ Yang, J. & Valdés-Cotera R. (2012). Conceptual evolution and policy developments in lifelong learning. Hamburg, UNESCO Institute for Lifelong Learning, 234.

educational opportunity» for those who wish to complete primary, secondary, and tertiary education; organizes additional training and professional development for working adults; implements educational and cultural programs for adults.

The role of adult education in India is growing. Adult education programs are closely linked to the work, life, environment (environment) of students and are implemented by local authorities, educational associations and organizations and institutions. In addition, in India, there are public colleges for 18 to 35 year olds with a term of study of between six months and one year. During the morning, each student learns about agriculture or craft; in the second, regional Hindi language and literature, Indian history, etc.

There are two types of adult education in Israel: adult education and extracurricular adult education. The first type involves training to obtain a certificate or diploma from a certain level of school, including Hebrew immigrant education, as well as to combat illiteracy. The second – covers those who want to improve the cultural and educational level through country studies, participation in sports games, discussion clubs. Adult education costs are \$21 million. US annually (approximately 1,5% of the Department of Education's budget)¹.

Adult Education in Nigeria in the 1980s and 1990s. moved away from liberal ideals and the perception of education as good. Education is treated as a «second chance» of obtaining a formal education and obtaining a certificate of completion of secondary or higher education, actively participating in the offer of various courses of study and improvement. According to the Ministry of Education of Nigeria, in 2018, nearly 450,000 people attended adult education courses, of whom nearly 59% were women, and nearly 1.5 million adults attended the 2018 writing and reading courses. Consequently, governments in many countries are pursuing public policies in the field of adult education.

Employment prospects are a major factor in motivating companies and individuals to invest in adult education. In all countries where PIAAC data is available (mainly high-income countries), 80-90% of adults who participate in adult education report that they participate to get a job, keep a job, get a job or move to a better job².

¹ World Development Report: The Changing Nature of Work (2019).

² Duke, C. & Hinzen H. (2011). Adult education and lifelong learning within UNESCO: CONFINTEA, Education for All and beyond. *Adult Learning*, 22 (4), 18–23.

In these countries, employers also fund between 60 and 85% of all adult education activities. Countries with the highest level of support from employers also show the highest level of activity related to adult education. Companies that primarily invest in education are, as a rule, large companies operating in the global markets and creating organizational and innovative ones (Google, Porsche, Amazon, etc.).

Regardless of where you live, adult education helps people become healthier, improve their economic prospects, and be more informed and active citizens.

- In the Philippines, adult education programs, by promoting breastfeeding and improving infant nutrition, have helped reduce infant mortality.
- In the United States, adult education has led to improved environmental behavior and literacy.
- In China, exercise, dance, and music help older people improve their mental health.
- Dozens of studies in Europe have shown that adult education is cost-effective for employers. In a number of African countries, civilian education programs have given new opportunities to people, which has increased political participation¹.

Over the past 10 years, a number of countries have taken initiatives to improve literacy skills and the ability to count among the most vulnerable segments of the adult population in ways that are directly related to the labor market. For example, a program The «Basic Work Life Competency» in Norway and various literacy and core skills programs in Canada. A survey of Canada's most promising labor programs was conducted Literacy and other core skills resources. This study led to the development of a number of key ideas.

First, effective literacy in the labor market and core skills programs should be provided separately from other literacy programs.

Secondly, there is an agreement regarding the importance of a partnership approach that includes the state and employers, as well as the need for programs focused on the needs of workers. Partnerships are especially helpful for stakeholders to work together to identify, assess and identify the most important skills and knowledge needs.

Thirdly, it is extremely important to create training courses that combine continuing education, employment and further education and training.

Fourth, employers should be involved in all aspects of employment

development programs, including program development, job creation, and changing employment practices.

Finally, the results confirmed the need for government intervention, especially regarding financial support, and the need for advocacy to stimulate demand¹.

New jobs and jobs are constantly being created. A new career is opening all the time. An able-bodied applicant or employee is one who has not only certificates, diplomas, but also knowledge, and accordingly a high level of human capital.

A lifelong learner is an engine of economic development, staying on top of his or her industry to be able to respond to change quickly and without fear. Therefore, adult education is increasingly becoming the vector that needs to move the economy into the 21st century.

Therefore, a huge advantage of adult education is its impact on enriching life and raising human capital. Each person has topics in which they are interested. And the labor market trends are such that the employer wants to hire someone who is not only competent in the business but also loves what he will do. As a physical performer, human beings are no longer interesting, as technologies are gradually replacing and fulfilling the simplest of tasks, so the need for adult education in the context of improving human capital is gaining ground.

Adult education and training is the most important structural basis of the learning society in the formation of learning local communities, cities and regions, which contributes to the formation of a lifelong learning culture and the revival of learning within the family, community, other educational environment and in the workplace. Thus, it directly affects the formation of human capital of a person and the country as a whole.

However, countries have not yet invested enough in education, especially for the most disadvantaged groups. Public sector investment should increase, and governments need to strengthen the incentives they provide to companies and individuals to invest and participate in adult education. Where governments, employers and workers will collaborate, both current and future labor market needs can be identified. This will help people cope with change, and economies and companies will become more competitive in global markets.

¹ Mc Kenzie & David, J. (2017). How Effective Are Active Labor Market Policies in Developing Countries? A Critical Review of Recent Evidence. Policy Research Working Paper , World Bank, 124-136.

Therefore, it should be noted that the economic development of the 21st century is gradually beginning to be characterized not only by economic but also by social indicators, namely the index of human capital. And for the full economic development of the country, not only human income but also the standard of living as a whole must be taken into account.

Lifelong learning helps people to master the mechanisms of real impact on improving the quality of life, strengthens awareness and perception of people as personal problems that affect their health and quality of life. It becomes clear that it is necessary to rethink all educational activities, no levels and forms of which, including higher education, can no longer be considered truly final. Therefore, the significant changes required by the education sector must go in the direction of their formation as a continuing education for all or lifelong learning.

Consequently, the reorientation of the economy to human development should become a crucial feature of the future socio-economic development.

5. INNOVATION FRAMEWORK FOR THE REGIONAL INNOVATION DEVELOPMENT IN UKRAINE

Iermakova Olga

5.1 Current challenges for innovative development of regions of Ukraine

The main task of modern economic policy of Ukraine is to redirect from a resource-oriented economy, which provides advantages in the short term, to an innovation economy, which is the key to the country's development in the long term. The reform of the decentralization of power that is taking place in Ukraine makes it necessary to study the processes of ensuring innovation development at the regional level. As world experience shows, the regions contain a significant potential for innovation development, and the task of scientific research in this area is to identify leverage to use this potential, considering the paradigm shifts in the global economy.

The challenges of innovation development are systematized according to the groups of institutes of a regional innovation system considering their functions, in particular, state regulatory institutions in the field of innovation, institutions that generate and consume innovations, market infrastructure institutions, and institutions of human resourcing in the innovation field.

Based on the study of world experience and the realities of the national economy, the following key challenges for innovation policy can be identified:

I. Challenges of innovation development for the group of institutions of state regulation:

1) glocalization: it is a dialectical combination of global and local dimensions of a particular phenomenon¹. In the innovation sphere, glocalization is manifested through the integration of regional innovation systems into the global networks through numerous communication channels. The glocalization of the innovation sphere of a region could be expressed through three key components:

– local – a unique socio-ecological and economic environment of the region. The formation of a favorable innovation environment is one of the main

¹Islankina E. A., Fiyaksel E. A. (2015). Glokalizaciya innovacij: rol klasterov i mezhdunarodnogo konteksta v regionalnom razvitii [Glocalization of innovation: the role of clusters and the international context in regional development]. Innovatsii – Innovations, 11, 64-74 [in Russian].

tasks of regional innovation policy. After all, local authorities will not be able to create an innovation-oriented regional economy on their own, but they can create conditions conducive to its growth, they can contribute to the formation of prerequisites for the establishment of partnerships, the removal of institutional and cultural barriers that impede the innovation activity of key players: entrepreneurs, universities and research centers, investors and venture intermediaries¹;

- global – the integration of regional socio-economic systems, including the regional innovation system, into global networks, thus providing innovative activity with relevant resources (financial, human, technical, informational) from both local and global sources, by facilitating access to them and creating opportunities for their usage. The limitation of the formation of an innovative environment in a certain territory leads with the lapse of time to the "trap" of local communication, when all its reserves are exhausted and there is no further development of channels of communication and diffusion of innovations. This restriction can be overcome through the usage of information exchange through global channels, through which tacit knowledge extends from local players to external counterparties and vice versa, going far beyond the territory of the region;

- institutional – to consolidate the norms and customs of global-local interactions in the form of laws, organizations, institutions in order to complement the combination of global, national and local interests. Simple integration of regional players into global networks is not a guarantee of obtaining the region necessary resources for its development. Regional institutions that contribute to establishing strategic links with global networks, considering the interests of the region and its inhabitants, play an important role in this context.

2) «smart» innovation-based economic growth: one of the important directions of implementing the Association Agreement with the European Union, as well as economic integration with the EU common market and ensuring involvement in global value chains is the implementation of the idea of smart specialization in Ukraine. Based on the need to join the strategies of smart specializations of the European Union, Ukraine has been actively working since

¹ Bogdan N.I. (2006). Problemy regionalnoj innovacionnoj politiki: opyt evropejskih stran i specifika Belarusi [Problems of regional innovation policy: the experience of European countries and the specifics of Belarus]. Belarusskij ekonomicheskij zhurnal – Belarusian Economic Journal, 1, 57-58 [in Russian].

2016 to develop an agreed position with the EU. Today the concept of smart specialization in practice is considered by the Ministry for Development of Economy, Trade and Agriculture of Ukraine in the formation of the principles of the new industrial policy, in particular, in the draft Strategy for the development of the industrial complex of Ukraine for the period till 2025. The fundamental difference in the application of the concept of smart specialization in the Ukraine from the European approach is the prioritization of sectoral development rather than functional. In the EU, the concept of smart specialization is used as an innovative system of smart decisions aimed at providing structural changes in the regional economy, forming and developing the regional ability to operate effectively in the most important world markets. The European essence of smart-specialization includes the development not only in industry, but a wide range of sectors of regional economy that are prosperous for innovations. Innovative development priorities in the region should not be focused to support the specific industries (even advanced ones), but to develop any innovations for the most promising industries of regional economy and allow the regional economy to adapt to unpredictable market fluctuations in future. The priorities should be identified as functional development issues rather than sector ones due to the strategy aspects. Therefore, if the sector development priorities were identified «manually», there is a risk of mechanical determination of basic industries in the region, and preserve the outdated economic structure of the regions of Ukraine¹. Moreover, shifting the emphasis from supporting industries to supporting innovations for promising industries is an effective mechanism for countering the oligarchic model of the economy, since oligarchic structures are usually not interested in introducing innovations.

3) competition based on innovative advantages: the concept of comparative advantage is derived from the economic theory of international trade, and provides that the state or region should specialize in those sectors of the economy where the territory has the appropriate resources for development (labor, materials, energy, taxes, infrastructure, etc.), and which provide a price advantage in the production of goods using them. Such regional policy considered mainly proposal. Economic history shows that competitive advantages based on «first nature»² are not permanent and unchanged, and if in

¹Snegovaya E. (2018). Smart-specializaciya i stupid-realizaciya [Smart specialization and stupid implementation]. Zn.ua, 1191 [in Ukrainian].

² Krugman P. (1999). The Role of Geography in Development. International Regional Science Review, 22, 2, 142-161 [in English].

the early industrial era the competitive position of a region was determined by natural resources and geographical position, then in post-industrial, knowledge-based economy era, competitiveness is determined by human capital and innovations. Innovativeness of development strategies also allows avoiding tough competition in the «win / lose» scenario. One of the modern theories of this direction is the «Blue Ocean» strategy, authored by Chan Kim and Renee Mauborgne¹. The essence of this strategy is that it is possible to avoid competition by creating «blue oceans» – markets without competition. Creating such a market requires a unique product. The main postulate of this concept is «in order to win the competition, one must not enter it at all». The markets, where its participants trying to outperform their competitors, compete viciously for the demand, are called «red oceans». «Blue oceans», in return, provides a competition-free space with unoccupied market niches, which, of course, requires an innovative approach.

Determination the competitive advantages of regional economies, such as low logistics costs and developed logistics infrastructure, favorable geographical location and access to the Black Sea, the availability of production sites, high mineral resource potential, the free trade agreement with the EU and other countries, and so on, indicates a further desire of the government to exploit the “first nature” competitive advantages of the industrial era, which will strengthen the further preservation of the economic structure of the regional economy, which is inadequate to the requirements of the time.

4) ecologization of the innovation development: the deepening environmental crisis has led to the penetration of the ecological component into all spheres of human activity, including innovation.

5) decentralization: the reform of decentralization of power in Ukraine and the process of voluntary integration of territorial communities have launched processes that have made it urgent to implement mechanisms for economic growth of integrated territorial communities, including in the field of innovation development.

II. Challenges of innovation development for the group of institutions that generate and consume innovations:

6) non-linear model of innovation development: the basis of the model for stimulating the supply of innovations is assigned by J. Schumpeter in the 20s of

¹ Kim W. Ch., & Mauborgne R. (2015). Blue Ocean Strategy, Expanded Edition: How to Create Uncontested Market Space and Make the Competition Irrelevant. Harvard Business School Publishing [in English].

the last century. This model is based on innovation as a linear process: fundamental scientific research – applied research – commercialization. However, many researchers believe that the linear model of innovation is incorrect, since it does not explain the appearance of new products and services expected by the market without significant research. In the mid-60s of the last century the United States Department of Defense released the results of a study that stated that only 0,3% of developments were the result of theoretical research. The policy of innovation supply incentives carries a number of risks, in particular: a substantial time lag between the provision of government support and economic effect; low returns on measures of state support – only a small number of companies that have received particular support will be able to offer the market an innovative product or service; a small percentage of the economy is covered by such policy.

The implementation of the policy of innovation demand incentives marks a transition from a linear model of innovation development focused on R&D to a broader understanding of the innovation product value chain. The model for stimulating demand for innovation combines the development of innovation with increasing the efficiency of public spendings in priority areas. The risks of this model are the following: the traditional focus on purchasing goods at the lowest price, as well as a high level of fragmentation of public demand can limit the scale of innovative purchases; public procurement can create non-market barriers to the import of innovative products; industry regulation has long-term consequences and should be based on a concrete strategy; standardization is difficult to use as a public policy tool, since the right to determine industrial standards usually belongs to self-governing professional organizations and associations, moreover, many standards are international.

7) neo-industrialization, which is based on the production of products based on innovative, information technologies and computer-integrated systems. For Ukraine the question of choosing the further path of development of the industrial complex is particularly acute, due to its critical situation. Now there is an active de-industrialization of the country. According to the indicators of the most developed countries and due to the estimations, provided by the Ukrainian League of Industrialists and Entrepreneurs, the output of the industrial complex of Ukraine should approach 1,0 trillion USD. These numbers seem unreal. It is almost impossible to achieve them using traditional methods of simple market self-organization, because this requires not just the creation of at least additional

5 million new high-efficiency jobs, but a fundamentally new technological and production complexity of the industry based on new, specially selected for specific conditions of Ukraine, innovations that integrate domestic production and sales systems into global technology chains, providing an increase in the intellectual, innovative component in the value-added chains due to technologies of 5-6 technological modes.

The development of industry requires not only a deep production and technological, structural transformation of industrial enterprises. This cannot be achieved without changing the positioning of industry in the country's life, changing the state's approach to its functioning and development. Advanced development of industry should become a priority for all state bodies and structures of Ukraine and for business and civil society¹.

III. challenges of innovation development for the group of market infrastructure institutions:

8) quadruple innovation helix model that includes social capital: the triple helix model, that has developed, provides a sustainable development of parallel links between national and regional authorities, the business community and science. The quadruple helix model includes social capital – an important system-forming element that contributes to the transformation of circulating into innovation. In order to effectively use the resource of social capital in the interests of innovation development of the region, it is necessary to include in the toolkit of regional strategies the appropriate mechanisms for its accumulation, in particular crowdsourcing and crowdfunding. The potential of social networks can become a catalyst and accelerator of dynamic innovation processes in the region.

9) impact investments and social innovations: impact investments (transformative investments) have become a global trend and are investments aimed not only at making a profit, but also at social change. This is not a classic charity – an investment project should first of all be clearly measurable, based on the principles of payback and classic investment. However, this approach allows a socially responsible business to combine entrepreneurship with the expression of its values in practice. Gradually, impact investment moves from the category of a side function of the company to its key components. Impact investments introduced a number of new concepts and tools, such as social

¹ Novickij, V.S. (Ed.) (2018). Nova industrializaciya – realnij shans dlya Ukrayini [New industrialization – is a real chance for Ukraine]. Kyiv: Antikrizova rada gromadskih organizacij Ukrayini [in Ukrainian].

bonds and measurable indicators of social impact, on the basis of which companies are rated. The capacity of the market for impact investments is not very big today, even on a global scale, and it is still more modest in Ukraine. Ukrainian investors have two options. One can collaborate with the Swiss impact investment funds and select ready-made instruments from its portfolio. But the object of such investments is likely to be a social enterprise abroad, such as a school for children from low-income families on the outskirts of Santiago. The second option is the development of social projects in Ukraine, on the territory of the functioning of the enterprise-investor. Examples of the second option in the Odesa region are the Green Theater, Impact Hub Odesa, and 4City¹.

IV. Challenges of innovation development for the group of institutions of human resourcing:

10) mobility of human resources, new competencies: globalization, integration of countries' economies have led to increased mobility of human resources. Along with unconditional advantages of it, such as diffusion of innovations, obtaining new knowledge and experience, there are serious risks, in particular, brain drain. National governments should implement tools to minimize risks, in particular to encourage young professionals to work at homeland, develop state programs that provide practical solutions to housing issues, salary levels, growth prospects, etc.

The challenge for the education system is the need to develop competencies that are necessary in the knowledge economy, such as complex problem solving, critical thinking, creativity, human resource management, coordinating with others, emotional intelligence, judgment and decision making, service orientation, negotiation skills and cognitive flexibility².

The determined above challenges prove the necessity to formulate a regional innovation policy based on the following principles: systematicity, multi-level governance, sustainable development, effectiveness, dialectics of global and local dimensions, priority of national interests, cross-sector cooperation and partisipativity, cooperation and development of prolonged

¹ Grebennikov Ye. (2017). Dilemi “Pributok VS suspilne blago bilshe” ne isnuye [Dilemmas “Profit VS public good” no longer exists]. Annual Report of Impact Hub Odessa, 1 [in Russian].

² World Economic Forum (2016). 10 skills you need to thrive tomorrow – and the universities that will help you get them. Retrieved from https://www.weforum.org/agenda/2016/08/10-skills-you-need-to-thrive-tomorrow-and-the-universities-that-will-help-you-get-them/?utm_content=buffer51265&utm_medium=social&utm_source=facebook.com&utm_campaign=buffer [in English].

value chains by all participants of innovation development, authenticity and uniqueness, resource availability. The implementation of these principles will help to increase the adaptability of regional innovation systems to the constant changes caused by innovation development that is one of the main tasks of regional innovation policy.

5.2 Transformation of regional policy in Ukraine in terms of innovation-based economy

On the one hand, the innovation system of Ukraine has such important competitive advantage as the high general level of education, the strong scientific base that is inherited from the Soviet Union. On the other hand, the innovation system of Ukraine has a number of problems. Among them – the lack of effective interactions between science and businesses, unfavorable framework conditions for innovation and poor infrastructure. While the solving of the problem of improving the framework conditions is the national level task, the establishment of interaction among participants of the innovation process and the development of innovation infrastructure are the tasks that require the active role of regions.

Statistics indicates a gradual degradation of innovative potential in Ukraine: the number of researchers is rapidly declining, the low science share in the gross domestic product, the negative dynamics of the number of enterprises engaged in innovation, insignificant investments in intangible assets and the prevalence of acquisitions of foreign machinery and equipment, the low share of sold innovative products in the volume of sold industrial products¹.

The key indicators of effectiveness of innovation policy in Ukraine in comparison with the countries-leaders of innovation development in 2019 are presented in Table 5.1.

As it can be seen from the Table 5.1, the leader by the Global Innovation Index in 2019 is Switzerland, Ukraine occupies in this ranking 47th place. The global leader of innovation development – Switzerland – spends on science 3,4% of its (!) GDP, Japan – 3,2%, Germany – 3,0 %, the USA – 2,8%, Ukraine – only 0,4%. The entry of Ukraine into the top 50 of the most innovative

¹ Сайт Derzhavnoho komitetu statystyky Ukrainy [Site of the Sovereign Committee on Statistics of Ukraine]. www.ukrstat.gov.ua. Retrieved from www.ukrstat.gov.ua [in Ukrainian].

economies in the world is due to the high coefficient of innovative efficiency – the ratio of the result to resources in the field of innovations, according to which Ukraine occupied 5th place in the world in 2018 (in 2019 this indicator was not calculated). This is a Ukrainian phenomenon and evidence that even in conditions of degradation of innovative potential, low resource support, innovation activity in Ukraine is extremely effective and produces world-class innovation developments.

Table 5.1. Global innovation index in Ukraine and in countries-leaders of innovation in 2019¹

Countries	Global Innovation Index (among 129 countries)	Output rank	Input rank	Gross expenditure on R&D, % GDP
Ukraine	47	36	82	0.4
Switzerland	1	1	2	3.4
USA	3	6	3	2.8
Germany	9	9	12	3.0
Japan	15	17	14	3.2
China	14	5	26	2.1

The analysis of innovation policy in Ukraine revealed a number of key features. First of all, it should be noted that the majority of scientific research are provided by public research institutions. As shown in the Table 5.2, Ukraine is far behind the leaders of innovation by business expenditures on research. For example, in Japan this index is 78,3 %, while in Ukraine – 30,1%.

Transnational corporations (TNCs), that, as a rule, has strong research centers, supported by significant financial resources, are the powerful catalysts for innovative development of industrialized countries. The role of the TNCs in the innovation sector is particularly noticeable in the newly industrialized countries of the South East Asia. However, in Ukraine the TNCs don't influence innovation processes significantly. The key feature of TNCs in Ukraine is that their Ukrainian branches provide usually one of the least innovative parts of the production chain – assembling. Thus, the important effect of innovation on the overall economic progress – their diffusion (Schumpeter J.)² – stays away from

¹ Dutta S., Lanvin B., & Wunsch-Vincent S. (eds.) (2019) The Global Innovation Index 2019 : Creating Healthy Lives – The Future of Medical Innovation. Retrieved from <https://www.globalinnovationindex.org/gii-2019-report> [in English].

² Courvisanos J. Mackenzie S. (2014) Innovation economics and the role of the innovative entrepreneur in economic theory. Journal of Innovation Economics & Management, 14, 41-61 [in English].

the economy of Ukraine.

Table 5.2. Indicators of interaction between education, research and production in the innovation process in Ukraine and countries-leaders of innovation in 2019¹

Countries	Gross expenditure in R&D financed by business, %	University/industry research collaboration, rank	State of cluster development, rank
Ukraine	30.1	64	98
Switzerland	63.5	3	3
USA	63.6	1	1
Germany	65.2	6	2
Japan	78.3	18	7
China	76.5	27	28

The situation of inefficient innovation system enhanced by the poor collaboration among science, education and business in the innovation process. It is proved by the low index of cooperation between universities and industry in Ukraine. An important condition for establishing links between all participants of the innovation process in the country is the cluster development. Ukraine has only started to develop and implement the principles of the cluster approach. Ukraine lags far behind by this indicator, due to its cluster effectiveness coefficient Ukraine occupies the 98th place. The major obstacles of unsatisfied links between science and industry in innovation sector of Ukraine are the following:

- low domestic demand for innovation, even commercially profitable, that is caused by undeveloped innovation products markets and relatively low innovation activity of the business sector;
- mismatch of supply and demand for innovation indicates a poor interactions between producers of knowledge (research institutes, universities) and its consumers (producers, entrepreneurs).

Analysis of framework conditions for the implementation of innovation policy in Ukraine revealed that the vast legislation basis and regulations in the innovation sector don't encourage innovation sector, and innovations didn't become a priority for the majority of Ukrainian enterprises. For Ukraine with the powerful innovation potential these trends are abnormal. What is the reason for ineffective innovation potential usage in Ukraine?

The president of the Center of Economic Reforms, Doctor of Economics V.Lanovoy in his research sees the answer to this question in the oligarchic

structure of the Ukrainian economy, and we agree with him at this point. In the Ukrainian realities, unlike Western countries, oligarchic economic structures are built as multi-sectors and multi-levels corporations with a limited number of major owners (usually less than 10 people). In fact, oligarchs are actors of the financial business, they aren't entrepreneurs. Their goal – is not to develop and exceed competitors, but only to benefit financially. With access to the political lobbyist instruments of obtaining economic profit oligarchs do not set themselves the task of finding and implementing innovative solutions. In contrast to the oligarchic structures small, medium businesses, large corporations and national mono-sector local affiliates of TNCs provide therapeutic effect on the economy, on its structure and financial position, do not require active government regulatory actions to prevent any negative consequences of their operation. These types of businesses are focused on market competition, innovation, financial responsibility for performance, horizontal cooperation with partners, intense national development. However, SMEs are in the most difficult situation in Ukraine¹.

Key notes about the national innovation system of Ukraine are the following:

1) Institutions of state regulation in the field of innovations:

– Innovation Regulatory Institutions. Analysis of the framework conditions for implementing innovation policy in Ukraine has revealed that the gap between normative and real innovation policy is a serious problem of the innovation process in Ukraine: despite numerous measures to stimulate scientific and technological development and innovation, strategic, program, legislative documents, the actual effectiveness of their implementation remains low.

– Financial stimulation of innovation: state funding for innovation activity in Ukraine tends to decrease. The share of budget funding for research and development is approximately 0.4% of the country's GDP. Modern systems of financial support for innovative development of industry in the country are practically inactive, regional budgets are unable to provide tangible innovative support to innovative projects.

– Institutions of non-financial stimulation of innovations: Verkhovna Rada of Ukraine has defined «Development of innovative culture of society» as one of

¹ Lanovyi V. (2012). Perezavantazhyty ekonomiku [Restart the economy]. Ukrainskyi tyzhden – Ukrainian week, 50 (267), 16-19 [in Ukrainian].

strategic priorities of innovative activity of Ukraine. At the same time, despite this legal recognition, a common understanding of the innovation process and the importance of innovation among politicians, businessmen and population is still insufficient.

2) Institutions of generation and consumption of innovations: Ukraine is characterized by the fact that the majority of R&D is performed in state scientific institutions. The number of industrial enterprises engaged in innovation and the share of innovative products produced by them is extremely small. There is a significant rise in the development of Ukrainian startups during last years.

3) Institutions for market infrastructure in the field of innovations: the process of creating market infrastructure for innovation in Ukraine is not systematic.

4) Institutions of human resourcing in the field of innovations: there is a reduction in the number of scientific staff.

The key to overcoming the existing problems in the innovation field of Ukraine is the orientation of the innovation policy towards building an effective national innovation system, that is, building cooperation among the main participants of innovation process. The traditional notion of innovation as a linear process (science – technology – commercial product) must be replaced by an understanding of innovation as a result of the simultaneous interaction of a large number of participants combined in a complex system.

5.3 System approach to the determination of innovation development priorities

In practice, the regional policy of the Soviet era was based on the «levelling-off» principle in order to overcome the economic lag of certain regions. At first glance, this approach contributed to socio-economic development of depressed regions, but in comparison to the more developed regions the lag maintained or even increased. Moreover, this approach led to the passivity, lack of initiative, rooting of passive behaviour of depressed regions that were not looking for their own development paths and hoped only on support from the center. Much of this attitude remained in the region of the

independent Ukraine. However, international experience shows^{1,2} that regions in order to be competitive in today's environment should be active in usage of their endogenous development potential. In this context, the development of regional innovation systems will become a prerequisite for improving the competitiveness of Ukrainian regions in the conditions of the innovation-based economy.

