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CONCEPTUAL FOUNDATIONS OF FINANCIAL SUPPORT FOR INCREASING THE INNOVATIVE COMPONENT OF UKRAINE'S INTERNATIONAL COMPETITIVENESS

Abstract. The article describes the dynamics of Ukraine's position in the Global Innovation Index for 2015—2019. It is revealed that the domestic economy has a high educational and scientific potential, is able to produce various innovations in the form of ideas, scientific developments, patents; the bottlenecks of Ukraine in the state of innovative development are the state of cluster development, the share of foreign direct investment in GDP, the online service of the government, the use of information and communication technologies, the availability of joint agreements on strategic alliances, the state of domestic lending to the