Due to the European concept of smart specialization, that was mentioned above, priorities of innovation development should be determined as functional areas, rather than sectoral ones. Determining priorities for innovative development based on the regional innovation system best meets the modern requirements of smart specialization. Inherently, the regional innovation system is an institutional basis for the innovative development of the region.

Institutions of the regional innovation system according to their functions in the system can be classified into four groups (Fig. 5.1): institutions of state regulation in the field of innovations (regulatory institutions, institutions for financial incentives of innovations, institutions of non-financial stimulation of innovations); institutions of generation and consumption of innovations (subjects of demand and supply of innovations); institutions of market infrastructure of innovations (financial institutions, industrial-technological and information institutions, the market of innovations); institutions of human and social capital, that represent links between all elements of the innovation system.

Social capital is a resource embodied in interpersonal relationships based on trust and cooperation between individuals, which enhances the innovative capacity of actors of innovation through synergy and collective learning³. The significance of social capital for the economic development of the country and its regions is to obtain an economic return from social relations in a society united by a national idea and common goals, capable of various forms of development-oriented self-organization, the domination of spirituality and human dignity, mitigation of social injustice and the trust based interaction of all sectors of society, in particular power, business, science and community. The accumulation of social capital manifests itself in the growth of social interaction in society. A society with a low level of trust, lack of social capital is not

¹ Benneworth P., & Dassen A. (2011). Strengthening Global-Local Connectivity in Regional Innovation Strategies: Implications for Regional Innovation Policy. OECD Publishing [in English].

² Regions and Innovation Policy. (2011). OECD Publishing [in English].

³ Fukuyama F. (2001). Social Capital, Civil Society and Development. Third World Quarterly, 22, 7-20 [in English].

capable of innovation.

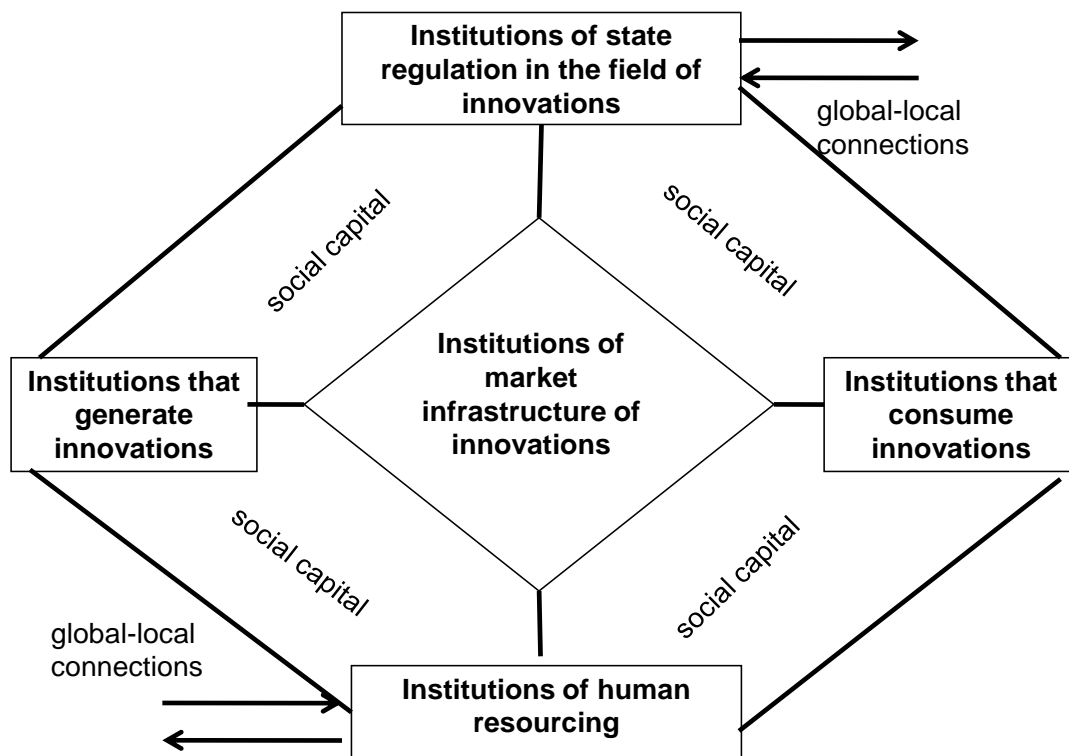


Fig. 5.1. Conceptual rhombus of the national / regional innovation system (author's development)

The approach to innovative development of the region from the perspective of the regional innovation system is a priority, as it provides a systematic process of strategizing, allows to determine the directions and tools of innovative development of the region in the vertical section (local/regional – national – global) and in the horizontal section – among the institutions of the innovation system.

Directions of improvements for the innovation system are presented in Fig. 5.2. The above analysis shows that the most necessary directions for the Ukrainian innovation system are the following:

- Industry development on an innovation basis: the growth of demand for innovations is possible if the industry develops, and Ukraine has preconditions for this. It is also necessary to consider the global trend – neo-industrialization, which is based on the production based on innovative, information technologies and computer-integrated systems.

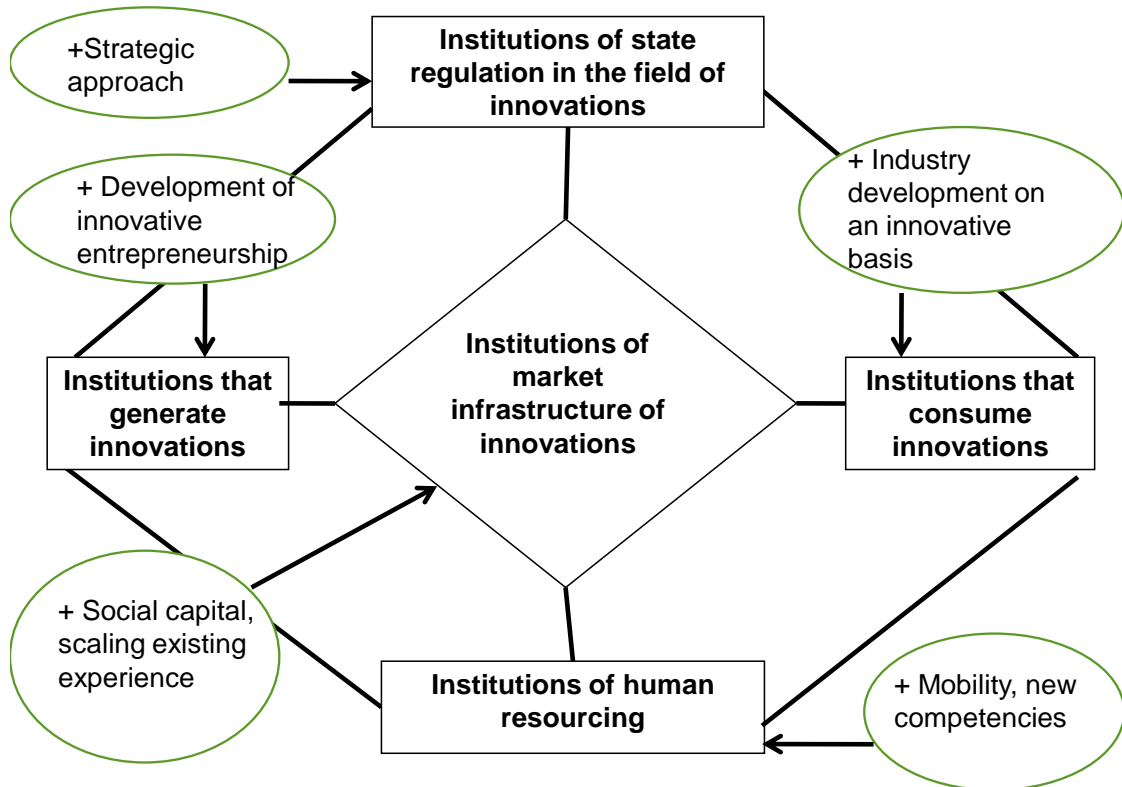


Fig. 5.2. Directions of improvements for the national / regional innovation system (author's development)

The system of goals for reforming and developing Ukrainian industry on an innovative basis should include the following¹:

1) increasing the load level of existing enterprises for comprehensive provision of necessary products and services in the fields of national security, economy, population and exports.

2) increasing the depth of processing of domestic raw materials and raw products into products with higher added value.

3) development of export of domestic high-tech products with high added value and import substitution measures.

4) reconstruction and technical re-equipment, increasing the technological level of the production base of existing enterprises in order to bring their capabilities closer to the world level.

5) modernization, rapid growth of existing and creation of new production facilities with significant scientific and technological potential.

6) systematic development of small and medium-sized businesses.

¹ Novickij, V.S. (Ed.) (2018). Nova industrializaciya – realnij shans dlya Ukrayini [New industrialization – is a real chance for Ukraine]. Kyiv: Antikrizova rada gromadskih organizacij Ukrayini [in Ukrainian].

7) development of Key enabling technologies – KETs, which include a group of six technologies: micro– and nano-electronics, nanotechnology, industrial biotechnology, modern materials, photonics and advanced manufacturing technologies. Such technologies are used in various industries and help solve social problems.

- development of innovation entrepreneurship: innovative companies are powerful generators of innovation and entrepreneurship in general. IT companies need a favorable business environment, in particular protection from raiding, searches, intellectual property protection and so on. These issues require legislative solutions at the national level. The competence of regional authorities is to create a favorable infrastructure for innovative companies.

- involvement of social capital resource into innovation development of the region: the third set of priorities is related to the establishment of interaction among all participants in the regional innovation system – government, business, science, education and society.

- improving the business climate and ensuring high standards of quality of life in the region, which should be attractive for people, including highly qualified specialists, is an essential prerequisite for strengthening the region's global position in the innovation sphere.

- in the strategic aspect, innovation development should be included in the strategy of socio-economic development of regions as a strategic goal, or strategies and programs for innovation development of regions should be developed, which is enshrined in national legislation. The development of innovation strategies in the regions is an important signal for investors, including foreign ones.

Modern economic processes requires a change in the paradigm of national and regional innovation policies, which consists in moving away from the distribution of financial resources and the widespread creation of innovation infrastructure to stimulating activity related to the concentration of human and social capital, the formation of a favorable business climate and institutional environment, the integration of regional innovation systems into global networks.

5.4 Institutional support of the organizational and economic mechanism for environmental management at the regional level

Sokolenko Ludmila

Under the conditions of transformational economic and socio-political changes, the issues of ensuring stable and reliable national security in the country and its components become significantly relevant. The implementation of the conditions and objectives of sustainable development as well as the financial aspects of its support identify the increasing role of the environmental and financial components of national security and the study of methods and tools for their regulation.

In consideration of the environmental management as a symbiosis of ecology and economy, it is possible to achieve sustainable development only if all natural resources are restored, or substituted by artificially created natural capital, at a faster pace than the rate, at which they are used. That is why timely monitoring and regulation by the regional environmental management subjects are crucial elements to achieving the goals and objectives of sustainable development in the country as a whole and its regions in particular.

In these conditions, in the study of regional environmental management, it is necessary to apply a systematic approach, according to which nature management is an integral combination of many elements (subsystems) that are in continuous unity and interconnected with each other.

The functioning of the regional environmental system is based on the interaction between the control and managed subsystems through the implementation of the regulation, control, stimulation, and preventive functions.

The implementation of the regulatory function is focused on providing an environmentally friendly environment for society to live in and for business entities to operate in it.

The main directions regarding the implementation of the regulatory function at the state level include¹:

– to develop, to approve and to identify conditions for the implementation of the state environmental policy;

¹ Postanova Verkhovnoyi Rady Ukrainy «Pro osnovni napryamy derzhavnoyi polityky Ukrainy u haluzi okhorony dovkillya, vykorystannya pryrodnykh resursiv ta zabezpechennya ekolohichnoyi bezpeky» [Resolution of the Verkhovna Rada of Ukraine "On the main directions of state policy of Ukraine in the field of environmental protection, use of natural resources and environmental safety"] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon3.rada.gov.ua/laws/show/188/98-bp> [in Ukrainian].

- to approve local environmental programs;
- to monitor the environment regularly;
- to monitor compliance with environmental laws;
- to develop and to approve standards regarding some components of the environment.

Regulation of environmental management at the regional level provides for:

- development of environmental programs;
- establishment of maximum permissible concentrations of substances, determination of payment standards for environmental pollution and waste disposal;
- organization of the collection, processing, recycling and disposal of waste on its territory;
- development of legal support for environmental policy at the regional level;
- monitoring compliance with environmental laws.

In the implementation of environmental management, the direct and indirect influence methods¹ are used. Their description is given in Table 5.3.

The implementation of the control function by the environmental management system entities involves activities aimed at compliance with legislation in the field of environmental protection by state and regional authorities, business entities and households.

Depending on the entities implementing this function², the following types of control can be distinguished:

- state control, which monitors the compliance with legal requirements in the field of environmental management and environmental protection by state authorities, enterprises, institutions and organizations in Ukraine;
- departmental control – the monitoring, which is carried out by ministries and state committees on compliance with environmental legislation by enterprises, institutions and organizations within their subordinate industry;
- production control, which verifies the compliance with environmental requirements in the workplace by the relevant structural units of the enterprise;
- public control, which provides inspections in the field of environmental management by public associations.

¹ Baldzhi, MD(2010) Organizational and economic principles of complex nature management at the regional level: monograph. Atlant (pp.274-276).Odessa.

² Закон Украйны «Pro okhoronu navkolyshn'oho pryrodnoho seredovyscha» [Law of Ukraine "On Environmental Protection"] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon1.rada.gov.ua/laws/show/1264-12/page3> [in Ukrainian].

Table 5.3. Features of environmental management impact methods
(author's development)

Group	Type	Means and direction	Description
1	2	3	4
Direct impact on the resource users	Administrative	<ul style="list-style-type: none"> • control over compliance with environmental legislation; • provision of licenses to run state business; • coercive methods – setting norms and standards, introducing a system of fines 	The development and adoption of legislative acts, regulating environmental management processes, defining the rights and obligations of the main subjects of the environmental management system are presupposed
Indirect impact on resource users	Budgetary	<ul style="list-style-type: none"> • budgetary and tax incentives; • budget reserves; • budgetary sanctions; • budget planning and forecasting 	It is based on the use of state budget funds; made through various types of appropriations from the state budget
	Optimization of managerial decisions	<ul style="list-style-type: none"> • forecasting, planning; • programming • modelling 	It allows to develop optimal and effective models of environmental and economic development of the territory
	Economic	price policy; determination of marginal values of the profitability of the certain goods and services release; control over the expenses for the services provided, work is done, etc., stabilization of the exchange rate; currency stabilization; stimulation of personal savings; subsidies and other forms of financial support; financing, lending	It is supposed to use various economic tools: prices, tariffs, payments, fines, rewards, economic incentive funds, credit mechanisms.
	Organizational	<ul style="list-style-type: none"> • environmental education; • special education; • incentives for resource-saving production; • price subsidies; • provision of tax benefits 	Organization of functional distribution in management, ensuring technological discipline and control, the introduction of best practices in managerial methods
	Social and psychological	<ul style="list-style-type: none"> • stabilization and environment restoration; • creation of conditions to improve the life of the population; • conservation of natural resource potential 	It provides favourable conditions for the life of the population, reducing morbidity and increasing life expectancy; preservation of the aesthetic value of natural landscapes, protected areas, etc.

In conditions of increasing anthropogenic pressure on the environment, which is accompanied by an increase in the volume of generated waste, harmful substances emissions into the air, water bodies, the implementation of measures to prevent negative environmental impacts, becomes more relevant than the elimination and compensation of economic and environmental damage. The subjects of the regional environmental management system provide preventive function in such a way. In performing this function, economic sanctions are used and their impact on the final results of economic entities is assessed.

The stimulation function is implemented by directing business entities to achieve effective results based on environmental responsibility principles. Moreover, this function is implemented through the use of motivational tools.

The functions of the control subsystem are implemented in the context of its structural elements. These elements include government bodies and local governments, investors, insurance companies, commercial banks, international financial institutions, specialized financial and credit institutions, business entities, and households. The relationships between the control subsystem subjects are caused by the corresponding relationships between the individual management functions and between the individual components of the regional environmental management system regulation. Each structural unit of the control subsystem must ensure the implementation of the corresponding controlling activity through the implementation of certain functions, rights, obligations.

The subjects of the control subsystem affect the managed subsystem through the regulation and monitoring of indicators for reducing the resource intensity of production processes, measures for cleaning, restoring and disposing of waste by implementing environmental measures of the management activity by performing certain functions, rights of duties.

The interaction between the control and managed subsystems is ensured by the regional nature management subsystems that we have identified:

- the subsystem of regulatory information support;
- economic (production) subsystem;
- natural subsystem;
- financial subsystem.

The regulatory and information support subsystem is represented by a set of

regulatory legal acts, including the Constitution of Ukraine¹, the Law of Ukraine «On Environmental Protection»², decrees and orders of the Cabinet of Ministers of Ukraine, departmental normative acts in the form of orders, directives, provisions, instructions. In general, they determine the areas of activity, rights and obligations of the subjects of the regional environmental management system. The Air³, Land⁴ and Forest Codes⁵, the Law of Ukraine «On the Flora»⁶, «On the Fauna»⁷, the Subsoil Code of Ukraine⁸ define the features of the state and regional regulation of relations in the field of rational use and protection regarding the individual objects of the regional environmental management system.

The production subsystem is implemented through the implementation of the economic (production and economic) activities by the control subsystem entities. Although most of the production processes at the enterprises are related to the processing, the use of natural resources and waste generation, it is important to study the essence of the natural subsystem and its relationship with other components of the regional environmental management system.

The natural subsystem functioning is ensured by natural conditions and natural resources (water, land, air and forest). The natural subsystem identifies the nature of the economic structure in the region, its specialization, the features of the productive forces distribution, the technological peculiarities of the production process, and the agriculture specialization.

Natural resources include land, forest, water, fuel and energy, mineral and raw materials. The volume, structure and quality of natural resources significantly affect the level of the regional economic potential capacity. Natural conditions include climate, soil, terrain, nature of soils, etc.

¹ Konstytutsiya Ukrainy [Constitution of Ukraine] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon.rada.gov.ua/go/254к/96-бп> [in Ukrainian].

² Zakon Ukrainy «Pro okhoronu navkolyshn'oho pryrodnoho seredovyscha» [Law of Ukraine "On Environmental Protection"] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon1.rada.gov.ua/laws/show/1264-12/page3> [in Ukrainian].

³ Povitryanny kodeks Ukrainy [Air Code of Ukraine] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon3.rada.gov.ua/laws/show/3393-17> [in Ukrainian].

⁴ Zemel'nyy kodeks Ukrainy [Land Code of Ukraine] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=2768-14&p=1316592302508964> [in Ukrainian].

⁵ Lisovyy kodeks Ukrainy [Forest Code of Ukraine] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=3852-12&p=1316592302508964> [in Ukrainian].

⁶ Zakon Ukrainy «Pro roslynnyy svit» [Law of Ukraine "On Flora"] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon0.rada.gov.ua/laws/show/591-14> [in Ukrainian].

⁷ Zakon Ukrainy «Pro tvarynnyy svit» [Law of Ukraine "On Fauna"] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon4.rada.gov.ua/laws/show/2894-14> [in Ukrainian].

⁸ Kodeks Ukrainy «Pro nadra» [Code of Ukraine "On subsoil"] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon0.rada.gov.ua/laws/show/132/94-бп> [in Ukrainian].

The financial subsystem of the regional environmental management system is focused on the financial support for the functioning and interaction of all elements in the regional environmental management system. Funds of the control subsystem subjects are the main financial resources aimed at environmentally friendly measures.

The Law of Ukraine «On Environmental Protection»¹ determines that environmental protection activities are financed at the expense of the State budget of Ukraine, local budgets, funds of enterprises, institutions and organizations, environmental protection funds, voluntary contributions etc. (Fig. 5.3).

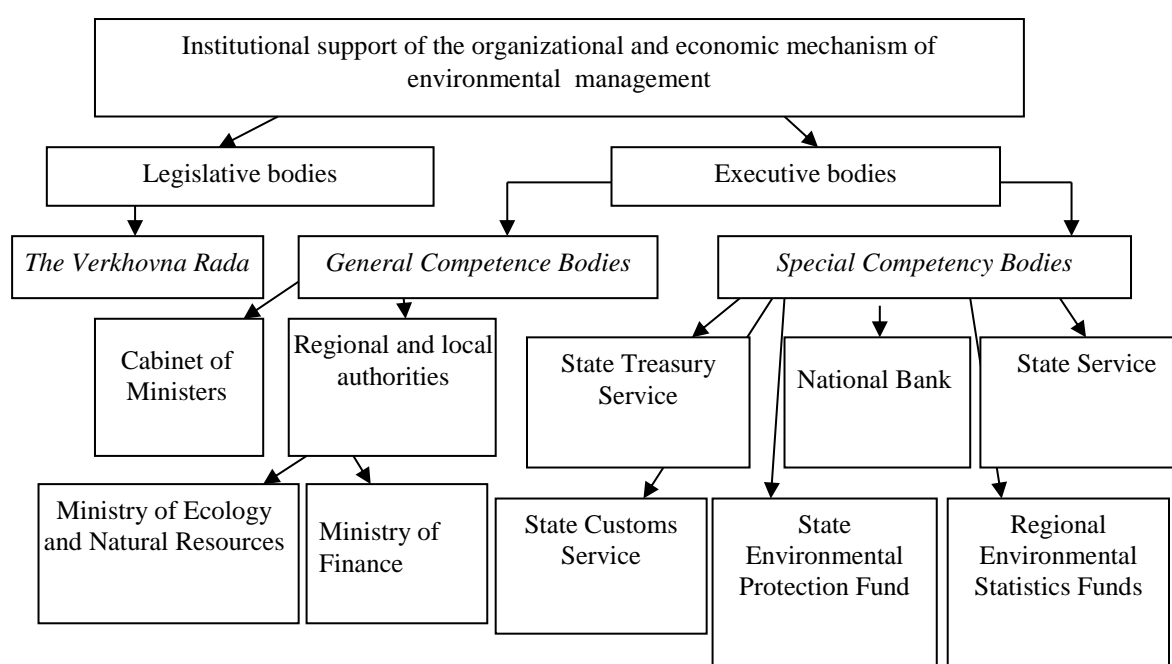


Fig. 5.3. Institutional support of the organizational and economic mechanism for environmental management in the region
(author's development)

Since the vast majority of environmental (nature) management activities are implemented at the state level, the organizational and economic mechanism to regulate the financial and environmental security of a region is a complex functional system. It combines interconnected and interdependent components, the effective functioning and interaction of which contribute to the implementation of the environmental goals and objectives of the region and

¹ Закон України «Про охорону навколишнього природного середовища» [Law of Ukraine "On Environmental Protection"] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon1.rada.gov.ua/laws/show/1264-12/page3> [in Ukrainian].

finally, ensure the environmentally friendly regional development.

The subject component of the organizational and economic management mechanism is represented by legislative and executive bodies (institutional support of the mechanism). The managerial actions are implemented on the basis of the strategic coordination principle through the fulfilment of the support and regulation functions.

The main purpose of the support function is to prevent environmental violations, protect human rights to environmentally safe life and other environmental rights. It is achieved through the implementation of legally significant actions.

The regulatory function is aimed at setting relations, ensuring compliance with priorities, norms, standards, limits and other requirements in the field of environmental safety through the formation of legal norms and rules¹.

Effective interaction of all subjects in the control subsystem of regional environmental management between each other should be oriented to achieve the following results:

1. Creation of the favourable environment to implement economic (entrepreneurial) activities based on the principles of sustainable development:

The following measures ensure the implementation of this goal:

- a) to improve regulatory support;
- b) to develop mechanisms of stimulating business entities to implement environmentally friendly activities;
- c) to promote the environmental entrepreneurship ideas, to stimulate and support initiatives for the raw materials reuse, waste processing, the non-waste production etc.

2. Formation of a mechanism to ensure effective financial support from the state:

- a) to provide timely and sufficient financial and credit and investment support;
- b) to improve the tax system;
- c) to strengthen information and resource support;
- d) to activate investment and innovation activity;
- e) to implement national and regional programs to support and develop

¹ Sokolenko, L.F. (2015). Organizational and economic principles of environmental safety management in the system of regional nature management.(Dissertation of the degree of candidate of sciences). Sumy State University, Sumy.

regional environmental management in conditions of ensuring a high level of environmental safety.

The state authorities and local self-government bodies regulate and ensure environmental safety management through the use of tools, which, in our opinion, are more appropriate to divide into regulatory and stimulating.

The most common instruments in the international practice to regulate the environmental management process include taxes and obligatory payments, which, along with the accumulation of funds, allow state authorities to influence business entities by establishing various benefits, changing tax rates for environmentally friendly activities, etc.

In Ukraine, the Tax Code regulates the environmental taxation of business entities. According to it, the following elements in the state regulation mechanism of environmental management are distinguished:

- environmental tax levied on actual emissions into the air, discharges of pollutants into water bodies and waste disposal;
- fees for the special use of natural resources;
- compensation for losses caused by the violation of environmental legislation¹

Recently, in addition to environmental taxes, penalties become popular as the most effective enforcement measures on business entities.

Fines are usually levied for excessive emissions, i.e. those that exceed standard norms. Penalties are determined by the tax rate system. For industrial enterprises, there are tariffs to pay for the water that they consume, in proportion to the amount of its intake from natural sources or water supply systems and the volume of effluents. The tariff increases with growing pollution of effluents with various harmful substances.

All the above tools (as components of the state regulation mechanism) allow forcing business entities that harmfully affect the environment, to make changes to production technologies, upgrade equipment, and use resource-saving technologies.

Incentive instruments include concessional lending, taxation, subsidies and donations.

Preferential taxation instruments are the main levers to stimulate business entities to carry out environmentally friendly activities, and, accordingly, to

¹ Podatkovyy kodeks Ukrainy [Tax Code of Ukraine] (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon3.rada.gov.ua/laws/show/2755-17> [in Ukrainian].

implement environmental safety. The main areas of tax incentives include tax incentives for VAT and income tax in the production of environmental goods, for enterprises producing environmentally friendly products; tax concessions for income tax on environmental investments.

Concessional lending, which is one of the supporting instruments, has a significant impact on the behavior of business entities. The Law of Ukraine «On Innovation Activities»¹ provides for the following types of financial support for innovative activity:

- a) full interest-free lending of priority innovative projects (on terms of inflation indexation) at the expense of the State budget of Ukraine and local budgets;

- b) partial (up to 50%) interest-free lending of innovative projects (based on the inflation indexation) at the expense of the State budget of Ukraine and local budgets, provided that the remaining necessary funds of the project executor and (or) other subjects of innovative activity are attracted to the project financing;

- c) full or partial compensation of interest (at the expense of the State budget of Ukraine and local budgets) paid by innovation entities to commercial banks and other financial and credit institutions for the lending of innovative projects;

- d) the provision of state guarantees to commercial banks lending to priority innovative projects.

The use of concessional lending enables to provide financial support to business entities that introduce resource-saving technologies, implement environmental measures, and direct efforts towards the development of environmentally friendly technologies aimed at environmental protection measures.

Today the implementation of managerial actions and activities through the use of regulatory tools and incentives from the subjects of the organizational and economic management mechanism is a key element of environmental regulation in the region. Its proximity to the other countries' policies is the main indicator of the country's competitiveness in the world.

¹ Закон України «Про інноваційну діяльність» [The Law of Ukraine «On the innovative activity»]. (n.d.). zakon.rada.gov.ua. Retrieved from <http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=40-15> [in Ukrainian].

6. IMPACT OF FLEXIBILITY ON ORGANIZATIONAL INNOVATION AND MANAGEMENT

Kitzmann Harald

6.1 Organizational innovation

In the modern production world a company has to manage its production swiftly and in a very effective and efficient way. Products have to be made in time and made according to customers' requirements, which change very quickly. Due to growing globalization, fast development of information and communication technologies, shortened product life-cycles, increasing the speed of changing client demands and market process, manufacturing companies find themselves in very competitive and dynamic surroundings. This permanent changing of environment, framework requirement and system conditions require to measure and manage all components of a production system taking into consideration that needed changes should be done fast and with the minimal efforts. Main key factor to match these requirements is continuous adapting of the production, which is discussed in present time in the context on Industry 4.0, internet of things, digitalisation etc. To ensure the viability and the sustainable development of the companies, new ideas, new products, new methods, new services, new processes, new technology, or new normative and strategic approaches need to be implemented – as organisational innovations – in the companies' business practices, workplace organisation or external relations (OECD, 2005). This redesign of the business system request in general sustained long-term effort for innovation (Malik, 2013)¹ with establishing of «innovation capabilities of an organization to understand and respond to changing conditions of its context, to pursue new opportunities and to leverage the knowledge and creativity of people within the organization in collaboration with external interested parties» (ISO, 2020)². Usually this challenge is considered mainly from the engineering point of view, preferring to operate deterministic models to identify cause-and-effect relationships between dependent and independent variables. In modern conditions of functioning of the companies these

¹ Malik, F. (2013). Strategie: Navigieren in der Komplexität der neuer Welt. Frankfurt am Main: Campus Verlag.

² ISO. (2020). ISO 56000:2020 – Innovation management — Fundamentals and vocabulary. International Organization for Standardization.

approaches have limited application therefore it is necessary to pass on system-oriented thinking and the actions based on the principles of self-organization, the theory of complex systems, the theory of chaos, etc. In the last 50 years, since its invention by L. Bertalanffy, the systems theory has continuously developed and focused more attention on business science. The latest developments could be mentioned as the complexity, chaos, catastrophe theory and theory of self-organising systems. In particular, the theory of self-organising systems found high acceptance in different sciences (Fuchs, 2003)¹. The main principle of self-organisation is that a dynamic system always tends to evolve towards a state of equilibrium without influence from outside; in the understanding of feedback systems it called as negative feedback manners or homeostasis (Stacey, 1992)². According Ludwig von Bertalanffy identified in open systems beside the equilibrium a steady state and reasoned it in the demand of open system in impulse/energy from outside to stabilise the system (Bertalanffy, 1969)³; these steady states are equifinal, because their state can be reached by many potential means (ibid p. 159). This understanding of homeostasis and steady state are suitable for explaining the operational management activities in companies but have their limitation in describing the strategical activities of changing. On the other side the positive feedback describes the disordering as explosive unstable equilibrium, which this imbalance – as the moving of the system from one state to another (Ashby, 1957)⁴ – and is the important driver for changes. Positive feedback loops increase the value of the parameters on the development from initial point up to the target point, which takes place in a sequence of active behaviour of the control unit management and could end in a chaotic state and bifurcation (Guastello, 2002)⁵. This ambivalence of need for improvement and ending in a chaos (Vester, 2002)⁶ is the challenge for the management especially in interaction between strategical and operational management. Beside these two states exists a third state, the bounded instability (Stacey, 1992)⁷ which is the mixture between stability and imbalance. This state in case are far enough away

¹ Fuchs, C. (2003). Structuration Theory and self-organisation. *Systemic: practice and action research*, 16(4), 133-167.

² Stacey, R. (1992). *Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organizations*. John Wiley & Sons.

³ Bertalanffy, L. v. (1969). *General systems theory: foundations, development applications*. George Braziller Inc.

⁴ Ashby, W. (1957). *An introduction to cybernetics*. London: Champan & Hall Ltd.

⁵ Guastello, J. (2002). *Managing emergent Phenomena: nonlinear dynamics in work organisations*. London: Lawrence Erlbaum Associates Publisher.

⁶ Vester, F. (2002). *Die Kunst venetzt zu denken*.

⁷ Stacey, R. (1992). *Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organizations*. John Wiley & Sons.

from the stable equilibrium, the structure changes permanently between positive and negative feedback (ibid p.40). In this type status of the system real innovation have the best possibility to initiate, because the interconnections between positive and negative feedback loops form irregular structures, which is the best basic for spontaneous self-organisation and flexibility in the system and therefore supporting sustainable development of the organisation (ibid p. 7). Focusing only on negative feedback loops (operational management) prevents dealing with fast changing and innovation and focusing only on positive feedback loops (strategical management) creates uncontrolled increasing of disintegration, which is contra productive in regard to the viability of the company as a whole. Task of the innovative management is therefore to handle in a proper way the tightrope walk between instability and stability and therefore the monitoring of stabilising and destabilising activities. Supporting this management challenge with analytical models is limited. On one hand the stability could be designed according the model of damping oscillations and presuming a moving from one state to another as development with stabilising character; analytics solutions could be developed using Markov chains or approaches of continuous time multi-state models. On the other hand the duality between these two forces is the real challenging questions to get solved. Classical – mainly statistical – approaches are not sufficient to solve the question, because they consider limited the dynamical development, suppress feedback loops and based on evaluation capabilities of the human brain, which is limited in handling with complex and dynamical processes (Sterman, 2000)¹. Modelling approaches describing the biological behaviour are more suitable to explain the viability in organisations (Schwaninger, 2018)². Living systems creating a clear difference between environment and the internal processes design as a whole, but demonstrating also the interconnection and communication with these two parts. These clear borders enable the continuous operating of the internal autopoietic processes (Maturana, 1982)³. Oduntan & Park proposed a system design for viable systems (Oduntan, Park, 2012)⁴, in which the organisation should be able to fulfil the present needs of its

¹ Sterman, J. (2000). *Business Dynamics: System Thinking and modeling for a complex world*. Boston: Irwin/McGraw-Hill.

² Schwaninger, M. (2018). Systemic design for sustainability. *Sustainability Science*, 1225-1234.

³ Maturana, H. (1982). *Erkenntnis: Die Organisation und Verkörperung von Wirklichkeit*. Ausgewählte Arbeiten zur biologischen Epistemologie. Braunschweig: Vieweg.

⁴ Oduntan, O.O.; Park, N. (2012). Enterprise Viability Model: Extending Enterprise Architecture Frameworks for modelling and analyzing Viability under Turbulences. *Journal of Enterprise Transformation*, 2(1), 1-25.

stakeholders, and should be able to transform itself to meet the stakeholders future needs (ibid p. 13). Therefore it has the characteristics of a system which fulfils the dualism of stability and instability. Approaches following the system dynamics allow better results because the structure of the system is designed as network of causal cause-impact relationship of stock, flow and auxiliary figures (Schwaniger, 2019)¹. These approaches help to understand the management process, but give no real idea of the design of the future system. For designing the future there is needed the evaluation of the system by the managers and stakeholders based on their knowledge and intuition.

6.2 Flexibility

Permanent changing of environment, framework requirement and system conditions require to measure and manage all components of a production system taking into consideration that needed changes should be done fast and with the minimal efforts. This understanding following the main idea proposed by Upton (1994)² and complemented by De Toni and Tonchia (1998)³ in their definition of flexibility: *«flexibility is the ability to change or react with little penalty in time, effort, cost or performance in order to cope with a set of production requirements»*. Although in related literature exists a large variety of definitions for the term and content of flexibility, the most common understandings are connected with the definition by Upton/DeToni,Tonchia (Sethi, A.K.; Sethi, S.P., 1990⁴; Singer, 2012⁵; Kitzmann, 2018⁶). The plurality of the definitions of flexibility creates the demands for a clear and consistent understanding of flexibility especially in understanding of quantifying flexibility. Measuring and evaluation of flexibility and of the company specific potentials is there for one important challenge, especially considering that measuring is the prerequisite for

¹ Schwaniger, M. (2019). On John Sterman's "System dynamics at sixty": rigor, relevance and implications for education. *System Dynamics Review*, 35(1), 15-18.

² Upton, D. (1994). The measurement of manufacturing flexibility. *California Management Review*, 72-90.

³ De Toni, A. ; Tonchia, S. (1998). Manufacturing flexibility: a literature review. *International Journal of Production Research*, 1587-1617.

⁴ Sethi, A.K.; Sethi, S.P. (1990). Flexibility in Manufacturing: A survey. *The International Journal of Flexible Manufacturing Systems*, 289-328.

⁵ Singer, C. (2012). *Flexibilitätsmanagement zur Bewältigung von Unsicherheit in der Supply Chain*. Hamburg: Josef Eul Verlag GmbH.

⁶ Kitzmann, H. (2018). Разработка модели управления гибкостью предприятия на оперативном и стратегическом уровне (Development of a model for measuring and evaluating flexibility on operational and strategic management level of manufacturing companies). Moscow.

target-orientated planning. For evaluating the flexibility there is the need to know benefits, but also the cost for resource-allocation, but the quantifying of costs aspects are easier than the quantifying of benefits (Kaluza, Blecker, 2005)¹. Measure flexibility is widely discussed and shows a wide range of different possibilities to measure flexibilities. Pibernik classified approaches according measuring by indicators, allowed strategies, achieved targets and real-option approaches (Pibernik, 2001)². Seebacher proposed the degree of flexibility for measuring flexibility considering the variation and also the efficiency of the system. This approach overcomes the limitation but focusing only on the operative level of management (Seebacher, 2013)³. Understanding flexibility as a set of real options means it is possible to determine the economic efficiency of such systems using findings from the financial theory, but it assumed that the different options could be measured in terms used by the financial theory; this assumption could be eliminated by using the approach of Enhanced Economic Evaluation (Schulze, Brieke, Seidel, Sallaba, 2012)⁴, but it stays the general critics on Real option approaches not to consider the identifying and implementation of the strategy behind the value. Although different methods and procedures for measuring flexibility of production systems exist, many of them have a certain practical function and have been developed for specific purposes that are why they are limited to isolated considerations (Rogalski, 2009)⁵. In addition, measures consider only a limited number of components flexibility generally consists of, and they do not take into account the dynamics of a system (Schneeweiss, Schneider, 1999)⁶. Especially the dichotomy of static and dynamical aspects and the usage numeric and non-numeric parameters are used to determine flexibility show the limitation to measure and evaluate flexibility with traditional analytical methods and using flexibility as an objective in management models. Therefore flexibility is used as a complex framework of management

¹ Kaluza, B. ; Blecker, T. (2005). Flexibilität – State of the Art und Entwicklungstrends. In B. Kaluza, & T. Blecker (Eds.), Erfolgsfaktor Flexibilität: Strategien und Konzepte für wandlungsfähige Unternehmen (pp. 1-28). Berlin: Erich Schmidt Verlag.

² Pibernik, R. (2001). Flexibilitätsplanung in Wertschöpfungsnetzwerken. Frankfurt: Gabler Edition Wissenschaft.

³ Seebacher, G. (2013). Ansätze zur Beurteilung der produktionswirtschaftlichen Flexibilität. Berlin: Logos Verlag.

⁴ Schulze, P. ; Brieke, M. ; Seidel, H. ; Sallaba, G. . (2012). Erweiterter Wirtschaftlichkeitsrechnung in der Fabrikplanung. In V. d. Ingenieure, Strategien und nachhaltige Wirtschaftlichkeit in der Fabrikplanung (pp. 75-157). Berlin, Wien, Zürich: Beuth Verlag.

⁵ Rogalski, S. (2009). Entwicklung einer Methodik zur Flexibilitätsbewertung von Produktionssystemen . Karlsruhe: Universitätsverlag Karlsruhe.

⁶ Schneeweiss, C.; Schneider, H. (1999). Measuring and designing flexibility as a generalized service degree. European Journal of Operational Research, 98-106.

variables with characteristics of objective, actuating and control variable as well as with the character of dichotomy of operative and strategical management (Table 6.) (Kitzmann, 2018)¹:

Table 6.1. Flexibility and management variable

Management variable	Flexibility based on Upton/ De Toni, Tonchia
Objectives	flexibility is the ability to change or react with little penalty in time, effort, cost or performance
Actuating variable	in order to cope with a set of production requirements
Control variable	time, effort, cost or performance

Determining the objectives on the operative management level will be done with mathematic modelling approaches based on simulating approaches like LOC (Nyhuis, Wiendahl, 2009)². The actuating variable on the operative level is identified and described as a bunch of characterising parameters illustrate as a cube (flexibility cube) with the levers objects which need to be flexible (dimensions, like product variations, quantity, time, cost and quality), the frequency of changes (time horizon, like short term, medium term and long term) and the ways of being flexible (elements, like range, heterogeneity, mobility and uniformity) (Upton, 1994³; Kitzmann,H.; Falko, S., 2017⁴). The control variable of flexibility management is described with a life cycle cost approach (Pachow-Frauenhofer, 2012)⁵.

On the strategical management level the value of the actuating variable described by the evaluation of transformability (Heger, 2007)⁶ generate the impulse for activating strategical activities and implementing activities on the operational level and connect therefore these two management levels. The objectives on the strategical level are determined based on tri-partite evaluation approach of the flexibility-environmental-management model (Fig. 6.) which follows the nowadays understanding of management. This model is a

¹ Kitzmann, H. (2018). Разработка модели управления гибкостью предприятия на оперативном и стратегическом уровне (Development of a model for measuring and evaluating flexibility on operational and strategic management level of manufacturing companies). Moscow.

² Nyhuis, P.; Wiendahl, H.-P. (2009). Fundamentals of Production Logistics. (R. Rossi, Trans.) Berlin, Heidelberg: Springer Verlag.

³ Upton, D. (1994). The measurement of manufacturing flexibility. California Management Review, 72-90.

⁴ Kitzmann,H.; Falko, S. (2017). Управление гибкостью предприятия на оперативном уровне. Инновации в менеджменте(11), 26-31.

⁵ Pachow-Frauenhofer, J. (2012). Planung veränderungsfähiger Montagesysteme. Hannover: PZH Produktionstechnischen Zentrum GmbH.

⁶ Heger, C. L. (2007). Bewertung der Wandlungsfähigkeit von Fabrikobjekten (Berichte aus dem IFA ed.). (P. Nyhuis, Ed.) Hannover: PZH Produktionstechnisches Zentrum.

modification of the classical cause-effect based receptor model according (Cisek, Habicht, Neise, 2002)¹ and consists of 6 different parts: 3 elements and 3 connections.

Table 6.2. Elements of the operational strategical management of flexibility

Management variable	Operative management	Strategical management
Objectives	Flexibility measures according Park/Son	GHZ-FEM
Actuating variable	Flexibility cube	Heger integrative Evaluation of Transformability
Control variable	Pachow-Frauenhofer flexibility life cycle cost approach	

The 3 elements (environment, management and organisational structure) are similar to the 3 different views in the Gallen Management approach of the 4th generation (Rüegg-Stürm, Grand, 2014)². The author took for his model the environment aspect of the 3rd Generation model with the stakeholders and Environmental spheres.

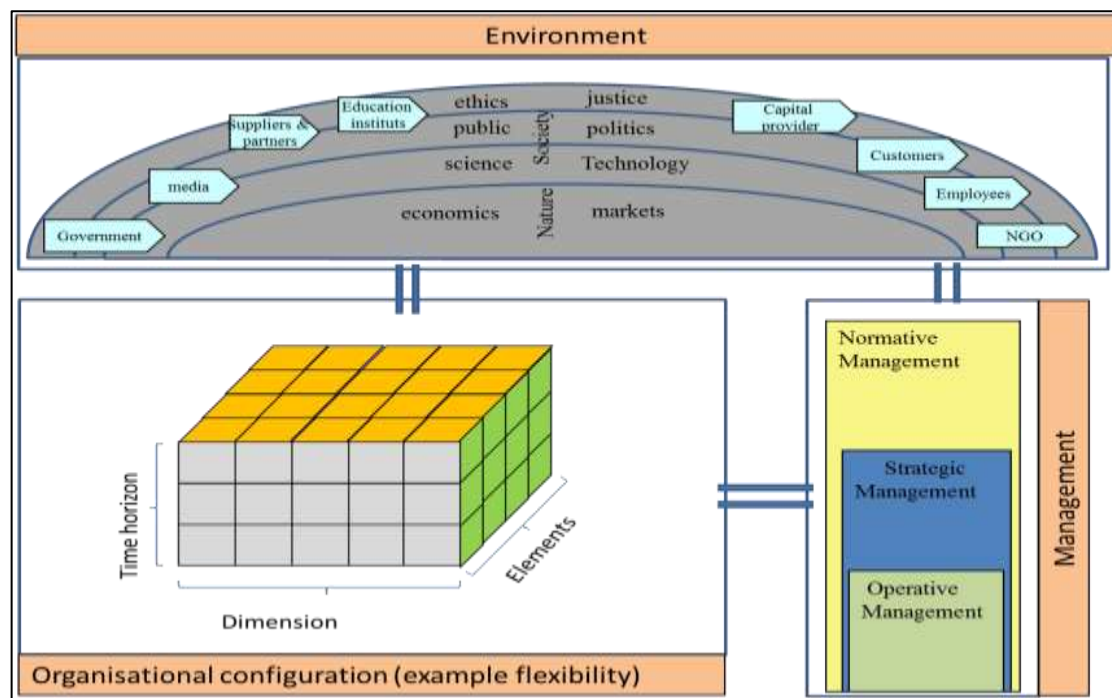


Fig. 6.1. FEM-Model (Kitzmann, 2018)

¹ Cisek, R. ; Habicht, C. ; Neise, P. (2002). Gestaltung wandlungsfähiger Produktionssysteme. zwf(Nº 9 (97)), 441-445.

² Rüegg-Stürm, J. ; Grand, S. (2014). Das St. Galler Management-Modell. Bern: Haupt Verlag.

The 3 connection between the elements are tight interdependent connectors and very often shows entangled relationship between the elements. The issues of interactions (Norms and values, resources and concerns and interests) in the St. Gallen Management-model describe these types of connectors between the environment and the organisational configuration, the environment and the management and the connection between organisational configuration and management.

6.3 Managing innovation and flexibility methods

In actual understanding of the different tasks of Managers (Schumacher, Wimmer, 2018)¹ are tight cooperating as partners to contribute to the success of the organization. Due to digitalization the toolbox and mind-set will change the profile of the decision maker, their tasks in the enterprises are taken over by machines or software and the boundaries between different occupations need to be defined new with overlapping and therefore not clear separable tasks (Manyika, 2017²; Schäffer, Weber, 2015³).

Preparing the decision making will be influenced in finding an effective combination of failure prevention and safety philosophy as well as uncertain, chaotic trial and error culture (Schäffer, Weber, 2016)⁴. Prerequisite for digitalization of this decision-making activity is the understanding of the cognitive process of intuition and deliberation in decision-making (Milli, Smitha & Lieder, Falk & L Griffiths, Thomas, 2018⁵; Gronchi, G.& Giovannelli F., 2018)⁶ as well as the modelling of the decision making-process on different management levels (Stacey, 1992, pp. 52-54⁷; Ashby, 1957, p. 57⁸). These

¹ Schumacher, T. & Wimmer, R. (2018). Gleichzeitig optimieren und neu erfinden? OrganisationsEntwicklung(1), 10-17.

² Manyika, J. . (2017). Jobs lost, jobs gained: Workforce transition in a time of automatisisation. McKinsey Global Institute.

³ Schäffer, U. & Weber, J. (2015). The Controller as Business Partner. Retrieved 03 13, 2019, from WHU on Controlling: <https://www.whu-on-controlling.com/en/latest-thinking/business-partner/>

⁴ Schäffer, U., & Weber, J. (2016). Digitalization will radically change controlling as we know it. WHU Controlling & Management Review, 60(6), pp. 34-40. doi:10.1007/s12176-016-0093-9

⁵ Milli, Smitha & Lieder, Falk & L Griffiths, Thomas. (2018). A Rational Reinterpretation of Dual-Process Theories.

⁶ Gronchi, G.& Giovannelli F. (2018, 07 17). Dual Process Theory of Thought and Default Mode Network: A Possible Neural Foundation of Fast Thinking. Front Psychol., 9, 1237.

⁷ Stacey, R. (1992). Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organizations. John Wiley & Sons.

⁸ Ashby, W. (1957). An introduction to cybernetics. London: Champan & Hall Ltd.

different directions have in common the co-existence or dualism of these processes as well as dualism between the static element of situation and the dynamical element of development direction. The dichotomy (intuition and deliberation) and the evaluation of decision-situations increase significantly the complexity in decision making and these aspects are in the focus of the research in the decision and judgement theory (Horstmann, 2012, p. 22)¹. The strategical developments are hardly to describe based on statistical analyses (Malina, K. ; Selto, K. , 2004)² or game theory approaches (Cavalcanti, 2010)³, because of the classical/traditional composition of these models with its aspects of causality and deterministic view of life (local realism). Uncertainty and randomness, caused by lack of knowledge and information, is ignored or identified as unknown parameter in modelling, which makes the results of a prediction inaccurate (Cavalcanti, 2010)⁴. But with knowledge of these parameters the precision will be increased and the result could be determinate.

Recent researches show two mainly directions in solving these complex decision situations. One direction is focusing on the understandings of the quantum mechanics which shows better results to explain the nature and therefore also the model of human decision making (Wang, Z., Busemeyer, J., Atmanspacher, H., Pothos, E. M., 2013⁵; Helland, 2018⁶); main focus areas are hereby decision processes, ambiguous perception, semantic networks, probability judgments, order effects of cognitive measurements and memory. Researchers around Busemeyer focusing on the Quantum decision model and establish a way of human decision making (Busemeyer, J.; Bruza, P. D., 2012)⁷. Yukalov and Sornette are focusing on the analytic part of the model and establish the mathematic requirements for the quantum decision theory (Yukalov, V.I.; Sornette, D., 2010)⁸ and allows quantitative prediction of decision making including quantitative explanations of classical decision-

¹ Horstmann, N. (2012). *Intuition und Deliberation bei der Entscheidungsfindung*. Mannheim.

² Malina, K. ; Selto, K. . (2004). Choice and Change of measures in Performance Measurement Models. *Management Accounting Research*, 441-469.

³ Cavalcanti, E. G. (2010). Causation, Decision Theory, and Bell's Theorem: A Quantum Analogue of the Newcomb Problem. *British Journal for the Philosophy of Science*, 569–597.

⁴ Cavalcanti, E. G. (2010). Causation, Decision Theory, and Bell's Theorem: A Quantum Analogue of the Newcomb Problem. *British Journal for the Philosophy of Science*, 569–597.

⁵ Wang, Z. ; Busemeyer, J. ; Atmanspacher, H. ; Pothos, E. M. (2013). The Potential of Using Quantum Theory to Build Models of Cognition. *Topics in Cognitive Sciences*(№ 2), 1–17.

⁶ Helland, I. S. (2018). *Epistemic Processes*. Springer.

⁷ Busemeyer, J.; Bruza, P. D. (2012). *Quantum Models of Cognition and Decision*. Cambridge University Press.

⁸ Yukalov, V.I. ;Sornette, D. (2010). Mathematical Structure of Quantum Decision Theory. *Adv. Complex Syst.*(13), 659-698.

making paradoxes (Yukalov, V.I.; Sornette, D., 2015¹; Yukalov, Y. & Sornette, D., 2018)². In multi-step decision-models like multi-period optimising (Solomonovich Mazelis, L.; Sergevich Solodukhin, K., 2013)³, continuous time multi state models, Markov-chains, *Syntegeation* model (Malik, 2013, p. 308)⁴ or sensitivity analysis (Vester, 2002, p. 125)⁵ the modelling of QDT will find it benefits, especially when considering probability matrix approaches in modelling; additional allows these models describing the “hermeneutic” interpretation of mainly qualitative information (Maderthaner, 2008)⁶.

Besides the describing of the mathematical analytical approaches to solve the dichotomy aspect, existing approaches which focus more on the management aspect. Jiří F. Urbánek use the relationships between the way and sense of activities of different entities performing and built up a Leadership Controlling model (Urbánek, David Král, 2014)⁷. He developed the computer assist language Dynamic Vector Logistics of Processes (DYVELOP[®]), which combine analysis, evaluation, heuristics, modelling, simulation, scenarios and engineering of any entity's relationships in a scenic meta-model, representing the entities' roles, semantics and namely their relationships in pictographic mind maps, on a scene. With implementing of DYVELOP into Controlling of SMEs he gave promising results in explaining and simulating both the quantitative and qualitative aspects of developing activities (David Kral; Jiri F. Urbánek, 2014)⁸. Although he developed the approach for managing of crisis, this model is useful for explaining and simulating the dichotomy of quantitative and qualitative aspects (strategic and operative or deliberate and intuitive) of the management in decision making.

In modern management understanding the effectiveness of cause-effect approaches has limited impact (Malina, Selto, 2004⁹; Cavalcanti, 2010¹) even

¹ Yukalov, V.I.; Sornette, D. (2015). Quantum theory of measurements as quantum decision theory. *Journal of Physics: Conference Series*(№ 1 (594)), 1-9.

² Yukalov, Y. & Sornette, D. (2018). Quantitative Predictions in Quantum Decision Theory. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 48, 366-381. doi:10.1109/TSMC.2016.2596578

³ Solomonovich Mazelis, L.; Sergevich Solodukhin, K. (2013). Multi-Period Models for Optimizing an Institution's Project Portfolio Inclusive of Risks and Corporate Social Responsibility. *Middle-East Journal of Scientific Research*, 17(10), 1457-1461.

⁴ Malik, F. (2013). *Strategie: Navigieren in der Komplexität der neuer Welt*. Frankfurt am Main: Campus Verlag.

⁵ Vester, F. (2002). *Die Kunst venetzt zu denken*.

⁶ Maderthaner, R. (2008). *Psychologie*. Wien: Facultas, UTB.

⁷ Urbánek J. F., David Král. (2014). *Modelling and implementation of added value controlling in small and middle enterprises continuity*. (crp. 312-320). Prague: University of Finance and Administration Prague.

⁸ David Kral; Jiri F. Urbánek. (2014). *Terror Threats Life Cycles Controlling Using Crisis Management during Environmental Metamorphoses*. *IERI Procedia*(№ 9), 141-147.

⁹ Malina, K. ; Selto, K. . (2004). *Choice and Chnage of measures in Performance Measurement Models*. *Management Accounting Research*, 441-469.

when using different research strategies for immunisation the models via *ceteris paribus* conditions and constraints, or limitation the valid possibilities by using deterministic or stochastic assumptions.

This needs the creation of theoretical concept with modelling case, organisation or situation based individual, dynamical and process depending elements (Jacobsen, 2003)². The appropriate model set-up was created by Greenberger, Horne and Zeilinger (1989)³ and find its realization into management science as the tri-partite modelling set-up of organisation, environment and management as an inseparable, syndetic unit (Rüegg-Stürm, Grand, 2013⁴; von der Reith, Frank ;Wimmer, Rudolf, 2014⁵).

In biological and medicine science quantum decision models are used to explain the therapeutic mechanisms (Hyland, 2003⁶; Milgrom, 2004⁷). Hyland is reasoning the therapeutic mechanism in a symptom-diagnostic-therapy approach by using the complexity theory, quantum mechanics and ideas of genetics and following the traditional causality of reasoning, Milgrom on the other side uses a modelling setup following nonlinear systems theoretical understandings which is more suitable for reasoning the mechanisms (Oberbaum, Menachem/Vithoulkas, George/van Haselen, Robbert, 2003)⁸. Milgrom stated that for the therapeutic situation the interactions between three participants (patient, the practitioner and the remedy) are reasoning the improving process of medical care based on weak quantum theory and GHZ-states (Greenberger-Horne-Zeilinger), where the measure of entanglement – as the tightness of connection– determine the improvement success (Milgrom, 2004)⁹.

Core question in the tri-partite modelling set-up is the degree of entangled

¹ Cavalcanti, E. G. (2010). Causation, Decision Theory, and Bell's Theorem: A Quantum Analogue of the Newcomb Problem. *British Journal for the Philosophy of Science*, 569–597.

² Jacobsen, L. (2003). *Bestimmungsfaktoren für Erfolg in Entrepreneurship*. Berlin: Freie Universität Berlin Hochschulschriften.

³ Greenberger, D.; Horne, M. ; Zeilinger, A. (1989). Going Beyond Bell's Theorem. In M. Kafatos (Ed.), *Bell's Theorem, Quantum Theory and Conceptions of the Universe* (pp. 69-72).

⁴ Rüegg-Stürm, J. ; Grand, S. (2013). *Die Zukunft des St. Galler Management-Modells: Ein Werkstattbericht*. St. Gallen: Institut für Systemisches Management und Public Governance IMP-HSG.

⁵ von der Reith, Frank ;Wimmer, Rudolf. (2014). *Organisationsentwicklung und Change-Management*. In R. Wimmer, J. O. Meissner, & P. Wolf (Eds.), *Praktische Organisationswissenschaft. Lehrbuch für Studium und Beruf* (pp. 139-166). Carl-Auer Verlag.

⁶ Hyland, M. (2003). Extended Network generalized Entanglement Theory: Therapeutic Mechanism, empirical prediction and Investigations. *The Journal of alternative and Complementary Medicine* , 919-936.

⁷ Milgrom, L. (2004). Patient-Practitioner-Remedy (PPR) entanglement. Part 5. *Homeopathy*(№ 2 (93)), 94-98.

⁸ Oberbaum, Menachem/Vithoulkas, George/van Haselen, Robbert. (2003). Clinical Trails of classical homeopathy: reflection and appropriate research design. *Journal of Alternative and Complementary Medicine*, 9(1), 105-111.

⁹ Milgrom, L. (2004). Patient-Practitioner-Remedy (PPR) entanglement. Part 5. *Homeopathy*(№ 2 (93)), 94-98.

relationship between the evaluators and the methods of detecting entanglement. In literature of physical science they propose several ways to detect entanglement beside other entanglement witness, entanglement measure, collective observables, entropic inequality (Gühne, Tóth, 2009)¹. Quantifying the degree and type of entanglement based on Wootters (1998)² equilibrium allows evaluation the effectiveness of strategic activities (Kitzmann, 2018)³.

Nowadays in manufacturing environment change has become continuous. Everything around is altering and modifying, thus in order to cope with it, a companies should be flexible and innovative.

Deterministic models to identify cause-and-effect relationships between dependent and independent variables find their limitations in modelling these aspects.

While flexibility and flexibility management on the operative management level mainly is operationalised with analytical models, are solutions on the strategical level rarely discussed. Considering recursion (fractals), control cycles (cybernetic), feedback loops (non-linear dynamics), operational closeness (autopoiesis) or feedback (biological systems) then flexibility is possible to determinate synthetically in evolutionary structures, but hardly to determine analytical. Therefore preparation for the future should be done based on holistic, complex and dualistic approaches which shows the limitation of classical management approaches and shows changing demand for the Managers and Supporting employees' their toolbox and mind-set and they will deal more intensive with strategic (and operational) uncertainties and will use failure prevention and safety approaches as well as trial and error philosophy in their daily tasks. Quantum Decision Theory, tri-partite Management approach and screenplay approaches are promising approaches, but they are in the early stage of development to get a generalized theory for the decision theory and get a complementary to the classical cause-impact based decision theory. With implementation of a higher maturity level of these approaches challenging adjustments in the requirements of future tasks of the Managers and supporting employees are required. As an intermediate step advanced knowledge is required in advanced mathematical approaches based on quantum mechanics

¹ Gühne, O. ; Tóth, G. (2009). Entanglement detection. Physics Reports, 474, 1-75.

² Wootters, W. K. (1998). Quantum entanglement as a quantifiable resource. Philbs Trans RSoc London A, 356, 1717-1731.

³ Kitzmann, H. (2018). Разработка модели управления гибкостью предприятия на оперативном и стратегическом уровне (Development of a model for measuring and evaluating flexibility on operational and strategic management level of manufacturing companies). Moscow.

solutions, screenplay based modelling set-up of decisions making situations, cross-functional and interdisciplinary multi methods handling in cybernetic management. Save haven will be the research activities, which have no direct connection to present solutions of customer demands. Further developments find their limitation in the capability of Artificial Intelligence and the ethical limitations and challenges of digitalization, with implicit demand on research and the therefor the degree on replacement of human activities and actors.

7. FUNDAMENTALS OF THE MANAGEMENT MECHANISM OF INNOVATIVE PRODUCTION COMMERCIALIZATION OF INDUSTRIAL ENTERPRISE

Illiashenko Sergii, Shypulina Yuliia, Illiashenko Nataliia, Melnyk Yuliia, Gryshchenko Olena

7.1 Theoretical and methodological principles of the management of innovative products commercialization of industrial enterprises

The commercialization of innovative products is the final stage of the innovative process, and the result of commercialization determines the economic efficiency of innovation activity. Accordingly, effective management of commercialization processes is an important component (subsystem) of the innovative management system at industrial enterprises that determines the innovative growth pace of the national economy as a whole. World experience shows that innovations and innovative activities are the most effective way of generating competitive advantages, of providing conditions for sustainable economic growth for both individual businesses and national economies as a whole. Increasing the efficiency of the innovation is one of the priorities of economic actors at different levels in the current conditions of economic transformation caused by changing economic cycles (from 5th to 6th) and the beginning of the 4th Industrial Revolution, to which is added a powerful influence of global pandemic crisis caused by COVID-19. The problem of its solution is particularly acute for domestic industrial enterprises, which lose to foreign competitors due to the inability to promptly commercialize their innovative developments that are not inferior to foreign counterparts.

It should be noted that the problem of commercialization of innovations in various spheres of economy is revealed in the scientific works of both domestic and foreign scientists. Lipkova L. and Braga D. explore methodological approaches, benchmarks, and a system of indicators for assessing the potential and effectiveness of innovation commercialization in EU countries¹. Farhan J., Kamariah I., and Nasir M. analyze the role and functions of university

¹ Lipkova L., Braga D. (2016). Measuring commercialization success of innovations in the EU. Marketing and Management of Innovations. n. 4. p. 15-30.

incubators and technology parks in the commercialization of innovations¹. Datta A., Reed R., and Jessup L. summarize existing approaches and develop their approaches to improving methods of commercialization². Marx M., Gans J., and Hsu D. consider a dynamic strategy for the commercialization of breakthrough technologies, highlight the features of their market launch³. Hora M. And Dutta D. reveal specific features of alliances of entrepreneurial structures, analyze their impact on the success of innovation commercialization⁴.

Gosens J. and others analyze the features of the commercialization of biotechnologies created by the Chinese academic entities⁵. Datta A., Mukherjee D., and Jessup L. summarize the theoretical and practical aspects of commercialization of innovations, based on analysis of 194 articles in 62 scientific journals⁶. Mollick E. and Robb A. explore the role of crowdfunding in the democratization of access to capital to fund the commercialization of innovations⁷. Sløk-Madsen S., Thomas Ritter T. and Sornn-Friese H. investigate the evolution of the concept of commercialization over 30 years, propose a process-oriented concept of commercialization and set directions for its further empirical research⁸. Bashmakov A. I. and others consider an approach to comprehensive scientific, methodological, and informational support for the innovative process, covering all stages, including the creation of innovations⁹. Braga D. analyzes the processes of commercialization of innovations in EU

¹ Farhan J., Kamariah I, Nasir M. (2015). Review of Commercialization Tools: University Incubators and Technology Parks. *International Journal of Economics and Financial Issues*. n. 5. p. 223-228.

² Datta A., Reed R., Jessup L. (2013). Commercialization of innovations: an overarching framework and research agenda. *American Journal of Business*. n. 28 (2). p. 147-191.

³ Marx M., Gans J., Hsu D. (2014). Dynamic commercialization strategies for disruptive technologies: Evidence from the speech recognition industry. *Management Science*. v. 60, n. 12 Retrieved from: <http://pubsonline.informs.org/doi/abs/10.1287/mnsc.2014.2035>.

⁴ Hora M., Dutta D. (2013). Entrepreneurial Firms and Downstream Alliance Partnerships: Impact of Portfolio Depth and Scope on Technology Innovation and Commercialization Success. *Production and Operations Management*. v 1. n. 22(6). p. 1389–1400.

⁵ Gosens J., Hellsmark H., Kåberger T., Liu L., Sandén B., Wang S., Zhao L. (2018). The limits of academic entrepreneurship: Conflicting expectations about commercialization and innovation in China's nascent sector for advanced bio-energy technologies. *Energy Research & Social Science*. v. 37. March. p. 1–11. Retrieved from: <https://www.sciencedirect.com/science/article/pii/S2214629617302803>.

⁶ Datta A., Mukherjee D., Jessup L. (2015). Understanding commercialization of technological innovation: taking stock and moving forward. *R&D Management*. v. 45, i. 3. p. 215-316.

⁷ Mollick E., Robb A. (2016). Democratizing Innovation and Capital Access: The Role of Crowdfunding. *California Management Review*. v 58, i. 2. Retrieved from: <https://journals.sagepub.com/doi/abs/10.1525/cmr.2016.58.2.72>

⁸ Sløk-Madsen S., Thomas Ritter T., Sornn-Friese H. (2017). Commercialization in Innovation Management: Defining the Concept and a Research Agenda. *Academy of Management Proceedings*. n. 1. Retrieved from: <https://research.cbs.dk/en/publications/commercialization-in-innovation-management-defining-the-concept-a>

⁹ Bashmakov A. I., Popov V. V., Zhedyaevskii D. N., Chikichev D. N., Voyakin E. A. (2015). Generic heuristic of innovation management from generating ideas to commercialization. *European Research Studies Journal*. n. 18 (4). p. 47-56.

countries, indicates the role of state stimulation of these processes¹. Rui L. based on the analysis of the experience of 126 IT companies has developed an empirical model to characterize the impact of R&D investment and employee engagement on innovations commercialization efficiency².

Problems of commercialization of innovations are also revealed in the works of domestic scientists. In particular, Kuzmin A.E. and Kostsyk R.S. consider forms and methods of commercialization of innovative products of enterprises, form stages of realization of innovative products of machine-building enterprises as a method of commercialization of innovations³. Kosenko O.P. and Balysheva V.D. consider the process of promotion of innovative products on the market and determine its features for the successful commercialization of innovations⁴. Malyuga L.M. performs an analysis of the concept of technology transfer and commercialization⁵.

Bogolib T.M.⁶ and Hruzдова T.V.⁷ consider the problems of commercialization of research and technological activities. Matselyuh N.P. and Demyanchuk G.V. investigate the problems of stimulating and financing the commercialization of innovations in Ukraine⁸. Chernomaziuk A.G. and Matsiuk

¹ Braga D. (2016). Commercialization of innovation, selected aspects (European Union level). Economic, political and legal issues of international relations. Volume of Scientific Papers. Publisher: Vydavatel'stvo EKONÓM. p. 56-60.

² Rui L. (2016). An Empirical Study on the Impact of R&D Investment and Employee Involvement on Innovation Commercialization: Evidence from IT Firms in China. Journal of Modern Accounting and Auditing. v. 12. n. 8. p. 429-442.

³ Kuzmin A.E. & Kostsyk R.S. (2013). Vybir metodiv komertsializatsii innovatsiinoi produktsii pidpriemstv. [The choice of commercialization methods of enterprises innovative products]. Economics and state [Ekonomika ta derzhava]. n. 9. p. 6-8.

⁴ Kosenko O.P., Balysheva V.D. (2013). Promotion as part of the marketing process of commercialization of innovations [Prosvannia yak skladova chastyna marketynhovoho protsesu komertsializatsii innovatsii]. Bulletin of the National Technical University "KPI": Technical progress and production efficiency [Visnyk Natsionalnoho tekhnichnoho universytetu "KhPI": Tekhnichniy prohres ta efektyvnist vyrobnytstva.]. n. 67(2). p. 54-62.

⁵ Malyuga L.M. (2014). Management of transfer and commercialization of innovations. [Upravlinnia transferom i komertsializatsiiei innovatsii]. Modern issues of economy and law. [Suchasni pytannia ekonomiky i prava]. n. 1. p. 47-51.

⁶ Bogolib T.M. (2014). Commercialization of universities' scientific developments [Komertsializatsiia naukovykh rozrobok universytetiv]. Economics of Ukraine [Ekonomika Ukrainy]. n. 1. p. 33-50.

⁷ Hruzдова T.V. (2013). Problems of commercialization of scientific and technical activities and their impact on innovation development of industrial enterprises [Problemy komertsializatsiyi rezul'tativ naukovo-tekhnichnoyi diyal'nosti ta yikh vplyv na innovatsiynny rozvytok promyslovykh pidpryyemstv]. ulletin of Khmel'nitsky National University. Economic sciences [Visnyk Khmel'nyts'koho natsional'noho universytetu. Ekonomichni nauky]. v. 2., n. 3. p. 59– 62.

⁸ Matselyuh N.P., Demyanchuk G.V. (2014). Financing and stimulation of innovations' commercialization in Ukraine: problems and solutions [Finansuvannia ta stymulyuvannia komertsializatsiyi innovatsiy v Ukraini: problemy i shlyakhy vyrishennya]. Science and innovations [Nauka ta innovatsiyi]. n. 3. p. 69-79.

I.R. explore the effectiveness of forms of commercialization of innovations¹. Tsybynoga M.O., Starkova O.V., and Gnuchix L.A. consider the organizational mechanism of commercialization of innovations². Melnyk Yu., Sager L., and Sygyda L. explore the ways and strategies of commercializing innovative products, depending on their type³. Butko M.P. and Popelo O.V.⁴ identify the main ways to commercialize innovative developments. In collective monographs, edited by Illiashenko S.M. and Bilovodska O.A.^{5,6}, the theoretical, methodological and methodological aspects of commercialization as the final stage of innovation activity are highlighted.

Melnyk Yu., Sager L., and Sygyda L. emphasize that innovative products can be implemented depending on the form (material or immaterial), the specificity and essence of innovative products (product or process innovation) in the following markets: intellectual property market; industrial market; product market (see Fig. 7.1). Thus, in the process of converting an idea to a finished product, innovation as an object of commercialization migrates through all three types of markets.

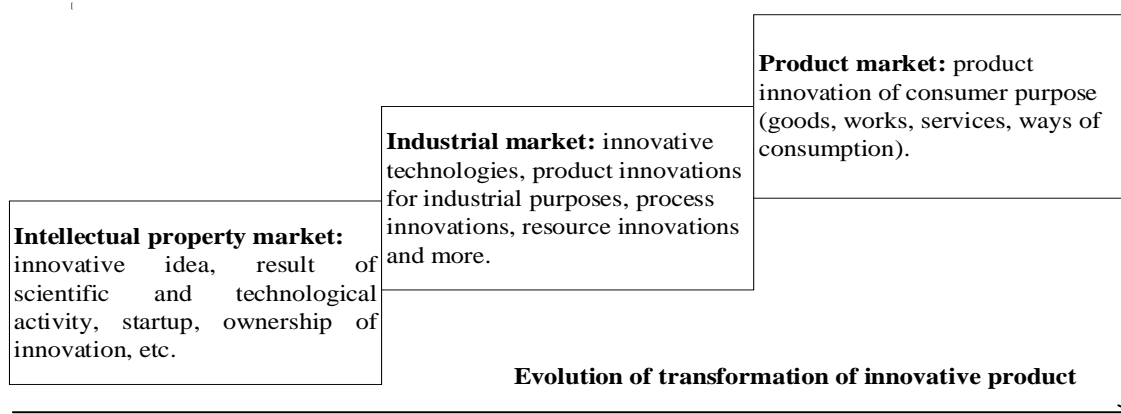


Fig. 7.1. Market vector of innovative products as an object of commercialization

¹ Chernomaziuk A.G., Matsiuk I.R. (2015). Efficiency forms and methods of innovation commercialization [Efektyvnist' form i metodiv komertsializatsiyi novovveden']. economic sciences [Visnyk Khmel'nyts'koho natsional'noho universytetu. Ekonomichni nauky]. v. 2. n. 2, p. 158-161.

² Tsybynoga M.O., Starkova O.V., and Gnuchix L.A. (2011). The organizational mechanism of procedure commercialization innovations [Orhanizatsiynny mekhanizm protsedury komertsializatsiyi innovatsiy]. Information processing systems [Systemy obrobky informatsiyi]. n. 2. p. 273-276.

³ Melnyk Yu.M., Sager L.Yu., Sygyda L.O. (2019). Theoretical aspects of strategies forming for innovative products commercialization. Odessa National University Herald. No 1 (74), pp 69-73.

⁴ Butko M.P. and Popelo O.V. (2015). Commercialization of the results of scientific and technological activities under integration processes deepening [Komertsializatsiya rezul'tativ naukovo-tekhnichnoyi diyal'nosti v umovakh pohlyblennya intehratsiynykh protsesiv]. Problems and prospects of economy and management [Problems and prospects of economy and management]. № 1. C. 7-20.

⁵ Tools and methods for commercialization of innovative products [Instrumenty ta metody komertsializatsii innovatsiinoi produktsii]. (2018). S.M. Illiashenko, O.A. Bilovodska (Ed.). Sumy: Trytoriya.

⁶ Management of commercialization of innovative products [Upravlinnia komertsializatsiieu innovatsiinoi produktsii]. (2019). S.M. Illiashenko, O.A. Bilovodska (Ed.). Sumy: Trytoriya.

On this basis, Melnyk Yu., Sager L., and Sygyda L. propose a set of strategic alternatives (see Fig. 7.2) for the commercialization of innovative products.

		Commercialization		
		Zero level	First level	Double
Market	Intellectual property objects	Scientific commercialization strategy is focused on the commercialization of the results of scientific activity, the product of which is the innovative ideas of stakeholders. The target audience may be research organizations, venture capital firms, investors, and more. The strategic concept is the foundation of innovative ideas.	Rapid commercialization the strategy involves the commercialization of innovative development rights created for the needs of one's own enterprise, but the objective factors have created the opportunity to generate rapid profits through the sale of intellectual innovative products to other entities. The strategic concept is to spread innovation in the industry.	Deep commercialization strategy involves the use of innovative products to create the latest progressive developments that can be implemented in the international market for intellectual property. A strategic concept is an innovative breakthrough (scientific or technological).
	Industrial	“Alienation” commercialization strategy involves the alienation of the right to an innovative idea by the subjects of the industrial purpose market. As a rule, these are innovative developments of scientific and technical nature, created not for their own use, but for-profit through alienation in the industrial market. The strategic concept is to strengthen scientific, technological, industrial, and innovation potential.	Internal commercialization strategy involves the creation of an innovative idea in the enterprise and its implementation in production or organizational processes, which allows gaining both commercial and non-commercial effect. improve working conditions.	Developmental commercialization strategy is the creation of innovative products for industrial purposes on the basis of both material (resources, technological lines, etc.) and immaterial (acquired patents, technologies, etc.) innovative products. Such a strategy requires considerable financial investment, and characterized by a high-risk level, but also involves high profits. The strategic concept is to create a competitive economy
	Product	Not applicable	Diffuse commercialization strategy is the implementation of the idea of innovation through the process of production into finished products and the realization of consumer product innovations to end consumers in the market of the products. The strategic concept is the creation of radical innovations, industry leadership.	Competitive commercialization strategy involves the use of innovative products (ideas, resources, production facilities, etc.) to create innovative products targeted at the mass consumer. A strategy can be used for both radical innovations and improvement, characterized by high competitiveness and mass coverage (for example, mobile phones).

Fig. 7.2. Strategic alternatives to the commercialization of innovative products (developed by the authors on the basis of ¹)

In general, we consider that the process of commercialization involves the formulation of an adequate strategy, which: is built in the conditions of the unpredictability of events; must be linked to market prospects; takes into account the phased deployment of activities, the presence of intermediate goals at each stage, and links these stages and goals to the sole basis for decision-making; takes into account the real availability of resources and the potential opportunities to

¹ Melnyk Yu.M., Sager L.Yu., Sygyda L.O. Theoretical aspects of strategies forming for innovative products commercialization. Odessa National University Herald. 2019. No 1 (74), pp 69-73.

obtain them.

Summarizing the literature review, it should be noted that the existing domestic developments in the management of commercialization are fragmental, and the direct application of the development of foreign authors without an appropriate adaptation is problematic and discredit the idea of innovative acceleration. The specific features of the Ukrainian economy require the creation of an original mechanism for managing the commercialization of innovative products (undoubtedly, taking into account foreign experience) and adapted to domestic conditions. This research is focused on this.

Summarizing the results of publications on the analyzed problem subject (see above), we can conclude that the organizational and economic mechanism of commercialization of innovative products of industrial enterprises (OEMCIPIE) should include key components shown in Fig. 7.3. Consider these components in more detail.

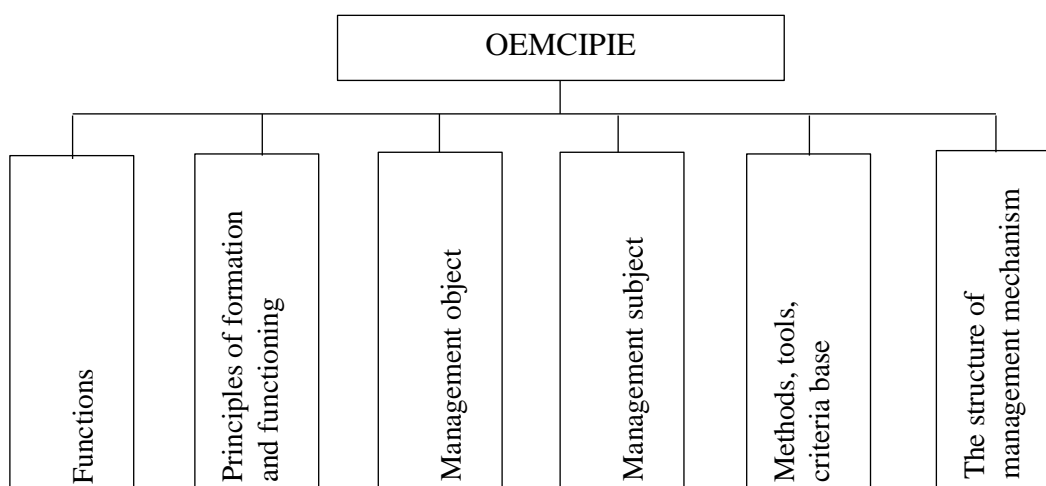


Fig. 7.3. OEMCIPIE components (author's development)

The analysis of the essence of the commercialization of innovations allowed us to identify two main groups of its functions.

1. The orientation of innovative activity of the enterprise on the creation of perspective innovations which are directed on the solution of current and predicted problems of actual and potential consumers. At the same time, created innovations must solve the problems of the enterprises-innovators: alignment of internal opportunities (innovative development potential) to external ones, which are generated by the market. That is functions that are associated with the creation and production of innovations that have a high chance of being commercialized.

2. Formation and stimulation of demand for innovation, promotion of innovations in the market, monitoring analysis of market trends (to respond to changes in external macro– and microenvironment), i.e. functions that are directly related to the commercialization of innovations.

Many scientists and experts practitioners consider only the second set of functions. However, the experience of the world leaders of innovative growth^{1, 2} shows that the success of commercialization is based on the stage of idea generation and development of the concept of innovation, which should, as far as possible, take into account consumer requests (consumer problems) or form those requests (for radical innovations).

Based on a systematic analysis and generalization of approaches presented by the co-authors of collective monographs^{3, 4, 5, 6, 7} the system of principles of formation and functioning of OEMCPIE is formed (see Table 7.1).

The subject of management are strategies of commercialization of innovative products of industrial enterprise. Innovative process options and their respective strategies for the commercialization of innovative products are proposed to be identified depending on the completeness of the innovation cycle phases.

Figure 7.4 shows the options for the innovative process. They are detailed in Table 7.2. Table 7.2 shows the innovative strategies of the enterprise, as well as strategies for the commercialization of innovative products, corresponding to the selected options of the innovation process.

¹ Golysheva I.O., Gryshchenko O.F., Illiashenko N.S. The classification of the strategic directions of company's scientific and technological development. Bulletin of the Khmelnytsky National University. 2018. n. v.2. p. 128-131.

² Illiashenko N.S., Gryshchenko O.F., Golysheva I.O., Makarenko Ye.V. (2018). Practical aspects of successful international companies on the example of advanced development of Asian Tigers countries [Praktychni aspekty diialnosti uspishnykh mizhnarodnykh kompanii na prykladi vyperedzhalnogo rozvytku krain «aziiski tyhry»]. Advance innovative development: theory, methodology, practice [Vyperedzhaiuchy innovatsiinyi rozvytok: teoriia, metodyka, praktyka]. N.S. Illiyashenko (Ed.). Sumy: Trytoriya.

³ Problems and prospects of market-oriented management of innovative development [Problemy i perspektyvy rynkovo-orientovanoho upravlinnia innovatsiynym rozvytkom]. (2011). S.M. Illiashenko (Ed.). Sumy: TOV “TD “Papyrus”.

⁴ Marketing aspects of innovative development management [Marketynhovi aspekty upravlinnya innovatsiynym rozvytkom]. (2014). S.M. Illiashenko (Ed.). Sumy: TOV “TD “Papyrus”.

⁵ Market-oriented management of innovative development [Rynkovo-orientovane upravlinnya innovatsiynym rozvytkom]. (2015). S.M. Illiashenko (Ed.). Kharkiv: Disa plus.

⁶ Managing economic growth: marketing, management, and innovations (2016). S.M. Illiashenko, W. Strielkowski (Eds.). 1st edition. Prague: Institute for Qualification Enhancement.

⁷ Innovative management: theoretical, methodical, and applied grounds. (2018). S.M. Illiashenko, W. Strielkowski (eds.). 1st edition, Prague: Institute for Qualification Enhancement.

Table 7.1. A system of principles of OEMCPIE formation and functioning
(author's development)

Principles	Details
Systematicity	OEMCPIE is a complex open adaptive dynamic probabilistic system characterized by the following: the presence of subsystems and their elements with complex interconnections; self-supporting exchange of information and knowledge between the subsystems of the mechanism and the external environment; constant changes of place and role of its subsystems and elements depending on changes of conditions of functioning; taking into account the factors of incomplete certainty caused by the need to make sufficiently substantiated decisions under conditions, incomplete, inaccurate and contradictory information regarding the subject matter of the decision and its possible consequences.
Focus on innovative development	Managerial decisions are based on the understanding that innovations are the source of formation, enhancement, and realization of competitive advantages that are capable of ensuring sustainable economic growth.
Continuity of creation and implementation of innovations	Understanding that innovations and innovative activities enable to respond to changing external and internal environment, to occupy and to strengthen position in target markets.
Knowledge orientation as a basis for innovative decision-making	Managing the processes of producing and commercializing new knowledge regarding the following aspects: trends in the product markets of an industry (or related industries); trends in the development of scientific and technological progress (STP) in the industry (or related industries); a level of innovative development potential (IDP) of the enterprise; STP trends. This knowledge transfers into new products and technologies for its production, new management methods, etc.
Balance of interests of actors of the commercialization process	The commercialization of innovations should benefit all involved actors of the innovative process (at least not to be at odds with their interests): economic counterparties and contact audiences.
Orientation to solving customer problems	Innovative developments should focus not on meeting the needs of consumers, but mostly on finding ways to solve their problems: existing or future.
A comprehensive evaluation of commercialization effectiveness	Provides a multi-criteria comprehensive evaluation of the innovations' commercialization project, in particular by the following indicators: financial; project risks; strategic value; satisfaction of interests of owners, managers, employees of the enterprise, and in some cases, society in general, etc.
Responsiveness to innovation culture	The commercialization project should be consistent with the innovative culture of the analyzed enterprise and the innovative culture of the society (in the target markets).
Alternativeness	Decisions are not made until all commercialization options have been considered.

Management activities of innovative product commercialization involve the choice of the innovation process type and innovative strategy, which most closely match the specifics and conditions of activity of a particular enterprise, as well as the definition of the commercialization strategy. As follows from the analysis of Fig. 7.4 and Table 7.2, the determination of the commercialization strategy of innovations is carried out taking into account the scale of activity of the enterprise (small, medium, large) and its potential of innovative development. The analysis of the potential of innovative development of the

enterprise should be carried out by its components¹:

- a market component that characterizes the availability of consumer requests for innovative products of the analyzed enterprise, or the ability to form them (for radical innovations);

- an innovative component, which characterizes the ability of the personnel of the analyzed enterprise to transform the latest achievements of science and technology in products that can satisfy existing and future customer requests;

- a production and marketing component, which characterizes the technical ability and economic feasibility to manufacture and promote innovative products.

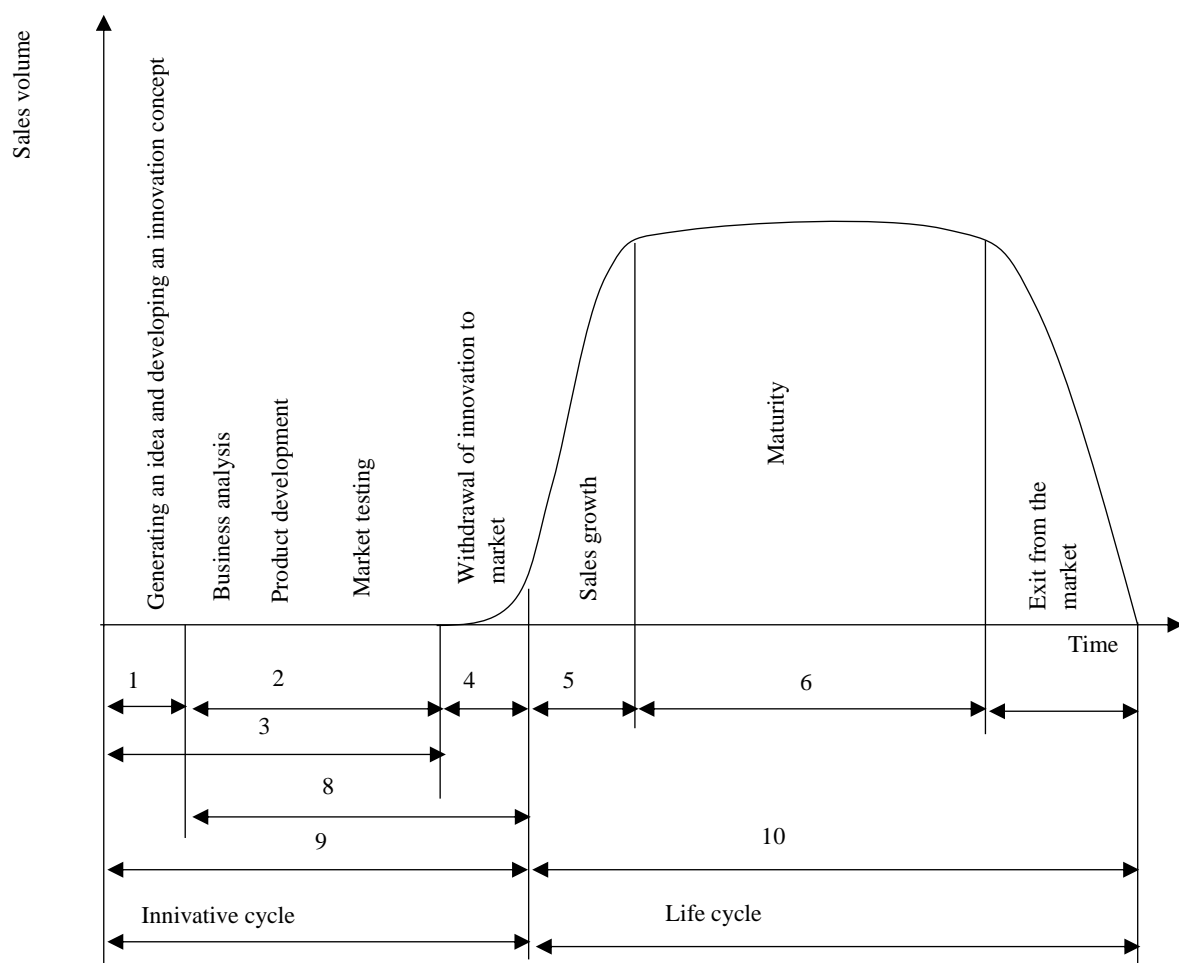


Fig. 7.4. The variations of innovative process ²

¹ Shypulina Yu.S. (2006). Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise [Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise]. Marketing and management of innovative development [Marketing and management of innovative development]. S.M. Illiashenko (Ed.). Sumy: VTD "Universytetska knyha".

² Illiashenko S.M. Innovative process rational choice grounding in organization. Marketing and Management of Innovations. 2015. n. 2. p. 11-20.

Table 7.2. Correspondence of innovative strategies and innovation commercialization strategies¹ (modified by the authors)

Strategy number and name (see Figure 2)	The size of the enterprise	The essence and content of innovation commercialization strategies
5, nicher	Small	Improvement (modification) of innovation, promotion of modifications to the market
6, traditional (protective)	Medium, large	Deployment of production and sale of innovative products analogs
7, nicher	Small	Modification of the product to the needs of outsiders, sale of modifications
10, protective	Medium, large	Improvement (modification) of innovation, deployment of production and sale of innovative products analogs
2, imitative	Small	Purchasing a patent, creating an innovation based on it, developing a technology for its manufacture, selling a license for manufacturing the innovation
4, imitative	Small	Purchase a license, manufacturing, and promotion the innovation on the market
8, imitative	Medium, large	Purchasing a patent, creating an innovation based on it, developing a technology for its manufacturing, production of innovation and promotion it on the market
1, licensing	Small	Generating the idea of innovation, patenting a technological or/ and technical solution, and selling a patent
3, licensing	Small	Generating the idea of innovation, creating an innovation, developing a technology for its manufacturing, selling a license for manufacturing the innovation
9, offensive	Medium, large	Generating the idea of innovation, creating an innovation, developing a technology for its manufacturing, production of innovation and promotion it on the market

The subject of managerial activities is the enterprise's management and organizational units.

7.2 Methodical principles of management of innovative products commercialization of industrial enterprise

We consider the methodological toolkit of commercialization management taking into account two main groups of its functions. The first group performs the task of marketing justification of the characteristics of the created innovations from the standpoint of solving them existing and future consumers' (or enterprises', or industry's, or related industries') requests. The second group performs the task of marketing support for the promotion of innovations.

¹ Illiashenko S.M., Shypulina Yu.S., Illiashenko N.S. (2020). Management of commercialization of enterprise innovative products [Upravlinnya komertsializatsiyeu innovatsiynoyi produktsiyi pidpryyemstva]. Proceedings from: Vseukrayins'ka internet-konferentsiya «Ekonomichna kibernetyka: doslidzhennya, rozrobka i vykorystannya modeley ekonomichnoyi povedinky sub'yektiv hospodaryuvannya» – All-Ukrainian Internet Conference "Economic Cybernetics: Research, Development and Use of Economic Behavior Models of Business Entities" (p. 185-189). Dnipro: NMetAU.

Next, the toolkit features for solving the above problems will consider.

1. Developing a market-oriented concept of an innovative product as a prerequisite for the success of commercialization activities. It is performed based on the knowledge given in Table. 7.3. The methods (methodical tools) for obtaining these complexes of knowledge are indicated.

Table 7.3. Types of knowledge based on which managerial decisions are made to determine the concept of an innovative product and its characteristics, as well as methodological approaches to their developing (author's development)

Types of knowledge	Methodical principles of knowledge acquisition
Trends in the markets where the enterprise operates or in the related industries	Traditional market research tools, as well as methods for forecasting future developments ¹
STP trends in the markets where the enterprise operates or in the related industries	Expert assessments, such as the author's method ²
Innovative development potential of the enterprise	Methods for assessing the potential of an enterprise's innovative development ³
Problems of consumers (in the markets where the enterprise operates or in the related industries)	An approach to the analysis of consumer problems ⁴

The knowledge in Table 7.3 is the basis for developing the concept of an innovative product. To enhance the validity of relevant innovative solutions, it seems appropriate to use formalized methods (see Table 7.4).

In general, the following complexes of analytical work are performed to develop the concept of an innovative product of the enterprise: enterprise's market positions analysis; market trends analysis; industry's (or related industries) STP trends analysis; analysis of customers' problems on the industry of the enterprise (or related industries) and determination the strategies to overcome them; analysis of market opportunities for innovative development of

¹ Illiashenko N.S., Rosohataya A.S. (2011). Trendwatching as the tool of definition of strategic directions of development [Trendvotchinih yak instrument vyznachennia stratehichnykh napriamkiv rozvytku]. Marketing and management of innovations [Marketynh i menedzhment innovatsiy]. n 1. p. 29–35.

² Illiashenko S.M. (2010). Conceptual bases of marketing forecasting of strategic directions of scientific and technological innovative development of Ukraine on the basis of expert evaluations [Conceptual bases of marketing forecasting of strategic directions of scientific and technological innovative development of Ukraine on the basis of expert evaluations]. Bulletin of Lviv Polytechnic National University. Problems of economy and management [Bulletin of Lviv Polytechnic National University. Problems of economy and management]. n. 668. p. 68-74.

³ Shypulina Yu.S. (2006). Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise [Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise]. Marketing and management of innovative development [Marketing and management of innovative development]. S.M. Illiashenko (Ed.). Sumy: VTD "Universytetska knyha".

⁴ Doron Adam (2018). Are You Solving Your Customers' Real Problems? Here's How To Find Out. <https://www.forbes.com/sites/forbesnycouncil/2018/02/21/are-you-solving-your-customers-real-pr>

the enterprise (SWOT, GAP, etc.); development of innovative product concept; business analysis and development of a marketing program to promote the innovations on the market (i.e., expected characteristics are defined in the concept); assessment the implementation prospects at a particular enterprise.

Table 7.4. Methods for developing innovative product concepts (modified and supplemented on the basis of¹)

The name and the essence of the method	Field of application	Advantages	Disadvantages
Prototype Improvement. Identification of the prototype shortcomings (prototype = the best market sample) and identify the ways to improve the prototype.	Improvement of existing products: improvement of their design, functional characteristics, economic characteristics, etc.	The relative simplicity of imitation of a product known to consumers (if the prototype is in demand then modification is in demand too).	The product is not always subject to improvement, minor improvements can lead to a loss of competitiveness.
Brainstorming Generating a group of ideas to solve a problem (critique of ideas is forbidden), after generating all ideas are evaluated.	To solve a problem as many ideas as possible are generated in short time frames.	Responsiveness; increasing the chances of finding a viable solution; multidimensional analysis of the problem.	The quality of an idea is almost independent of the search term; the obtained results require further investigation
Synectics The orientation of spontaneous intelligence activity of a group of experts (with the help of different kinds of analogies) to analyze and to solve the problem	Find the general solution of the problem	Allows you to overcome the bias of developers and solve problems in unconventional ways	It requires an experienced and strong manager, careful selection of specialists and their prior training
Deadlock situations elimination The search for new options for solutions when traditional have failed	Solution of a complex, non-traditional, large-scale problems in traditional search frames.	It allows for solving problems in situations when there is no acceptable solution.	Difficulties with access to search directions beyond the expertise, experience, traditions of developers.
Morphological maps Expanding the search area to solve the problem	Finding solutions to new problems	It allows to quickly generate several alternatives and find the best solution.	Requires the experience of developers and their knowledge of the problem structure.

Based on the above, an integrated graphical information model of developing the concept of an innovative product is proposed. It is presented in Fig. 7.5. The concept of an innovative product should include: defining its usefulness for the innovator, the consumer (ideally – for all subjects of the innovation process); description of the main characteristics (name, price,

¹ Jones J.K. (1986). Design methods [Metody proyektirovaniya]. Moskva: Mir.

specifications, etc.); a system of marketing activities aimed at enhancing consumer appeal of innovation, etc. The blocks of decision-making are indicated by figures in Fig. 7.5.

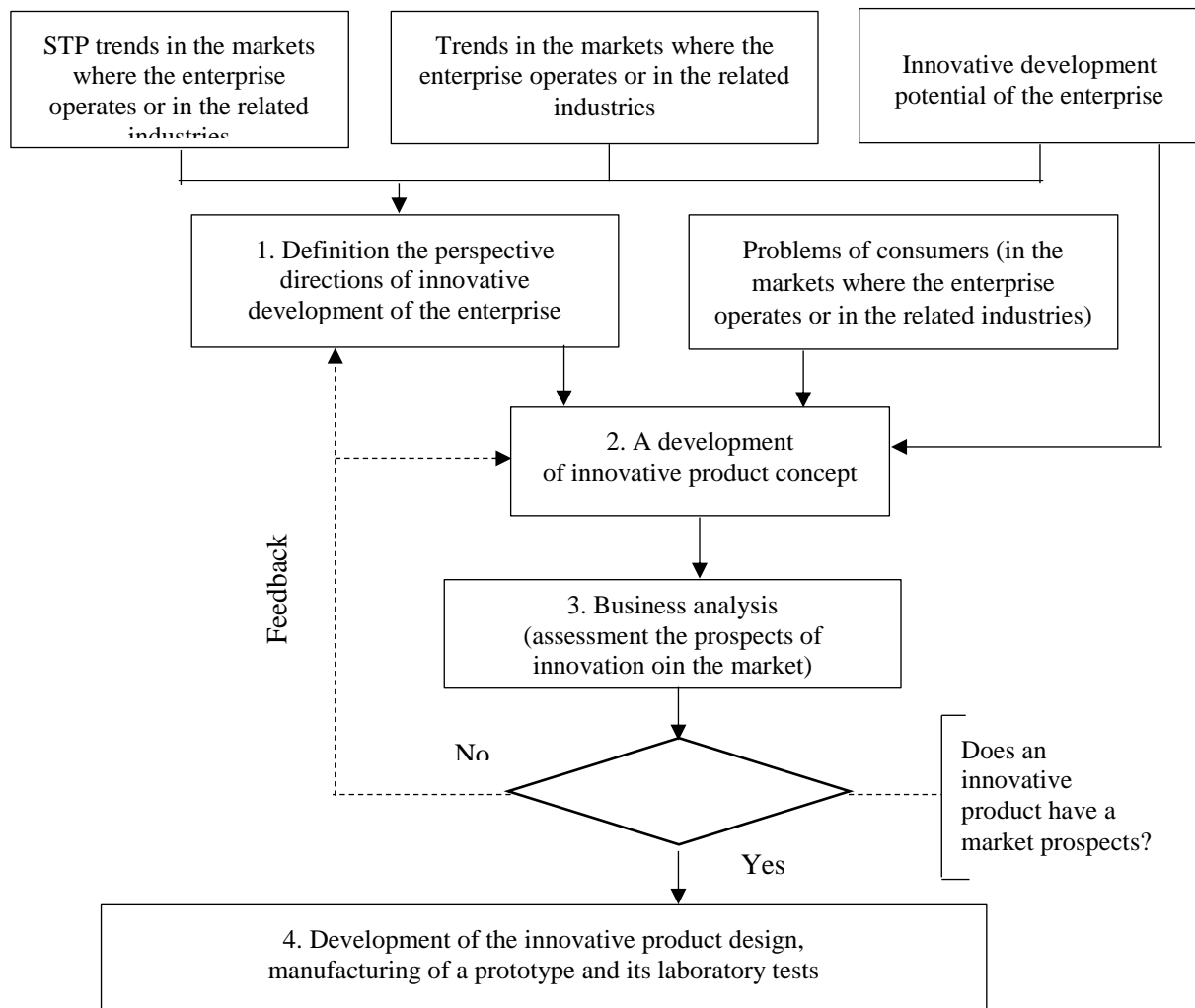


Fig. 7.5. The graphic information model of innovative product concept development (author's development)

2. Commercialization of innovative products of industrial enterprises (choice of commercialization strategies).

Taking into account the deliverables outlined in paragraphs 1 and 2.1, the algorithm for managing the commercialization of innovative products of the industrial enterprise was developed (see Fig. 7.6). It reflects the sequence and content of decision-making procedures, the types of information on which they are made, the criteria for decision-making, the reference to the methods of calculating the performance indicators.

Next, consider the main stages of the commercialization algorithm in detail.

1. The adequacy of the level of each component of the innovative development potential of industrial enterprise is performed according to the method of one of the authors¹. The evaluation is performed for a specific innovative project, which involves the creation and promotion of product innovations. It is based on the deliverables described in paragraph 2.1 (see Fig. 7.5, Block 4).

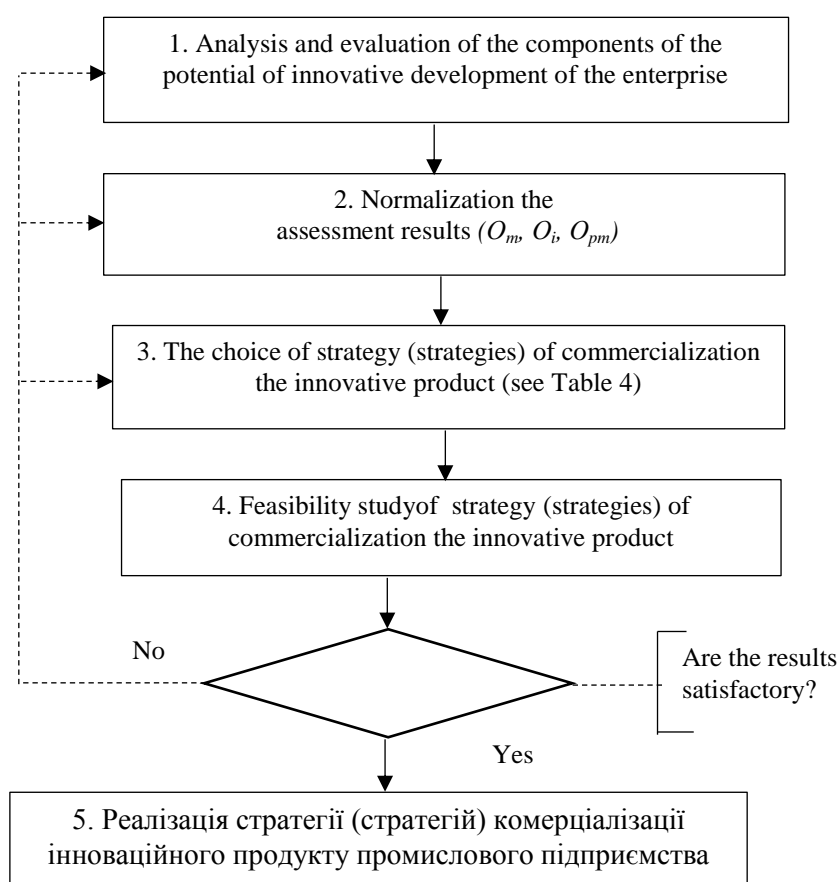


Fig. 7.6. The algorithm for managing the commercialization of innovative products of industrial enterprises (author's development)

2. Normalization the assessment results is performed according to the following:

- the estimate (O_i) of the relevant component is assumed to be 1 if the level

¹ Shypulina Yu.S. (2006). Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise [Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise]. Marketing and management of innovative development [Marketing and management of innovative development]. S.M. Illiashenko (Ed.). Sumy: VTD "Universytetska knyha".

of the component is sufficient;

– the estimate (O_i) of the relevant component is assumed to be 0 if the level of the component is insufficient.

3. The choice of a particular strategy for the innovative product commercialization is performed following the recommendations of Table. 7.5.

Table 7.5. Commercialization strategy selection table¹
(modified by the authors)

The innovation's novelty degree	The estimates of each subsystem's component of the innovative development potential of an industrial enterprise, respectively: O_m, O_i, O_{pm}							
	1, 1, 1	1, 1, 0	1, 0, 1	0, 1, 1	1, 0, 0	0, 1, 0	0, 0, 1	0, 0, 0
Radical	9	2, 3	8		4	1		
Improving, modifying	5		6	7, 10				

Table 7.5 shows the normalized estimates of the market (O_m), innovative (O_i), production, and marketing components (potentials-subsystems) (O_{pm}) of the innovative development potential of the analyzed industrial enterprise. The cells of Table 7.5 indicate the numbers of variants of the innovative process according to Fig. 7.4 and Table 7.1. For the convenience of use, Table 7.5 highlights the strategies of commercialization: separately radical and improving / modifying innovations.

4. Technical and economic analysis of the technical capacity and economic feasibility of implementing the selected commercialization strategy (strategies) is performed by standard methods. According to its results, the following options possible:

– to start the process of implementation of the selected variant of the innovative process (see Fig. 7.4) and the corresponding commercialization strategy (see Table 7.5) for the innovative production of the analyzed industrial enterprise envisaged by the innovative project (in case of positive results of the analysis);

– to move (in case of negative results of the analysis) to the previous blocks to make necessary adjustments to the innovative project and repeat these procedures.

Summarizing the above, it should be noted that the authors have developed a methodological approach to step-by-step management (according to

¹ Illiashenko S.M. Innovative process rational choice grounding in organization. Marketing and Management of Innovations. 2015. n. 2. p. 11-20.

formalized procedures) of commercialization of innovative products of the enterprise:

1) development of the concept of an innovative product, which is highly likely to gain market success;

2) control of the selection of strategies for commercialization of innovative product of industrial enterprise.

Practical testing of the proposed approach in small and medium-sized industrial enterprises producing machinery and equipment confirmed its effectiveness in managing the innovative process at the stage of selection of strategies for commercialization of product innovations.

The obtained results allow us to proceed to the formation of theoretical and methodological foundations of organizational and economic mechanisms for managing the commercialization of innovative products of an industrial enterprise.

7.3 The structure and features of formation and functioning of the organizational and economic mechanism of commercialization of innovative products of industrial enterprises

Based on the deliverables of paragraphs 7.1-7.2, the conceptual diagram of the organizational and economic mechanism of the commercialization of innovative products of industrial enterprises (OEMCIPIE) is presented in Figure 5. The arrows in the diagram show the flows of information and knowledge that underlie the relevant management decisions. Bold arrows show the direction of management effects on the internal components of ensuring the market success of strategies of commercialization of innovative products (creation of innovations and development of strategies of their commercialization); the influence of the commercialization strategy on the external micro-environment (implementation of strategies).

Interaction of blocks 1, 2, 4 implements the OEMCIPIE functions, which are oriented to the process of creating and manufacturing innovations to solve actual and potential consumer problems (see Paragraph 1). Such innovations have a high chance of being successfully commercialized.

Interaction of blocks 1, 3, 4 implements the OEMCIPIE functions, which are oriented to the commercialization of innovative products: the formation of a

communication system and stimulation of demand, as well as the formation of a marketing system and the implementation of innovation. The procedures of the commercialization system are formed depending on the chosen variant of its strategy (see section 2).

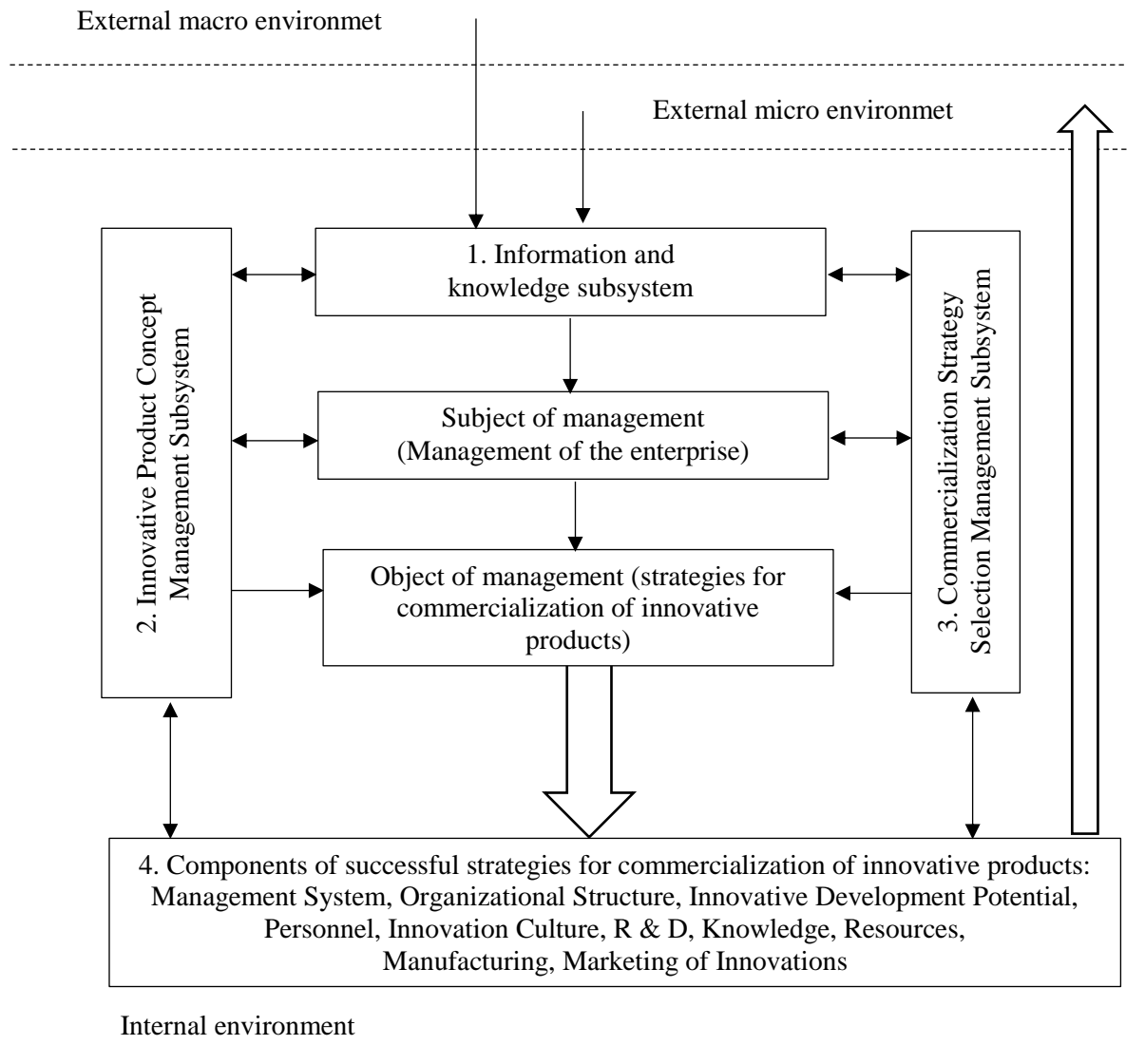


Fig. 7.7. OEMCIPIE scheme (author's development)

Block 4 (see Fig. 7.7) outlines the main components of an enterprise system, the impact of which ensures the effectiveness of industrial enterprise innovative product commercialization strategies. Next, we consider them in more detail from the standpoint of ensuring the effectiveness of the commercialization strategies management:

1. Management system. Managerial activities should address to the

following: rationalization of organizational structure; providing a dynamic and flexible response to changes in dynamic conditions, programming and change management; risk management; formation of an effective communication system (direct and feedback connections); improving the efficiency of the motivation system; ensuring effective control of management decisions implementation, etc.

2. Innovative development potential. Management actions should be aimed at ensuring a high level of its constituent subsystems and their elements. It is recommended to develop a system of appropriate measures based on the results of diagnostics of their condition and assessment of adequacy or insufficiency for the implementation of specific innovative projects¹.

3. Personnel. Managerial activities should be aimed at improving the level of skills, knowledge, creativity of staff, ensuring its rational age and gender structure, psychological compatibility, etc.

4. Innovative culture. Innovative culture management should be directed to the following: ensuring a high degree of support of individual employees, groups of employees (units) and the enterprise as a whole to innovations, readiness to transform them into new products, technologies, managerial decisions, etc.; motivation of creative activities, ensuring creativity, legal protection of copyright, etc.; promotion of the creative potential of the staff, continuous learning, and self-improvement, etc.

5. R&D. The management activities should be aimed at the development of the experimental and testing base, methodological support of R&D, support of patent activity of personnel, formation and development of research units, practical orientation and efficiency of R&D, etc.

6. Knowledge. Management of formation and actualization of the knowledge base of the enterprise. Ensuring the effectiveness of the enterprise knowledge management system (their production and use).

7. Resources. Maintenance of an adequate level of material, technical and financial support.

8. Manufacturing. Improvement of the production system, maintaining it at a high level: technologies, contacts, personnel, traditions, production areas, efficiency, etc.

¹ Shypulina Yu.S. (2006). Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise [Indicators, criteria and methods of diagnostics of innovative potential of industrial enterprise]. Marketing and management of innovative development [Marketing and management of innovative development]. S.M. Illiashenko (Ed.). Sumy: VTD "Universytetska knyha".

9. Marketing of Innovations. Formation of the marketing system of innovation (strategic and operational marketing): personnel, experience, practical orientation, organizational structure, relations with economic counterparties and contact audiences, methodical and information support, efficiency.

Considering that in the last decades among the functions of management (analysis, organization, motivation, control), the organization goes to the first positions and at the same time its role is constantly growing, the organizational aspects of the OEMCPIE functioning are investigated. According to the results of the research, the functions of the industrial enterprise divisions, which are involved in managing the strategies of commercialization of its product innovations, are systematized in Table 7.6.

Table 7.6 provides an overview of the division functions between of industrial enterprise at different stages of commercialization of its product innovations. Based on Table 6, it is advisable to form a matrix organizational structure for the implementation of OEMCPIE functions.

The matrix organizational structure of OEMCPIE supposes the involvement of qualified specialists of different departments of the enterprise. While carrying out the OEMCPIE tasks, they gain experience in related fields of knowledge. At the same time, most specialists are well aware of the possibility of the creative performance of specific tasks assigned to them, which are solved within the framework of the proposed project-oriented matrix structure. And this is an additional element of motivation of intellectual and creative activity of personnel.

Summarizing the above, the authors have developed and scientifically substantiated the methodological and theoretical and methodological foundations of the formation and functioning of the organizational and economic mechanism of commercialization of innovative products of industrial enterprises (OEMCPIE). The essence and content of the OEMCPIE components, the main functions, principles of functioning and structure, instrumental and methodological support, organizational aspects of functioning are determined. An approach to developing a market-oriented concept of an innovative product, as well as an approach to managing its commercialization strategies, are proposed and substantiated.

Table 7.6. OEMCIPIE functions and management actions of industrial enterprise divisions (author's development)

Key functions	Divisions, separate employees									
	Top management	Financial & economic	Marketing	Technological	Конструкторські	R&D	Production	Informational & analytical	HR	Logistics & technical support
Market trends analysis on the industry of the enterprise (or related industries)	D, DC		I, DI			C				
Industry's (or related industries) STP trends analysis	D, DC			DI	DI	C		I		
Analysis of enterprise's innovative development potential	D, DC	DI	DI	DI	DI		DI	I	DI	C
Analysis of customers' problems on the industry of the enterprise (or related industries)	D, DC		DI					I		
Identification of potential directions of innovative development of the enterprise	D, DC	DI	DI	DI	DI	C	DI	I	I	C
Development of innovative product concept	D, DC	C	DI	DI	DI	C	C	I	C	C
Business analysis (analysis of market prospects of innovation)	D, DC	C	DI	C	C	DI	C	I	C	C
Design of innovative product, production of prototype and its laboratory tests	D, DC	C	I	DI	DI	DI	C	I	C	C
Choice of commercialization strategies of innovative products	D, DC	C	DI	DI	DI	C	C	I	C	C
Feasibility study of the commercialization strategy (strategies)	D, DC	DI	DI	DI	DI	C	DI	I	C	C
Implementation of the commercialization strategy (strategies) of the innovative product of the industrial enterprise	D, DC	DI	DI	C	C	C	DI	I	C	DI

Legend: Actions for the implementation of OEMCIPIE functions by enterprise units: D – management decisions; I – information support of management decisions; C – coordination of management decisions; DI – implementation of decisions, DC – control of decisions.

The practical implementation of the scientific and applied research deliverables will provide an opportunity to solve the problem of increasing the efficiency of the commercialization strategies of innovative products of industrial enterprises, which operate in conditions of high degree uncertainty and risk.

The obtained results deepen theoretical and methodological foundations of innovations' management in terms of forming the principles of the organizational and economic mechanism of commercialization of innovative products of industrial enterprises. Further research should aim at improving the system of management tools, according to formalized procedures of strategies for commercializing innovative products.

8. RESEARCH OF CONDITIONS OF TAX PLANNING OF THE INDUSTRIAL ENTERPRISE

Kudrina Olha, Saienko Olga

8.1 Tax planning as a structural element of the general planning of economic activity of enterprises

In modern scientific views, taxes, along with the traditional, is given the role of a cost measure of the state and efficiency of the relationship between the enterprise and the institutional environment. Planning tax transaction costs allows the company to prevent many difficult situations in this regard and partially eliminate the negative effects of uncertainty and variability of the institutional environment.

Improving the planning of tax transaction costs in the enterprise in the context of recognizing taxes as a type of transaction costs is a way to increase the efficiency of the enterprise. Planning of tax transaction costs at the enterprise provides the owners of capital and management of the enterprise with the necessary information, which fully characterizes the impact of the tax system on the internal and external environment of the enterprise and allows to make more informed management decisions.

First, it should be noted that:

1. Taxes are an integral part of the enterprise's transactional institutional costs.

2. When planning tax payments, a number of methods are used that are adequate in a given situation, and these are the same methods that calculate all the negative financial flows of the enterprise, so tax planning methods easily fit into the mechanism of calculating financial plans. Therefore, tax planning is considered an integral part of financial planning of the enterprise.

3. Tax planning should not end with the calculation of the tax burden according to one method or another, because the tax burden indicator itself is not informative enough to make financial decisions. He must further participate in the calculation of the institutional burden of the enterprise both in retrospect and in the future – in the calculation of the relationship between the «price of obedience to the law» and «price of illegality», which are important indicators of financial policy.

As a result, short-term and medium-term financial planning in the enterprise should allow the formalization of these relationships in the company's plans and allow the calculation of the strength and direction of the impact of the initial controlled factors of the financial system on these ratios. It is necessary to calculate the coefficients of sensitivity of the resulting financial indicators to the financial decisions, including tax, in order to conduct an analysis according to the formula «what if». To this end, the financial plan of the enterprise must be improved so that it turned from reactive to inactive and made it possible to predict the price and size of the impact of certain tax decisions not only on the financial result of the enterprise but also on the total cost of its relationship with the environment.

Based on the above, the initial hypothesis for the study in this section will be considered as follows: the ideology and methodology of short-term financial planning does not allow to obtain certain numerical characteristics of financial management processes in the enterprise, which would allow targeted multivariate management of these processes.

Analyzing the basic theoretical provisions and definitions of financial planning, it becomes clear that most scholars perceive financial planning as a part of financial management, but do not perceive it as a tool of strategic management that would reconcile the financial relations of external and internal environment. This thesis is confirmed by such aggregated opinions of scientists:

1. «The purpose of financial planning is to determine the total needs of the enterprise in such a number of financial resources to ensure financing of production expansion, fulfillment of financial and credit obligations to the budget, banks, etc., solving social problems and financial incentives for employees. Besides, financial planning helps to prevent excessive and unplanned costs of inventory and financial resources as for certain types of activities and for capacity in general» says V.A. Goremykin¹.

2. Prof. E.A. Utkin² agrees with him and notes: «The object of financial planning is income and accumulation, their formation and distribution, relations with the financial and credit system, funds, their formation and use, capital investments and current assets, planning their volumes and sources of funding, definition of sources of financing of social and cultural and household spheres of the enterprise».

¹ Goremykin, V.A., Bugulov, E. R., & Bogomolov, A. Ye. (2000). *Planirovaniye na predpriyatii* [Planning at the enterprise]. Moscow: Informatsionno-izdatelskiy dom «Filin», Rilant [in Russian].

² Utkin, E.A. (Eds.). (1998). *Strategicheskoye planirovaniye* [Strategic planning]. Moscow: Tandem [in Russian].

3. D. Hahn generally agrees that «financial planning is based on the production indicators of the plan, the sales plan of products and services, the plan of capital investments and the development of the social sphere. But he adds: «... the main stages (stages) of financial planning are as follows:

- analysis of receipts and expenditures of financial resources by their types and in general for the previous reporting period;
- drafting a financial plan for the planned year;
- consideration and approval of financial plans;
- implementation of financial plans»¹.

That is, at the first stage of financial planning, as it should be understood, all financial flows, including taxes, are analyzed, but among the types of plans on which financial planning is based, the tax plan is not mentioned.

4. The main differences between the generally accepted essence of financial planning and the characteristics that, in our opinion, should belong to him, begin in the most defined concept of «financial planning». Let's take only some definitions of known scientists, which are summarized in Table 8.1, for research.

Table 8.1. Approaches to defining financial planning

Definition	Author
Financial planning is the determination of the amount of income of the relevant types of financial resources (profit, depreciation, etc.) and their distribution by areas of use in the planned year (period of time).	I.A. Blank ²
Financial planning is the planning of all income and areas of spending money to ensure the development of the enterprise. Financial planning is carried out by performing financial calculations and drawing up plans of different content and purpose, depending on the tasks and objects of planning.	A.M. Podderohin ³
Financial planning is a type of management activity aimed at determining the required amount of financial resources, their optimal distribution and use for the purpose of financial stability of the business entity. Financial planning is directly related to the planning of production activities of the enterprise. All financial indicators are based on indicators of production volume, product range, production cost.	V.V. Kovalov ⁴

¹ Hahn, D. (1997). Planirovaniye i kontrol: kontseptsiya kontrollinga. [PuK – Wertorientierte Controllingkonzepte] (A.A. Turchak, L.G. Golovach, M.L. Lukashevich, Trans). Moscow: Finansy i statistika [in Russian].

² Blank, I.A. (2000). Upravleniye aktivami [Asset Management]. Kyiv: "Nika-Tsent" [in Ukrainian].

³ Podderohin, A.M. (Eds.). (2005). Finansovyy menedzhment [Financial management]. Kyiv: KNEU [in Russian].

⁴ Kovalev, V.V. (1999). Vvedeniye v finansovyy menedzhment [Introduction to Financial Management]. Moscow: Finansy i statistika [in Russian].

A.M. Podderohin draws attention to the fact that «the system of planning and finance management of the enterprise must ensure the fulfillment of a certain strategic goal. Usually focus on one of three goals:

- survival of the enterprise (ensuring financial balance);
- making a profit;
- economic growth of the enterprise»¹.

Today in Ukraine, most companies in financial management cannot effectively implement the chosen global goal, because management decisions are made in response to current problems, i.e. the so-called reactive form of management is used, which creates a number of contradictions: between business interests and fiscal interests; the interests of production and the interests of financial services, etc. Therefore, the viability of the enterprise in the external environment is rarely a guide to financial planning². Analysis of the opinions, presented in Table 8.1, confirms this. Financial planning, both short-term and long-term, is based on the principle of balancing cash flows. If these flows are balanced, the financial planning procedure is considered completed and it is time to implement the plans and control their implementation.

However, it is not always advisable to critically evaluate and compare the amounts of cash flows and their nature. Below we will try to prove that it is impossible in the conditions of the existing generally accepted technique of financial planning.

The organization of financial planning in the enterprise depends on the tasks facing it. A.I. Ilin, who expresses a common opinion, asserts that «the main objectives of financial planning in the enterprise are:

- providing the necessary financial resources for production, investment and financial activities;
- identifying ways to effectively invest capital, assessing the degree of rationality of its use;
- identification of internal reserves to increase profits through the economic use of cash;
- establishing rational financial relations with the budget, banks and counterparties;

¹Podderohin, A.M. (Eds.). (2005). *Finansovyy menedzhment* [Financial management]. Kyiv: KNEU [in Russian].

²Kakhovska, O. V. (2006). *Udoskonalennya planuvannya vyrobnychych zatrat metalurhiynoho pidpryyemstva*. [Improving the planning of production costs of the metallurgical enterprise]. Candidate's thesis. Alchevsk [in Ukrainian].

- observance of interests of shareholders and other investors;
- control over the financial condition, solvency and creditworthiness of the enterprise»¹.

There is a reference to the establishment of rational financial relations with the budget, banks and counterparties, which probably involves minimizing the cost of relations with the institutional environment, which also includes taxes. However, it is necessary to check whether there is a methodological possibility to establish these most rational institutional relations in the framework of the procedure of financial planning in an industrial enterprise.

An important aspect of studying the procedure of financial planning in an industrial enterprise is the division of planning into current and future.

Current financial planning is «implementation» planning, it is considered as an integral part of the long-term plan and is a concretization of its indicators. Obviously, any economic activity, because it is managed at a conscious level, presupposes the existence of some plan. However, planning actions can be regular (carried out as a sequence of formalized business processes), or be vague wishes that arise under the influence of the current situation².

«The system of current planning of financial activities is based on the developed financial strategy and financial policy on certain aspects of financial activities. This type of planning is to develop specific current financial plans that allow the company to determine all sources of funding for its development, to form the structure of its income and expenses, to ensure constant solvency, as well as to determine the structure of assets and liabilities of the enterprise at the end of the planned period»³.

The current financial planning of economic activity of the enterprise consists of the development of three registers: the cash flow plan, the profit and loss statement plan, the balance sheet plan.

The current financial plan is drawn up for a period of one year. This is due to the fact that during the year, mainly seasonal fluctuations in market conditions are equalized. In addition, such a time period meets the legal requirements for determining the reporting period.

The annual financial plan is broken down quarterly or monthly, because

¹ Ilyin, A.I. (Eds.). (2000). *Takticheskoye planirovaniye* [Tactical planning]. Minsk: OOO “Novoye znanie” [in Russian].

² Kovalev, V.V. (1999). *Vvedeniye v finansovyy menedzhment* [Introduction to Financial Management]. Moscow: Finansy i statistika [in Russian].

³ Popov, V.M., & Lyapunov, S.I. (Eds.). (2001). *Biznes-planirovaniye* [Business planning]. Moscow: Finansy i statistika [in Russian].

during the year the need for cash can change significantly and in any quarter (month) there may be a lack of financial resources. In addition, the division of the annual plan into short periods of time allows you to track the synchronicity of inflows and outflows of funds and eliminate cash gaps¹.

The authors of the textbook believe that: «The current financial plan is based on data on:

- financial strategy of the enterprise;
- results of financial analysis for the previous year;
- planned volumes of production and sales, as well as other economic indicators of operating activities of the enterprise;
- system of expenses standards of separate resources, developed at the enterprise;
- the current taxation system;
- current depreciation policy;
- interest rates on the deposit and credit markets, etc.»².

The process of current financial planning is actually a financing plan, which is drawn up for the year with a breakdown by quarter.

In order to control the receipt of actual revenue on the current account and the expenditure of available financial resources, the company needs operational planning, which complements the current one. This is due to the fact that the financing of planned activities should be carried out at the expense of funds earned by the enterprise, which requires daily effective control over the formation and use of financial resources³.

Author A.M. Podderohin notes that the operational plan is necessary to ensure the financial success of the enterprise. Therefore, when compiling it is necessary to use objective information about trends in economic development in the field of enterprise, inflation, possible changes in technology and organization of the production process.

Operational financial planning includes both the compilation and execution of the payment calendar, the calculation of the need for short-term credit and cash plan.

¹ Boridina, Ye.I., Golikova, Yu.S., Kolchina, N.V., & Smirnova, Z.M. (2000). *Finansy predpriyatiy*. [Business finance]. Moscow: Banki i birzhi, UNITI [in Russian].

² Hridchina, M.V., Zahozhay V.B. & Osipchuk L.L. (2004). *Finansy (teoretychni osnovy)* [Finance (theoretical foundations)] (2nd ed., rev.). Kyiv: MAUP [in Ukrainian].

³ Hridchina, M.V., Zahozhay V.B. & Osipchuk L.L. (2004). *Finansy (teoretychni osnovy)* [Finance (theoretical foundations)] (2nd ed., rev.). Kyiv: MAUP [in Ukrainian].

Perspective financial planning determines the most important indicators, proportions and rates of expanded reproduction, is the main form of realization of the goals of the enterprise¹.

M.V. Hridchina believes that «long-term financial planning in modern conditions covers a period of one to three years. Long-term financial planning includes the development of financial strategy of the enterprise and financial forecasting. Development of financial strategy is a special area of financial planning, it must be consistent with goals and directions, formulated by the general strategy»².

Thus, the definitions of the financial planning types also do not specify the possibility and methodology of consolidating the planned transaction tax payments with the general current financial plan.

According to the aggregate definition of a number of scientists¹⁷, the process of financial planning consists of several stages. At the first stage there is an analysis of financial indicators for the previous period. To do this, use information from the main financial statements of enterprises: balance sheet, income statement, statement of cash flows. These documents are important for financial planning, as they contain data for analysis and calculation of financial performance of the enterprise, as well as serve as a basis for forecasting.

At the second stage is the preparation of basic forecast documents, such as balance sheet forecast, income statement, cash flows, which relate to long-term financial plans and are included in the structure of a scientifically sound consolidated plan of the enterprise³.

At the third stage there is a clarification and specification of indicators of forecast financial documents by drawing up current financial plans⁴.

At the fourth stage, operational financial planning is carried out. The process of financial planning is completed by the practical implementation of plans and control over their execution⁵.

An important part of the study is the study of methodological approaches to the procedures for forming a set of financial plans of enterprises, which also

¹ Podderohin, A.M. (Eds.). (2005). *Finansovyy menedzhment* [Financial management]. Kyiv: KNEU [in Russian].

² Hridchina, M.V., Zahozhay V.B. & Osipchuk L.L. (2004). *Finansy (teoretychni osnovy)* [Finance (theoretical foundations)] (2nd ed., rev.). Kyiv: MAUP [in Ukrainian].

³ Balabanov, I.T. (1995). *Osnovy finansovogo menedzhmenta. Kak upravlyat kapitalom?* [Fundamentals of financial management. How to manage money?]. Moscow: *Finansy i statistika* [in Russian].

⁴ Blank, I.A. (2000). *Upravleniye aktivami* [Asset Management]. Kyiv: "Nika-Tsentr" [in Ukrainian].

⁵ Ilyin, A.I. (Eds.). (2000). *Takticheskoye planirovaniye* [Tactical planning]. Minsk: OOO "Novoye znanie" [in Russian].

include tax and investment plans. Based on the study of literature sources, we can identify the main methods and models of formation of the enterprise's financial plan, used in modern practice¹⁵:

1. Synchronous production, investment and financial planning based on common models;

2. Methods based on the use of econometric regression models – the method of proportional dependence of financial plan indicators on sales (the method of «percentage of sales»), methods of regression analysis, forecasting method (planning) based on multifactor regression models;

3. Stochastic models of financial decision making;

4. Budget planning;

5. Specialized models of forecasting and planning.

According to the author¹, these groups of models can be divided into 3 classes: deterministic planning and balance models (1, 4, 5); statistical models (2); stochastic models (15).

The method of synchronous production, investment and financial planning is based on combining into a single model of planning production, investment and financial activities. These models, along with cost indicators, contain natural and time parameters and allow simultaneous development: product program and production plan, investment plan (capital investment) and external financing plan, overall results based on the most effective combination of profit and cost of capital²⁰.

Among the general models of synchronous planning there are 2 types: analytical models of decision-making based on the use of linear or mixed integer programming and simulation models built in the form of simple or complex systems of equations. Consider the models of synchronous production-investment and investment-financial planning, which belong to the type of analytical models of synchronous planning²⁰.

The author states: «Popp's model was developed specifically to address the problem of strategic and medium-term planning. This model is a model of production and investment planning, but maximizing the cost of capital, as a target function of the model, allows to take into account the impact of strategic measures on financial flows. This fact allows to use it as a basis for creation of

¹ Poltieva, I.A. (2004). Modelirovaniye protsessov finansovogo planirovaniya na predpriyatiyakh v usloviyakh neopredelennosti [Modeling of financial planning processes at enterprises in conditions of uncertainty] Candidate's thesis. Donetsk [in Russian].

the general model of synchronous production and financial planning, having expanded it so that in the process of optimization, a plan of investments in production facilities was formed under the condition of guaranteed liquidity, a plan of financing was formed by attracting borrowed capital, as well as changes in share capital by issuing shares and equity at the expense of profit.

Dynamic models of synchronous investment and financial planning are designed for simultaneous planning of investment and financial programs with given financial resources and the availability of financing alternatives. They use the method of determining the value of capital as the sum of all discounted at a single interest rate at a given point in time cash inflows and outflows arising from investment and financial activities»²⁰.

A one-step dynamic model of synchronous investment and financial planning was proposed by G. Albach¹. As a target function of the model, the total cost of capital of investment and financial programs was used, which was subject to maximization.

The multilevel dynamic model of synchronous investment and financial planning proposed by R. Hux and R. Weigartner²¹ helps to eliminate the assumptions about the independence of investment objects and objects of financing, as well as some contradictions in the circumstances adopted in relation to the target function. The target function of the model is the final value of the property, which is a positive balance of payments at the last moment of the planning period that is taken into account. To model the financial plan in this model it is necessary to enter the block of production planning. Accordingly, it is necessary to introduce the flow of net payments for operating activities, and among the restrictions – the conditions of production and marketing, as well as restrictions on liquidity. As an objective function of the model, it is necessary to maximize the total cost of production capital, investment and financial programs as the sum of all discounted at a single interest rate at a certain point in time revenues and payments from various activities²⁰.

«However, the greatest difficulty in implementing the model is not the solution itself, but data collection – forecasts of net payments for operating, investing and financing activities. To increase the accuracy of forecasts, we can

¹ Shelobaev, S.I. (2000). *Matematicheskiye metody i modeli v ekonomike, finansakh, biznese* [Mathematical methods and models in economics, finance, business]. Moscow: UNITI-DANA [in Russian].

offer a review of typical models of income flows¹ and their impact on the target function of the model: models of the flow of constant, conditionally constant income, income that changes linearly, exponential income flow», – believes author².

Methods based on the use of econometric regression models. The use of methods combined in this group is based on two characteristics of the enterprise – the relationship and inertia. The characteristics of the relationship follow from the definition of the enterprise as a system characterized by the interaction of its individual elements. This means that the indicators change in dynamics in a coordinated manner, despite the fact that many indicators are not interconnected by functional dependencies. Inertia means that given the stable technological processes, internal and external connections in the system, there can be no sharp deviations from the key quantitative characteristics. But this group of methods has the advantage of simplicity, so it is often used in practice, especially in conditions of insufficient information.

Stochastic models of decision making. Under conditions of uncertainty, one of the main methodological directions in the development of economic planning is the introduction of the factor of incompleteness and uncertainty of information using stochastic models that use random variables. In the theory of optimal planning, the problems of modeling the adaptability of plans and economic parameters that coordinate them, their adaptability to additional information received in the process of implementing the plan become relevant. Modeling the adaptability of the financial plan using stochastic models is an urgent task today, as author asserts²³.

Staging a stochastic model is a non-trivial task. To the possible forms of such setting (linear – nonlinear, in statics – in dynamics, and so on) is added a significant number of problems associated with the reflection of the indeterminacy of the modeled objects²³.

The method of budget planning refers to the methods of operational financial planning. «Today, from the point of view of the practice of improving the process of financial planning in enterprises, the most widespread is the introduction of budget planning (budgeting). Budget planning (budgeting) is a

¹ Ennuste, Yu.A., & Matin, A.V. (1989). Stokhasticheskiye ekonomicheskiye modeli adaptivnogo planirovaniya i problemy ikh koordinatsii [Stochastic economic models of adaptive planning and problems of their coordination]. Moscow: Nauka [in Russian].

² Poltieva, I.A. (2004). Modelirovaniye protsessov finansovogo planirovaniya na predpriyatiyakh v usloviyakh neopredelennosti [Modeling of financial planning processes at enterprises in conditions of uncertainty] Candidate's thesis. Donetsk [in Russian].

process, adapted to market conditions, of enterprise planning by developing interconnected budgets at different levels and control over their implementation»¹.

This method is widely used in Western practice, there are also positive assessments in its implementation in domestic enterprises. This is due to its built-in control system, which allows you to monitor daily budget execution, cash flow and current performance.

Analyzing the main groups of models used in the process of financial planning at different levels, according to the author ² it should be noted the following: «Statistical models are based only on internal information of the object, they do not take into account external information relevant to development Deterministic planning models are abstracted from incompleteness, uncertainty of information and inertia of economic development, they do not reflect the adaptability of planning indicators. Stochastic optimization models are stripped of these shortcomings and can remove the uncertainty factors of the environment, but in financial planning are used in a simplified form as solving more adequate and more complex models is very challenging.

The analyzed models are specialized for one of the selected levels of planning (strategic, tactical or operational). Based on the specifics of the financial planning tasks in conditions of uncertainty, there is a need to develop a set of models for forming a financial plan based on the association within a systematic approach of expert methodology and promising economic and mathematical methods»³.

In the literature on financial planning in enterprises two schemes of work organization on drawing up plans are usually distinguished: the method of break-down (top – down) and the method of build-up (bottom – up). According to the break-down method, work on making plans begins «from above», i.e. the management of the enterprise defines the purposes and tasks, targets on profit in particular. Then these indicators, in a more detailed form, as you move to lower levels of the enterprise structure, are included in the plans of departments. The

¹ Poukok, M.A., & Taylor, A.C. (1999). *Finansovoye planirovaniye i kontrol* [Financial planning and control]. Moscow: INFRA-M [in Russian].

² Kakhovska, O. V. (2006). *Udoskonalennya planuvannya vyrobnychychk zatrat metalurhiynoho pidpryyemstva*. [Improving the planning of production costs of the metallurgical enterprise]. Candidate's thesis. Alchevsk [in Ukrainian].

³ Kakhovska, O. V. (2006). *Udoskonalennya planuvannya vyrobnychychk zatrat metalurhiynoho pidpryyemstva*. [Improving the planning of production costs of the metallurgical enterprise]. Candidate's thesis. Alchevsk [in Ukrainian].

build-up method does the opposite. For example, the calculation of sales indicators begins with individual sales units, and then the company's head of the sales department brings these indicators into a single financial plan, which can later become an integral part of the overall plan of the enterprise. The break-down and build-up methods are two opposites. In practice, it is not advisable to use only one of these methods.

The financial plan consists of several specific documents that are interrelated in terms of indicators contained in them.

There are several options for developing a financial plan. According to one of them, the documents include:

- sales forecast;
- balance of cash expenditures and revenues;
- table of income and expenses;
- projected balance of assets and liabilities of the enterprise;
- calculation of break-even point¹.

I.A. Blank notes the importance of forecasting sales volumes as the initial stage of financial planning: «The forecast of sales volumes is not accidentally included in the financial plan and is in the first place. The source of the vast majority of financial resources is still sales revenue, which will include almost all future expenditures of the enterprise. If the forecast of sales volumes is made in physical units, there is an opportunity, by changing the price, to calculate financial indicators in several ways. But more often it happens that when making a sales forecast, the price of products, even for a short future, but is already determined»².

In most cases, the sales forecast is made for several years ahead. For example, it may be as follows: data for the first year is given monthly and is more accurate and reliable, as prospective buyers are well known and supply contracts have already been concluded with them. Data for the second year is given quarterly. The third year – one annual amount. Taking into account the forecast sales amounts, raw materials and equipment are purchased, wages are paid, and taxes are paid. The amount of all these costs should be such as to obtain the expected amount of profit, taking into account the capital invested in production.

¹ Kolass, B. (1997). *Upravleniye finansovoy deyatelnosti predpriyatiya. Problemy, kontseptsii i metody*. [Financial management of an enterprise. Problems, concepts and methods]. (Ya. V. Sokolov, Trans). Moscow: Financy, UNITI [in Russian].

² Blank, I.A. (2000). *Upravleniye aktivami* [Asset Management]. Kyiv: "Nika-Tsentr" [in Ukrainian].

8.2 Research of the enterprise's tax and general financial plan consolidation conditions

The most important document of the financial plan is the balance of cash expenditures and revenues, which has another name – cash flow balance. The purpose of its compilation is to achieve synchronicity of receipt and expenditure of funds or, in other words, to achieve the required level of liquidity of assets of the future enterprise. Since liquidity is determined by a value at a certain date, it is desirable that the data of the cash expenditures and receipts balance is given over short periods of time. When lengthening the time intervals, the value of the information presented in this document decreases, even if it is reliable¹.

The cash flow balance is in the form of a table, which displays data on the availability of cash at the beginning of the period, receipt and expenditure of funds during the period, and the calculation completes with data on the availability of cash at the end of the period.

For analytical purposes, the table can be supplemented with information on receivables and payables, the amount of bad debts, inventories, which is reflected in other sections of the financial plan. Data and the result of balancing cash flows must be associated with the actions of the enterprise to form its own working capital. Lack of working capital and its immobilization is the cause of the situation when at the right time the company does not have the required amount of money.

The next document (register) of current financial planning is the annual cash flow plan, which is actually the financing plan. It is made for a year with a breakdown by quarters. This plan can be made by two methods:

the direct method is based on the calculation of cash inflows and outflows, thus summing up the balance sheets for three types of enterprise activities: basic, investment, financial;

the indirect method is based on the consistent adjustment of net income due to changes in the assets of the enterprise. The initial element of this method is profit².

The calculation in the form of a table of income and expenses shows how the company's profit will be formed. Profit from the sale of marketable products

¹ Blank, I.A. (2000). Upravleniye aktivami [Asset Management]. Kyiv: "Nika-Tsentr" [in Ukrainian].

² Balabanov, I.T. (1995). Osnovy finansovogo menedzhmenta. Kak upravlyat kapitalom? [Fundamentals of financial management. How to manage money?]. Moscow: Finansy i statistika [in Russian].

is the main component of the gross profit of the enterprise. Consider the proposed in the scientific literature methods of its planning³⁰.

The direct calculation method is the most common. It is usually used when a range of products is small. In the most general form, profit is the difference between price and cost, but when calculating the planned amount of profit, it is necessary to specify the volume of products from which this profit is expected. Profit on commodity production is planned on the basis of cost estimates for production and sales, which determines the cost of commodity production of the planned period¹.

The projected balance of assets and liabilities of the enterprise should be made on the start and end dates of the planned period. This document has a structure that corresponds to the balance sheet of the enterprise and characterizes the size and composition of assets of the enterprise. These data are of interest to investors and commercial banks, which are approached by an entrepreneur who is going to finance the acquisition of these assets.

When compiling the balance of assets and liabilities, «plug method», recommended by foreign economists², can be used. As known, in economic calculations in planning and forecasting, priority is given to assets and expenses. The sources of their formation and financing are formed after them. The difference between the planned assets and the already existing sources of their formation is called «plug». If it has a negative value, it can be knocked out with the help of additional external financing: the issuance of securities or loans. If the forecast is that own sources and borrowed funds, already involved in the circulation, will be more than sufficient for the formation of productive assets, a positive plug is formed, which is eliminated by repaying borrowed funds, and excess own funds can be invested in securities³².

The final section of the financial plan provides a calculation of the conditions for achieving break-even point and analyzes other financial indicators. Profit maximization is the main goal of financial management, and one of the approaches to its achievement is to compare sales revenue not with total costs, but with variable fixed costs. The difference in the ratio between fixed and variable costs leads to the fact that changes in production and related sales revenue in different ways affect the change in profit.

¹ Goremykin, V.A., Bugulov, E. R., & Bogomolov, A. Ye. (2000). Planirovaniye na predpriyatii [Planning at the enterprise]. Moscow: Informatsionno-izdatelskiy dom «Filin», Rilant [in Russian].

² Poukok, M.A., & Taylor, A.C. (1999). Finansovoye planirovaniye i kontrol [Financial planning and control]. Moscow: INFRA-M [in Russian].

If we turn to the question of the chronology of the procedure of short-term planning in an industrial enterprise, this chronology is in the form of a diagram, according to several scientists, includes the following steps:

1. Financial and economic analysis (block 1).
2. Formation of the production program (blocks 2.1-2.6).
3. Calculation of enterprise budgets (block 3).
4. Financial planning (block 4.1-4.3).
5. Evaluation of the financial planning results (block 5).

The diagram, in addition to the functional blocks of which it consists, shows the sequence of consolidation of financial plans into a general system of plans of the enterprise. In the opinion of these scientists, the sequence of consolidation of certain types of plans into a general system of plans of an industrial enterprise should look like in Fig. 8.1.

However, many foreign scientists do not agree with this variant of the sequence¹.

The main feature of this approach is that budgeting in this case is perceived solely as a tool of financial planning: first, the formation of the production program is carried out, and then the calculation of enterprise budgets, based on which calculations of forecast financial results and forecast balance are made. In this case, it is unclear what is included in the budget calculation unit, while the consolidated budget of the enterprise² includes the operating part, consisting of sales and production programs, and the financial part, consisting of the calculation of financial results, balance sheet and calculation of cash flows (Fig. 8.1). In this case, the production program is calculated separately (block 2), calculations of the financial result, balance sheet and cash flow – separately (block 4). In the third block, either only the sales program remains, or the calculation of all parts of the operating budget is duplicated in the budgets. The authors of the scheme do not specify this point. Therefore, this procedure requires clarification and improvement.

One of the main substantive categories of the current financial planning procedure is planning methods. Planning methods are specific ways and methods of calculating indicators.

¹ Hahn, D. (1997). Planirovaniye i kontrol: kontseptsiya kontrollinga. [PuK – Wertorientierte Controllingkonzepte] (A.A. Turchak, L.G Golovach, M.L. Lukashevich, Trans). Moscow: Finansy i statistika [in Russian].

² Hahn, D. (1997). Planirovaniye i kontrol: kontseptsiya kontrollinga. [PuK – Wertorientierte Controllingkonzepte] (A.A. Turchak, L.G Golovach, M.L. Lukashevich, Trans). Moscow: Finansy i statistika [in Russian].

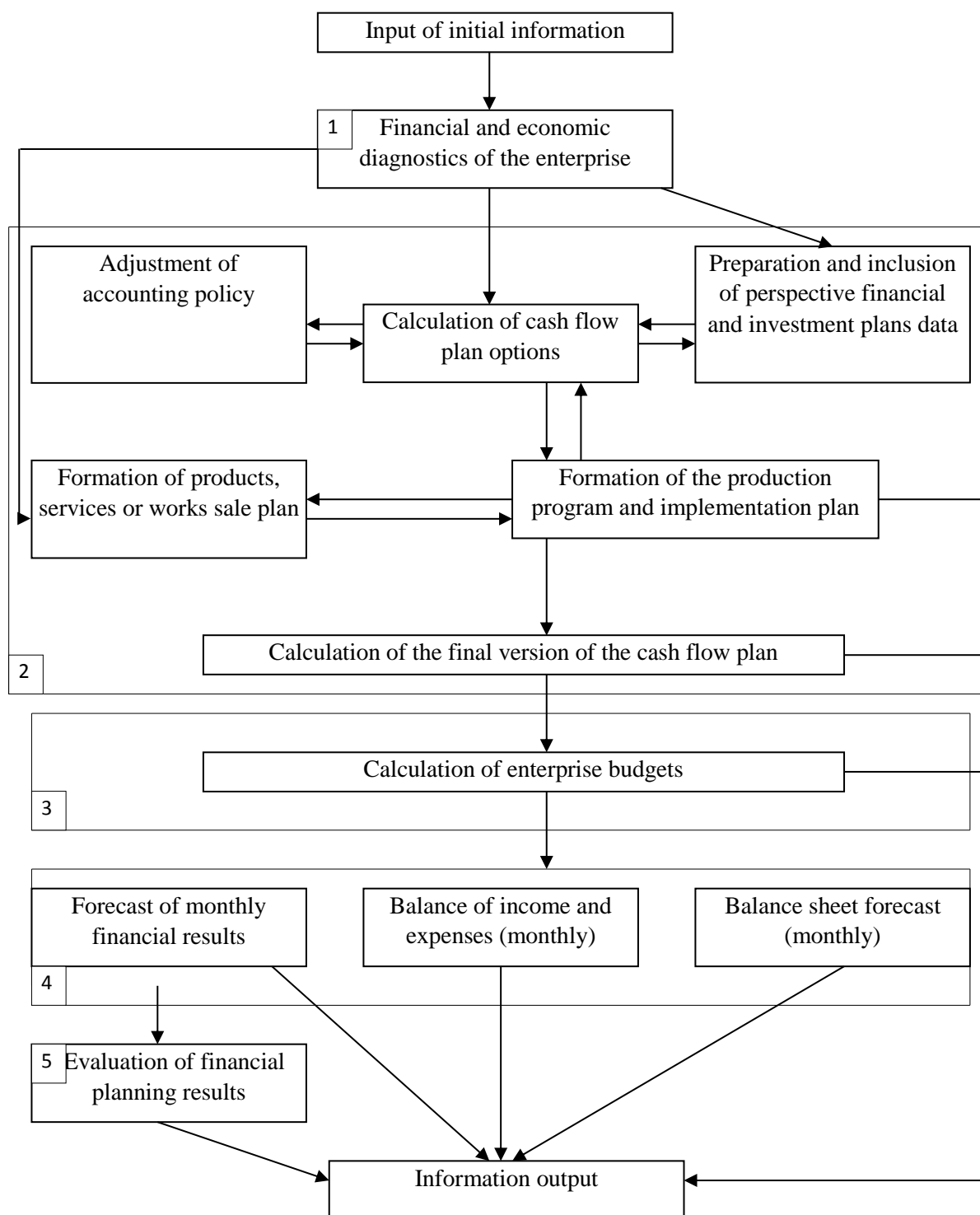


Fig. 8.1. The implementation scheme of an industrial enterprise's current financial planning^{1,2,3,4,1,2}

¹ Blank, I.A. (2000). Upravleniye aktivami [Asset Management]. Kyiv: "Nika-Tsentr" [in Ukrainian].

² Goremykin, V.A., Bugulov, E. R., & Bogomolov, A. Ye. (2000). Planirovaniye na predpriyatii [Planning at the enterprise]. Moscow: Informatsionno-izdatelskiy dom «Filin», Rilant [in Russian].

³ Kovalev, V.V. (1999). Vvedeniye v finansovyy menedzhment [Introduction to Financial Management]. Moscow: Finansy i statistika [in Russian].

⁴ Kolchina, N.V., Polyak, G.B., & Pavlova, I.P. (1998). Finansy predpriyatiy [Business finance]. Moscow: Finansy, UNITI [in Russian].

It is noted: «Naturally, there are no universal recipes that could be used with equal success in different companies. But there are methods that can be used to build enterprise management systems. They are a formalized set of concepts and processes that allow you to create a description of how the company must work, and have a purely constructive nature, i.e. they can be perceived as a set of instructions (algorithm)»³.

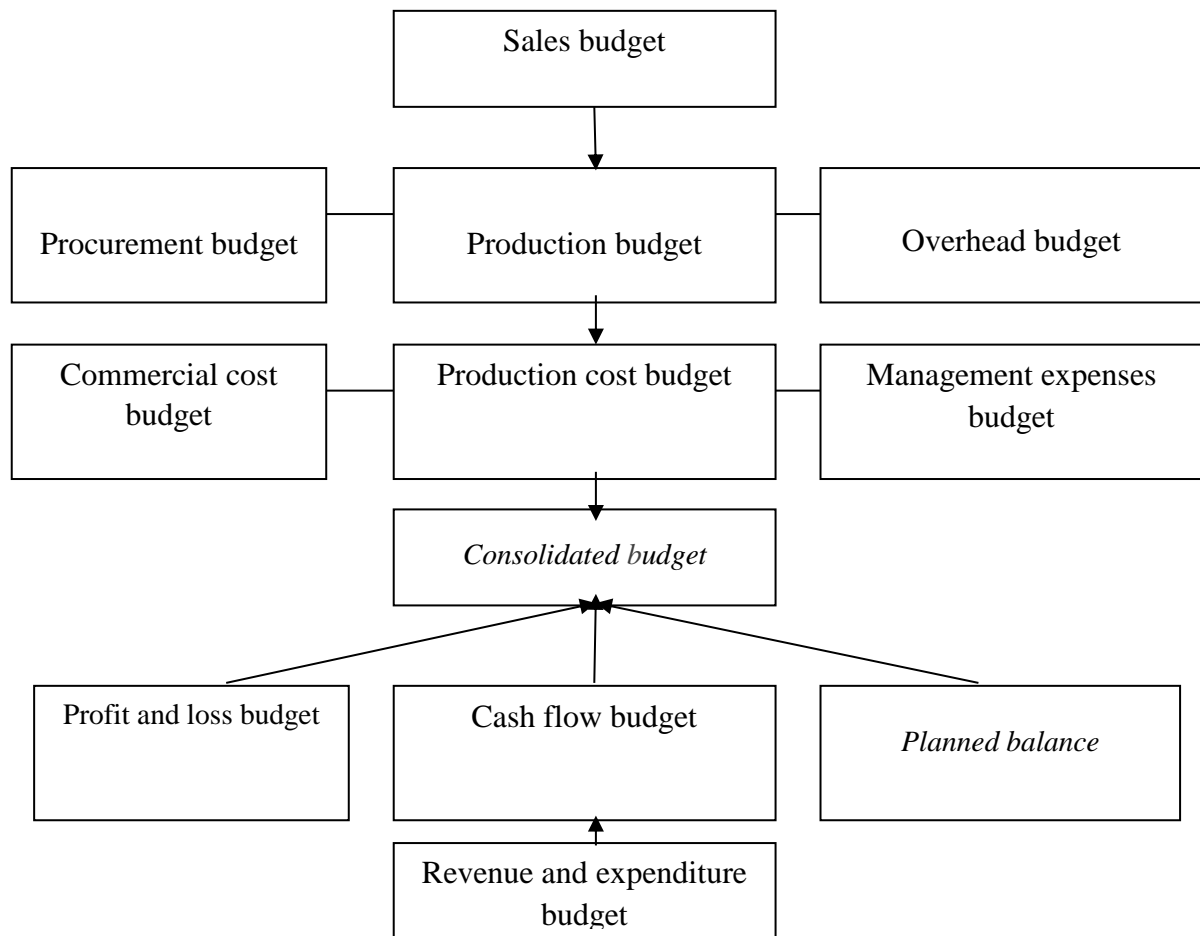


Fig. 8.2. The composition of an industrial enterprise's budgets⁴⁰

In the practice of financial planning, the following methods are used:

- economic analysis,
- normative,

¹ Hridchina, M.V., Zahozhay V.B. & Osipchuk L.L. (2004). *Finansy (teoretychni osnovy)* [Finance (theoretical foundations)] (2nd ed., rev.). Kyiv: MAUP [in Ukrainian].

² Podderohin, A.M. (Eds.). (2005). *Finansovyy menedzhment* [Financial management]. Kyiv: KNEU [in Russian].

³ Hridchina, M.V., Zahozhay V.B. & Osipchuk L.L. (2004). *Finansy (teoretychni osnovy)* [Finance (theoretical foundations)] (2nd ed., rev.). Kyiv: MAUP [in Ukrainian].

- balance calculations,
- cash flows,
- multivariate method,
- economic and mathematical modeling.

The method of economic analysis is used to determine the basic patterns, trends in the movement of natural and value indicators, internal reserves of the enterprise¹.

The essence of the normative method is that on the basis of pre-established norms and technical and economic standards, the business entity's need for financial resources and their sources is calculated. Standards can be set by the state in the form of a special regulatory or legislative framework – rates of taxes and fees, depreciation rates and other standards. Standards of the enterprise itself are standards developed directly at the enterprise and used by it to regulate production and economic activities, control over the use of financial resources, etc.

The use of the method of balance calculations to determine the future need for funds is based on the forecast of receipts and expenditures on the main balance sheet items at a certain date in the future³⁷.

The method of cash flows is universal in the preparation of financial plans and serves as a tool for forecasting the size and timing of the receipt of the necessary financial resources (Fig. 8.3). The theory of cash flow forecasting is based on the expectation of receipt of funds on a certain date and budgeting of all costs and expenses. This method provides much more useful information than the balance sheet method³⁷.

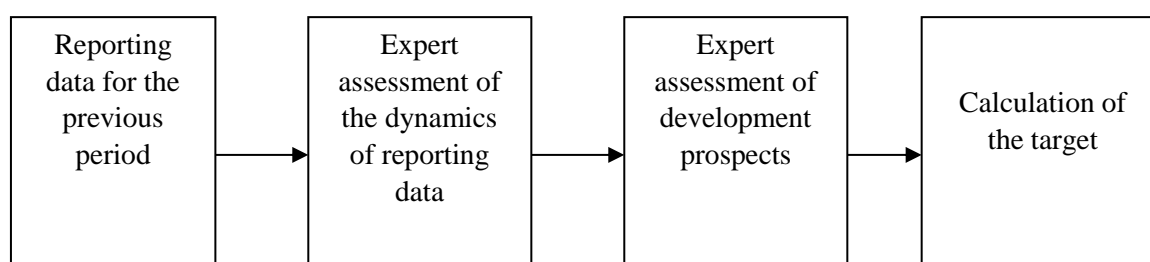


Fig. 8.3. Scheme of cash flows planning method⁴²

The multivariate method of calculations is to develop alternatives to

¹ Ennuste, Yu.A., & Matin, A.V. (1989). Stokhasticheskiye ekonomicheskiye modeli adaptivnogo planirovaniya i problemy ikh koordinatsii [Stochastic economic models of adaptive planning and problems of their coordination]. Moscow: Nauka [in Russian].

planned calculations, in order to choose the optimal one, and the selection criteria may be different. For example, in one option the ongoing decline in production, inflation of the national currency may be taken into account, and in another – rising interest rates and, consequently, slowing global economic growth and lower product prices¹.

Methods of economic and mathematical modeling allow to quantify the relationship between financial indicators and the main factors that determine them (Fig. 8.4).

Finally, it should be noted that formalized models of financial planning have two groups of disadvantages:

- in the course of modeling several variants of plans can, and in fact must be built or developed, and it is impossible to determine which of them is better by formalized criteria;
- any financial model only simplifies the relationship between economic indicators².

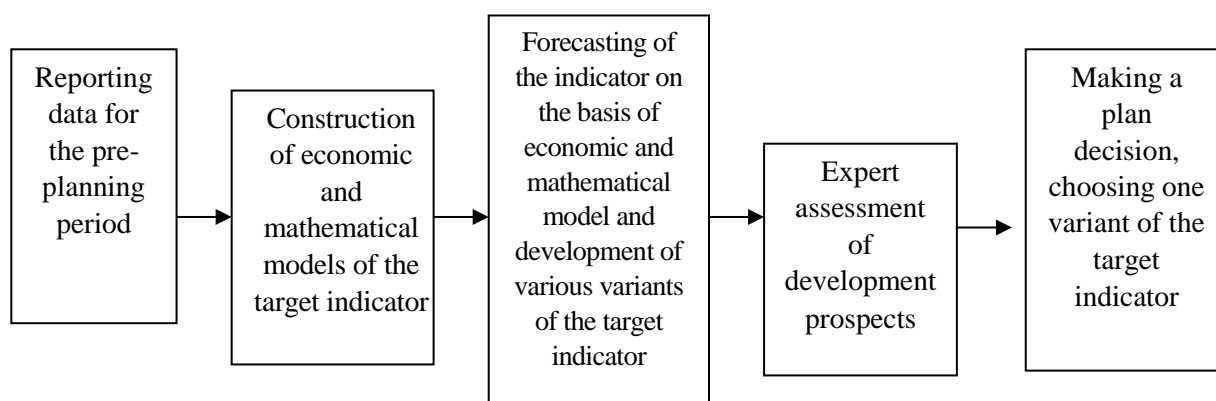


Fig. 8.4. The process of developing a target indicator using EMM methods³

These theses indicate that rigidly determined and unambiguous decisions in the planned work basically cannot be. Therefore, it is very rare to achieve

¹ Poltieva, I.A. (2004). Modelirovaniye protsessov finansovogo planirovaniya na predpriyatiyakh v usloviyakh neopredelennosti [Modeling of financial planning processes at enterprises in conditions of uncertainty] Candidate's thesis. Donetsk [in Russian].

² Hahn, D. (1997). Planirovaniye i kontrol: kontseptsiya kontrollinga. [PuK – Wertorientierte Controllingkonzepte] (A.A. Turchak, L.G Golovach, M.L. Lukashevich, Trans). Moscow: Finansy i statistika [in Russian].

³ Ennuste, Yu.A., & Matin, A.V. (1989). Stokhasticheskiye ekonomicheskiye modeli adaptivnogo planirovaniya i problemy ikh koordinatsii [Stochastic economic models of adaptive planning and problems of their coordination]. Moscow: Nauka [in Russian].

absolute success, firstly, in structuring and detailing the planned work, and secondly, in trying to get clear formalized targets and assessments of the planned nature.

The methods used in financial planning are essentially the same as in tax planning. Moreover, in the theoretical study it is difficult to establish what is the primary area of application of these methods – whether financial planning or tax. Therefore, in further research, we will proceed from the principle that the basis of planning different financial indicators, including tax, are the same methods of preparing target indicators.

As for the place of tax planning in the general scheme of industrial enterprise's financial planning, the study found the following. First, there is no clear position in the special literature on this issue that the tax plan is an independent branch of the financial plan, which is adjacent to it either at the entrance to the calculations (for the scheme in Fig. 8.1), or in the course of ancillary calculations (blocks 1-3 in Fig. 8.1), or when calculating performance indicators (blocks 4-5 in Fig. 8.1). Or the tax plan dissolves within the above blocks. Second, the study failed to establish in what mathematical way the indicators of strategic tax plans are assimilated into the current financial plan. Third, it is not established how the degree of tax and institutional burden of the enterprise affects the method of financial planning. The above aspects are not fully explored due to the limited sample of special literature involved in this study – special literature is not numerous. In addition, the opinion of the author is confirmed by the opinion of V.A. Goremykin, who conducted research with similar goals and summarizes: «... the place of tax planning in the system of financial plans is uncertain given both the scope of its application and the «recipe» of its use. Tax planning is highly dependent on the characteristics of the organization, where it is carried out. This significantly inhibits its popularization»¹.

As conclusion to this section it is necessary to emphasize the following.

One of the main tasks of financial planning at the enterprise are:

– determination of financial relations with state agencies, banking structures and other organizations regarding payments and redistribution of funds. The main solution to this problem is to ensure the priority of payments to the budgets of different levels, determining the optimal size of loans in working

¹ Goremykin, V.A., Bugulov, E. R., & Bogomolov, A. Ye. (2000). *Planirovaniye na predpriyatii* [Planning at the enterprise]. Moscow: Informatsionno-izdatelskiy dom «Filin», Rilant [in Russian].

capital, in financing capital investments, measures of technical progress, etc.;

- creation of methodical conditions for ensuring the heredity of indicators, their mutual connection;

- establishment of financial control over the implementation of the indicators adopted in the plan.

Thus, the methodology of financial planning in general and its component – tax planning, should provide simple and clear tools for solving these problems.

To solve mentioned problems, this study identifies the following areas.

The procedure that links strategic and operational financial planning should be the calculation of the planned rational institutional burden of the enterprise, which includes the calculation of the tax burden. This calculation is preceded by a justification of the rationality criteria of this relationship. The results of the calculations should be a set of indicators that have a tendency to sensitive analysis.

Based on a certain level of institutional burden of the enterprise, it is necessary to calculate the optimal level of tax burden of the enterprise, the criterion of optimality of which is to minimize the institutional burden as a whole. This level of tax burden should be included in the financial plan of the enterprise as one of the main criteria for optimizing the plan.

It is necessary to develop a set of rules for choosing certain methods of calculation in tax planning depending on the degree of tax burden, as well as to determine the degree of consolidation of the tax plan with the overall financial plan of the enterprise depending on the degree of tax burden.

A mechanism should be developed to integrate strategic indicators that characterize the level of institutional and tax burden of the enterprise into the current financial plan as a criterion for its optimization.

9. THE DEVELOPMENT OF GREEN TOURISM IN UKRAINE ON THE BASIS OF ECOLOGICAL MARKETING

Onopriienko Iryna, Onopriienko Volodymyr

9.1 Development of tourism industry

Global ecological crisis affects entire population of the globe. Climate is changing, natural ecosystems are degrading, water, air and food are increasingly polluted by industrial and agricultural waste. Removing or at least mitigating negative factors associated with global environmental crisis has become one of the central tasks of national governments and international organizations. According to WHO, human health is 20% determined by the state of environment. Therefore, greening and wastelessness of all types of industries are considered by the United Nations and the European Union as one of the priority problems that must be solved in the first half of the XXI century. These measures are supplemented by various forms of public health strengthening, among which tourism occupies one of the first places. Tourism is an active healthy rest. As one of the innovative mechanisms, providing solution to the problem of maintaining population health, in the sphere of tourism industry an innovative technology of a new form of tourism – green tourism, combining outdoor activities with preservation of the natural habitat, has been developed. With proper organization, tourism combines two important functions: it contributes to the population health improvement and at the same time forms ecological worldview in young and adult tourists and understanding of objective value of the natural environment. Tourists become active participants in environmental protection.

The purpose of this part is to analyze content of green tourism in its various modifications and specifics of environmental monitoring in tourism industry. The main tasks of the article are: to study the concepts and principles of sustainable and green tourism; to determine the basic principles of ecological and rural tourism; to study the importance of using marketing in the tourism business.

Tourism is an important component of the social and economic life of modern society. By 2018, the total number of tourists in the world exceeded 1.3 billion. According to the World Tourism Organization (UNWTO), 1235 million

international tourist trips were made in 2016. The total income from world tourism reached \$ 1,400 billion. Currently, the growth rate of world tourism is up to 5% per year, while the growth of the global economy is only 2-3% per year, i.e. tourism has largely become a factor contributing to world economy development¹.

The size of contribution of the tourism industry (in billion dollars) to the economy of different countries of the world is shown in Fig. 9.1. The United States of America is in the top of the list. Moreover, the richer the country, the greater number of its inhabitants makes tourist trips.

The share of tourism in Ukrainian GDP is only 2%, and in developed countries this figure reaches 8%. Tourists come to us mainly from Germany, the USA, Great Britain, China and Japan.

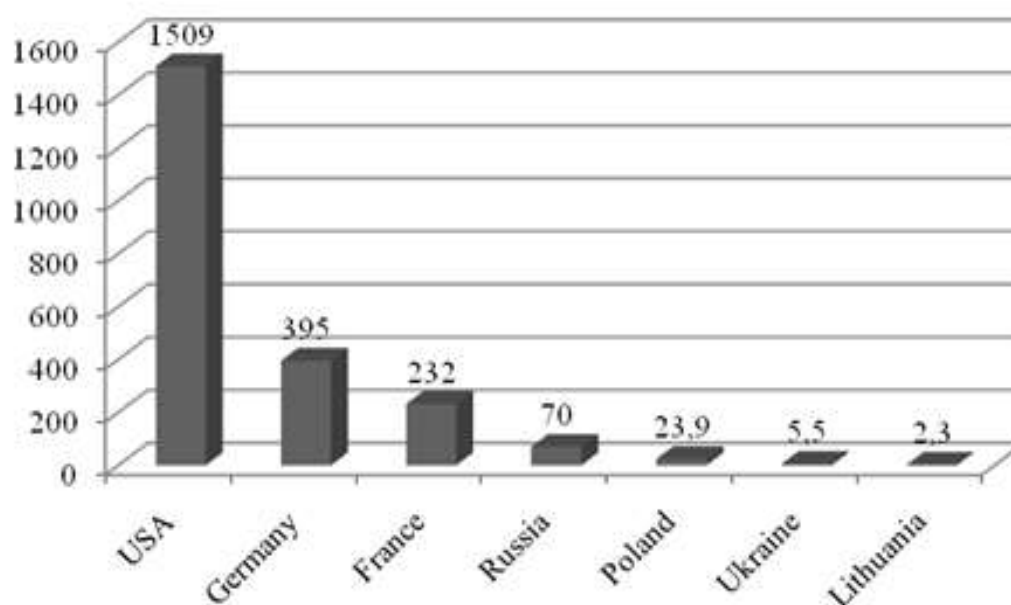


Fig. 9.1. The contribution of the tourism industry to the country's total GDP in billion dollars as of 2017²

In general, world tourism accounts for 10% of global investments (Fig. 9.2).

¹ Green Ideas for Tourism for Europe. Retrieved from <http://www.greentourism.eu/>

² KNOEMA – World Data Atlas. Retrieved from <https://knoema.com/atlas/topics/Economy>

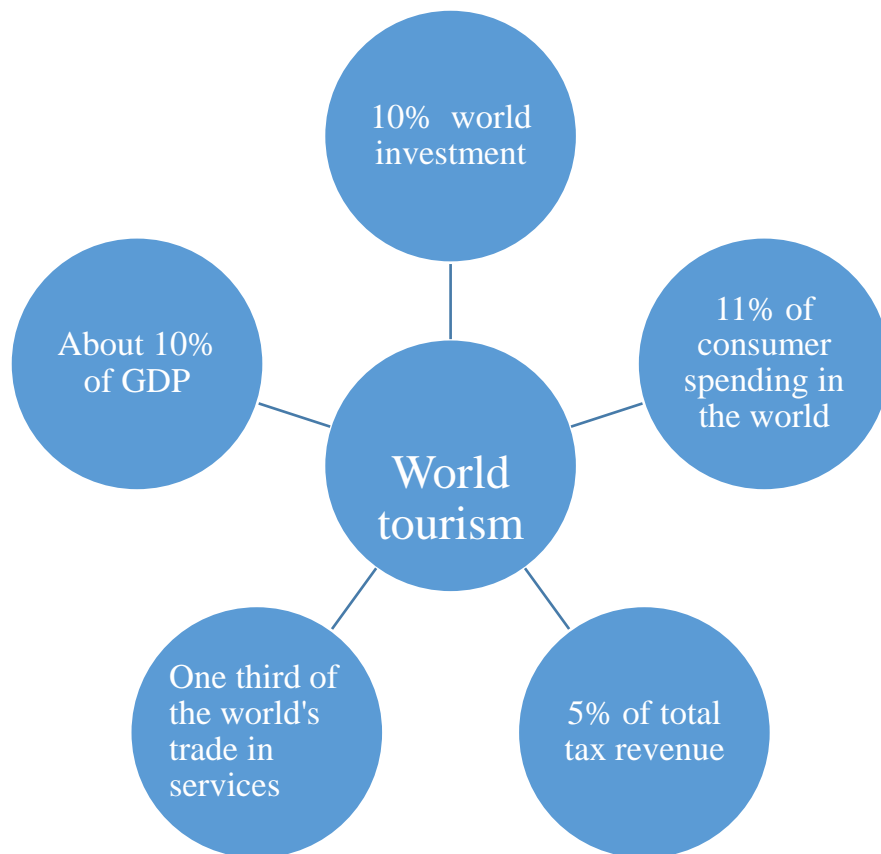


Fig. 9.2. Income from tourism¹

Fig. 9.3 shows the number of tourist departures as of 2017. At the same time, international tourists who leave the country are estimated by the number of tourist departures that people make from their country of permanent residence to any other country. It can be seen that by number of residents traveling on tourist trips, the top five are the USA, Germany, China, Great Britain.

Ukraine in this row is in 12th place from 91 countries, which indicates sufficient welfare of Ukrainian citizens. The variety of tourism types is very large. Among the main forms of tourism, we usually distinguish recreational tourism, pursuing only the goal of recreation, health-improving, cultural, focused on the study of the cultural traditions of individual countries and peoples, religious, extreme, ecological, etc.

¹ Green tourism. Retrieved from <https://www.gauteng.net/pages/green-tourism>

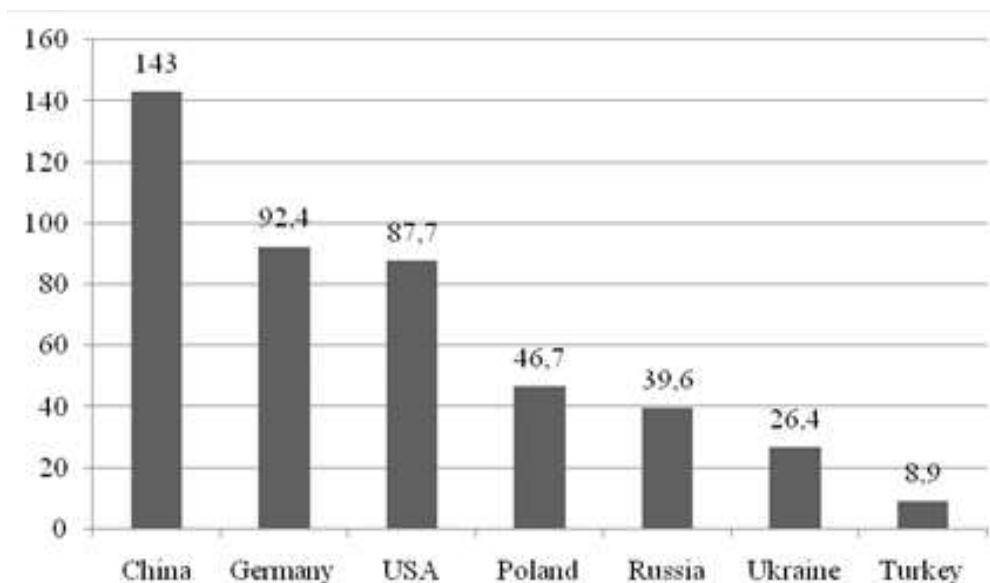


Fig. 9.3. The number of tourists leaving the country as of 2017, million people¹

According to the marketing research of the tourism services market conducted by the World Tourism Organization, the reasons for the decline of Ukrainian tourism are as follows²:

- neglect of international experience in tourism development;
- lack of consistent government policy in the industry;
- inefficient activities of the authorities in the field of tourism;
- lack of appropriate conditions for the development of tourism, tax and financial incentives for the state to export tourism services and domestic tour operators;
- unsatisfactory work on the formation and strengthening of the tourist image of Ukraine, the development and promotion of the tourism product in the international and domestic markets.

Signs and consequences of decline: decrease in the number of tourists compared to 2013-2014; significant reduction in the share of tourism in the country's GDP; drop in income from tourism and hotel services, tourist tax, foreign exchange earnings from the export of tourism and hotel services, investment in tourism infrastructure, and jobs.

Tourism provides active rest for the broad masses of the population, expands their culture and education. But at the same time, tourism sometimes causes irreparable harm to the natural environment, and this harm is the greater, the more economically and politically unstable is the state at which tourists

¹ KNOEMA – World Data Atlas. Retrieved from <https://knoema.com/atlas/topics/Economy>

² Green Ideas for Tourism for Europe. Retrieved from <http://www.greentourism.eu/>

arrive. Therefore, recently the efforts of international organizations have been directed, on the one hand, to progressive development of the tourism industry, to the sustainability of tourism, and, on the other hand, to mitigating its adverse environmental impact. In 1995, with joint efforts of the World Tourism Organization, the World Travel and Tourism Council and the Earth Council, the «Agenda 21 for the Travel and Tourism Industry» was developed. This document outlined a program of action for states, national tourism administrations and tourism companies on the sustainable development of tourism.

9.2 Sustainable tourism

The principle of *sustainable tourism* includes mandatory environmental protection as a condition for the long-term and sustainable development of the tourism industry. Thus, sustainable tourism should support key environmental processes and contribute to the conservation of biodiversity. As a result, the concept of «*sustainable tourism*» was formed. According to Maksarova's¹ «Sustainable tourism is a type of tourism that ensures the optimal use of environmental resources, supports socio-cultural characteristics of the host communities, ensures the viability of long-term economic processes, taking into account their benefits for all circles».

Later in 2000, the World Tourism Organization, together with UNESCO, formed the group «Tour Operators' Initiative for Sustainable Tourism Development». The participants of this partnership undertake to organize protection of animals and plants, prevent pollution of the environment, and maintain integrity of natural communities and landscapes when organizing tourism. For this, tourist organizations were obliged to direct part of the profit to maintain the state of the natural environment.

When organizing tourism, one should not forget of its main criterion, clearly formulated by Pirogova, O.V.² «Tourism is an activity that individuals enjoy», that means that tourism is an activity that gives a person pleasure. The task of combination of tourism interests with nature protection has no simple

¹ Maksarova, E.M. (2018). Main directions for the implementation of the principles of sustainable development in tourism, Bulletin of A. I. Herzen Russian State Pedagogical University, vol. 85, pp. 345-350.

² Pirogova, O.V. & Pirogova, A.Yu. (2017). The role of sustainable tourism in the world, International Journal of Applied and Basic Research, vol. 7-2, pp. 305-309.

solutions. But in this direction, there is an active search for forms and methods.

More than 5,000 publications were devoted to this problem. For the sake of advertising and false innovations, a number of authors and travel agencies replace the term sustainable tourism with semantic synonyms: *responsible tourism*, *soft tourism*, *nature-oriented tourism* or *alternative tourism*. All these items have similar contents – the priority goal of tourism is seen not only in the economic success of the tourism industry, but also in promotion of the well-being of tourism regions, minimization of damage to the environment. In general, all such forms of tourism are an alternative to the usual “natural tourism”, which does not set environmental protection tasks.

9.3 Green or ecotourism

When defining this concept, it should be borne in mind that in English literature and in everyday life the expression «green tourism» is equivalent to «ecotourism», and therefore these terms are considered as synonyms. In general, the terminology in this area is not unified. The term «green tourism» is more common, it is actively used in advertising texts on the websites of travel agencies and online stores, where it sometimes acquires new value meanings demanded by the modern generation of tourists¹.

Emergence of green ecotourism is associated with a change in public views on environmental issues, with clear guidelines for the protection of natural values. Therefore, this type of tourism has been attractive to the general population of all countries of the world.

The International Ecotourism Society defines green, or ecotourism, as «a responsible journey to natural areas, areas that preserve environment and support welfare of local residents». Green tourism, or ecotourism, can also be defined as a special form of sustainable tourism that focuses on visits to relatively untouched by human impact natural territories for the purpose of recreation and expanding ecological horizons.

The concept of green tourism is quite capacious. On the one hand, the use of environmentally friendly technologies in tourism services is considered a sign of green tourism. On the other hand, this term refers to recreation in an attractive

¹ Pirogova, O.V. & Pirogova, A.Yu. (2017). The role of sustainable tourism in the world, International Journal of Applied and Basic Research, vol. 7-2, pp. 305-309.

natural area. Currently, green tourism can be divided into the following main categories:

- a) natural tourism, the main purpose of which is learning natural ecosystems,
- b) ecological and ethnographic tourism, during which tourists get acquainted with life and traditions of people who have lived in harmony with their environment for millennia,
- c) rehabilitation tourism, when tourists are involved in direct work to restore natural sites, for example, plant trees, organize ecological trails, etc.
- d) rural tourism, actively including tourists in the life and production activities of rural residents.

The purpose of green ecotourism development is organization of outdoor activities in the context of harmonizing a person with natural and social environment, environmental education and upbringing of the population. The resource base of Ukraine for green tourism is extremely large. It includes unique natural complexes of the forest and steppe zones, various botanical and zoological objects¹.

The basic principles of ecotourism are the following:

- a) conservation of the biological diversity of recreational natural areas;
- b) increasing the level of economic stability of the regions involved in ecotourism;
- c) improving environmental culture of ecotourism participants;
- d) maintaining the ethnographic status of the recreational territory.

Green tourism is designed to perform a number of socially important functions: environmental education and upbringing, wellness, patriotic and aesthetic. But, perhaps, the central task of green tourism is environmental education aimed at fundamental change in the attitude of the population to wildlife. This aspect of green tourism has been emphasized by many experts².

The main contingent of tourists in green tourism are residents of large cities and industrial centers. And the most attractive objects of such tourism are the areas of preserved wildlife, natural protected areas and unique zoological and botanical objects. Matza,¹ et al. on the basis of a specially conducted study have shown that Sumy region has all the natural-ecological, climatic and other

¹ Green tourism. Retrieved from <https://www.gauteng.net/pages/green-tourism>

² Luu, T. T. (2020). Integrating green strategy and green human resource practices to trigger individual and organizational green performance: The role of environmentally-specific servant leadership. *Journal of Sustainable Tourism*, 28(8), 1193-1222. doi:10.1080/09669582.2020.1729165

conditions for green tourism development. But a survey of respondents has shown that 61% of respondents consider them low, 24% – medium and only 15% – high. Such a high frequency of low assessments of the prospects for green tourism development in the Sumy region is associated with poor awareness of the natural values of Sumy region and poorly developed tourism infrastructure. In addition, travel companies in the pursuit of higher incomes offer tourists primarily Turkey, Egypt or at least the Carpathians.

An urgent task is to focus the efforts of tourism companies on the ecotourism development in the internal and external markets, based on application of a systems approach to the issue of ecological tourism and its practical component.

9.4 Rural tourism

A special category of green tourism is rural tourism. It is sometimes called «rural green tourism», simply «green tourism», «agritourism» or «farm tourism».

The source of rural tourism in the territory of the Russian Empire was the «summer cottage», which began to take shape at the end of the XVIII century. City residents rented separate houses in the countryside for the spring-summer period, where the family was taken out, and its head ran over the weekend. Summer residents who rented houses for the summer period brought quite good income to local residents at the expense of rent for premises, as well as from purchases of agricultural products made in the area^{1, 1}.

The essence of modern rural tourism is that in a countryside in a separate house a group of tourists is accepted (usually a family with children), they are provided with a room, meals based on environmentally friendly products. Sometimes a tourist gets the opportunity to take part in some types of agricultural work on a personal plot – collecting hay, caring for animals, etc. In some regions, the emphasis is made on the tourist's participation in hunting, fishing, picking berries and mushrooms.

Some authors, depending on the predominant emphasis on one or another

¹ Matza, K.A. & Karpenko, N.N. (2015). Ecological tourism and its role in the formation of ecological and national culture, Bulletin of KhNU named after V. N. Karazin, Series "Ecology", vol. 10 (54), pp. 44-48.

form of rural tourism, use the above mentioned terms^{1,2}. In the first case, the tourist participates in agricultural work, and in the second, he is only an observer. Other authors call agritourism only such form in which a tourist participates in the work of a farmer. These functions are realized through the activities of travel agency specialists; therefore, their special preparation is required. In Ukraine, there is a special program «Green Farmstead», within the framework of which tourist estates that host tourists receive a special certificate guaranteeing high quality of tourist services. Moreover, «Green Farmstead» certificate has four quality levels: the first is the lowest, the fourth is the highest. The sign «Green Farmstead» is an image of a traditional Ukrainian hut, the level of quality is indicated by stars: one, two or three, the symbol of the hut without a star means the basic lowest level.

Rural tourism is a new component of the socio-economic development of villages in Ukraine. In a number of regions of Ukraine, rural tourism is supported by local authorities, but in general it is based on private initiative and the work of individual travel agencies. Rural tourism is especially promising in the regions of Ukraine with a developed agrarian structure. As of 2016, 375 estates were registered in Ukraine (305 of them in the Ivano-Frankivsk region) that host tourists. According to³ in Sumy region there is only one such estate, but as of 2014 there were 17 registered, including those that focused on historical and ethnocultural resources.

In total, the activities of green estates in Ukraine were cost-effective: expenses amounted to 25052.8 thousand UAH and incomes – to 41879.5 thousand UAH. In addition, indirect income from rural tourism received by the trading network, gas stations and other consumer services should be taken into account. Yu. S. Chumachenko⁴ et al. pointed out the need to use environmental marketing technology in this field as a condition for increasing profitability of agricultural tourism.¹

Rural tourism increases the intellectual level of rural residents, improves their knowledge in the field of ecology, history and culture, and tourists get acquainted with local folk traditions and crafts. V. Yu. Stepanov² rightly wrote: «Rural tourism in most countries is regarded as an integral part of the

¹ Dutka, G. (2018). Development of Rural Tourism in Ukraine, KNUTU Bulletin, vol. 4, pp. 79-89.

² Neshadym, L. (2015). Development of green tourism as a factor of improvement of social sphere of Cherkasy region, Journal of European Economics, vol. 14, issue 4, pp. 400-407.

³ Green tourism. Database of tourism in Ukraine. Retrieved from: <http://ruraltourism.com.ua/>

⁴ Chumachenko, Yu.S. & Chumachenko, E.S. (2018). The implementation of marketing in rural tourism as a pragmatic tool for the development of the industry. Modern Economics. vol. 7, pp. 203-210.

comprehensive socio-economic development of the village and one of the means of solution to many rural problems, as a specific form of recreation in the village using natural, material and cultural potential of the area». Unfortunately, the Law of Ukraine «On Rural Green Tourism» developed by the parliamentary group of the Verkhovna Rada in 2006-2007 was withdrawn from consideration¹.

Development of rural tourism is significantly limited by the low level of household amenities in the countryside. According to state registration, the total rural housing stock in Ukraine is large – 6.5 million buildings. But only 12% of estates have a centralized water supply, 18 % are provided with natural gas, and only 7% have sewers. Another limitation is due to the fact that in many cities of Ukraine the population has cottages, personal plots and relatives in rural areas. Rural tourism is not attractive for this category of population.

In a number of countries rural tourism is better developed than in Ukraine. Its features depend on the natural conditions and folk traditions of the country. In Germany, a whole network of farms has been formed, the owners of which host tourists, provide comfortable accommodation, environmentally friendly food, and familiarize them with agricultural production. Tourists can voluntarily help farm owners in their field work, but the main emphasis is most often placed on the possibility of tourist participation in various rural fairs. In France, tourists have the opportunity to try different grape varieties and their wines. There are more than 35 thousand such farms in this country. Among the countries of Eastern Europe, rural tourism is best developed in Poland. In general, the experience of rural tourism development in foreign countries shows that this form of tourism is a stimulating factor in the progressive development of the agricultural sector of the economy and improves social conditions in rural areas. This is facilitated by inclusion of rural tourism in state Programs for the integrated socio-economic development of the village².

9.5 Marketing in tourism industry

Marketing in its most general sense is the process of promoting goods and services from producer to consumer. Ecological marketing, or green marketing,

¹ Stepanov, V.Yu. (2018). Rural green tourism in Ukraine: problems and prospects. Actual problems of public administration. vol. 1 (53), pp. 1-5.

² Ehigiamusoe, K. U. (2020). Tourism, growth and environment: Analysis of non-linear and moderating effects. Journal of Sustainable Tourism, 28(8), 1174-1192. doi:10.1080/09669582.2020.1729164

can be defined as environmentally friendly activities related to development, creation and sale of products to meet the needs of the population, taking into account environmental impacts. This type of marketing is an integral part of the general circular economy – a modern economic system aimed at saving natural resources. In the tourism industry, marketing is a set of methods and techniques that a travel company uses in its activities. The marketing task in this case is to provide profit for the travel company in combination with satisfying the needs of the client – the tourist. One of the additional tasks of marketing in the field of tourism, and in particular green tourism, is promotion of tourism objects, or destinations, with demonstration of their advantages in economic and recreational terms¹.

In modern conditions, the use of media and Internet for marketing purposes, allows promoting certain tourist sites and forms of tourism as attractive in terms of cost and opportunities for useful and developing leisure. Informing through the media shapes a certain attitude towards particular countries and routes. Describing features of these tourism objects, the level of service in hotels, one can attract people with different needs and requirements. The difficulties of tourist marketing are in a certain abstractness of the «product» – a place of rest and form of recreation. A tourist cannot evaluate them before purchasing a ticket. This increases responsibility of advertising in the tourism industry.

Despite all the difficulties and peculiarities, the modern tourism industry, as shown above, is one of the largest highly profitable and most dynamically developing sectors of the world economy. In the structure of tourism income in developed countries, domestic tourism provides 80–90%, and on average in the world – over 72%. In Ukraine – about 64%². Thus, ecotourism provides additional financial resources, which are then used to improve the system of protected areas and expand scientific research in the field of ecology. Properly organized environmental marketing can significantly increase economic indicators of the tourism industry.

But tourism also solves other tasks. As it is rightly noted by a number of authors,¹ ecotourism in its various forms is an instrument of ecological upbringing and education. It contributes significantly to the promotion of nature

¹ Zinovchuk, N.V. & Raschenko, A.V. (2015). Environmental Marketing. Zhytomyr.

² Pivovarov, A.O., Shevchuk, V.P. & Livchenko, E.N. (2014). Contribution of ecotourism to nature conservation, The successes of modern science, vol. 12 (part 2), pp. 78-82.

conservation. It is not accidental that in all countries of the world administration of protected natural territories (reserves, national parks, etc.) is trying to attract tourists and actively acquaints them with the riches of nature.

In 2018, the Law on «Strategic Environmental Assessment» entered into force in Ukraine. A prerequisite for its implementation was signing of the Association Agreement between Ukraine and the EU and adoption of the Law of Ukraine «On Environmental Impact Assessment». Strategic environmental assessment is a procedure for determining, describing and analyzing the consequences for the environment and public health from implementation of state planning and development programs. In tourism industry, the use of strategic environmental assessments ensures sustainability of tourism services development and at the same time contributes to the protection of biodiversity, and in rural tourism it helps to solve many issues of agribusiness. The law raises importance of the environmental component in the environmental marketing of tourism activities.

Khristoforova I.V. et al. emphasize that the concept of environmental marketing includes communication and social parameters – it provides for a general high level of travel agency employees' culture, creation of an atmosphere of trust and strict fulfillment of all undertaken obligations, and a conflict-free solution to all difficult problems¹.

The whole set of parameters that make up marketing in the tourism industry is called a «Marketing mix» or «Ps». The marketing mix consists of four components or 4 Ps:

1. Product. In the tourism industry, it is a travel destination and all its components.

2. Place – presentation of tourism services at the right time and in the desired place for the tourist (destination). In tourism, destination plays an important role – it determines the content and form of a tourist trip.

3. Partnership – ensuring interaction with other companies that provide transport, food, accommodation for tourists, etc.

4. Price – it should cover the costs of the travel agency and bring it a profit, at the same time the price should be affordable for a sufficiently large number of people wishing to make a tourist trip. To these main positions can be added a fifth one – promotion, which includes various types of advertising media, travel

¹ Khristoforova, I.V., Sebekina, T.A. & Zhuravleva, T.A. (2016). Marketing in the tourism industry. M.: Academia Publishing Center.

agency image formation, personal contact, etc.

The key to success in tourism marketing is completeness and objectivity of information about the nature and content of the tour, taking into account the psychology and requests of tourists, unobtrusive inclusion of a number of targeted elements of the tourism campaign – in particular, environmental education and upbringing. Greening of the tourism business, therefore, should be organically integrated into the marketing mix strategy. Green marketing strategies – their advertising and their implementation – help travel companies in successful business¹.

The results of analysis, conducted by V. K. Kiptenko et al. have shown, that special sites and portals play an important role in tourism marketing. They can run by national, regional, district, city and individual travel agencies. The most popular are TourUA.com, TuristUA.com, Turne.com.ua, Otpusk.com, «Networks of Last-Minute Travel Agencies». They help tourists to get objective information about the destinations they are interested in, conditions of travel, cost, etc.²

An integral part of marketing in tourism is collection of information about promising tourists, their wishes, payment options. Such information is obtained through surveys, questionnaires, via the Internet and in other ways.

One of the important directions in tourism marketing is benchmarking. It consists in collecting information on the methods of work of more successful competitive travel companies with the aim of their use in developing their own business. In the marketing analysis, specific techniques are used: SWOT analysis, 5*5 method, GAP analysis and so on. Analysis of the marketing opportunities of a tourism company allows to determine the most attractive areas of marketing efforts of the company to ensure the profitability of its activities³.

Recently, franchising has been used in environmental marketing in the tourism industry⁴. Franchising is organizing business in such a way that allows the company-owner of the tourism industry (franchisor) to transfer the right to conduct tourism activities to another company. At the same time, not only the

¹ Voloshina, M. (2017). Analysis of the market of tourist services in Ukraine: problems and prospects. Retrieved from <https://koloro.ua/blog/issledovaniya/analiz-rynka-turisticheskikh-uslug-v-Ukraine.html>

² Kiptenko, V.K. & Tishchenko, A.A. (2014). Tourist Internet portals of Ukraine: current state and problems of use, Constructive geography and the rational use of natural resources: Sciences. Coll. K.: Ecotour info, part 2, vol. 11, pp. 238-250.

³ Danko, N.I. & Kurinna S.S. (2018). Current Trends in Marketing at Tourism Enterprises pp. 253-257.

⁴ Melnichenko, S. (2015). Franchise networks of tourism enterprises. Bulletin of the Kyiv National University of Trade and Economics, vol. 4 (102), pp. 30-43.

right to conduct tourism business is sold, but also a complete system of conducting commercial activities – a franchise package (franchise), which includes teaching aids, software, the seller's brand and other materials. Obtaining a franchise allows a new young company to work effectively even in the absence of experience in organizing tourism activities. The franchise buyer pays the franchisor monthly fees (royalties)¹.

Tourism is one of the leading and most dynamic sectors of the global economy². Due to its fast growth rates, it is recognized as an economic phenomenon of our time. Tourism industry is one of the largest highly profitable and most dynamically developing industries in Ukraine. Ecologically oriented green tourism is developing especially rapidly in its various forms: natural, rural, along ecological paths, confined to protected natural areas. Marketing in the tourism industry is an interconnected system of tools used by a travel company for targeted management of demand for travel services. The importance of environmental marketing is associated with its complexity: tourism combines a complex of material and social components and therefore requires a competent and innovative approach for economic and substantial success.

¹ Zhang, K., Sun, X., Jin, Y., Liu, J., Wang, R., & Zhang, S. (2020). Development models matter to the mutual growth of ecosystem services and household incomes in developing rural neighborhoods. *Ecological Indicators*, 115 doi:10.1016/j.ecolind.2020.106363

² Green Tourism Marketing Toolkit. Retrieved from <http://www.devontourismadvice.co.uk/assets/Documents/GreenTourismMarketingToolkit.pdf>

NATIONAL DEVELOPMENT GOALS: INNOVATION FRAMEWORK

Monograph

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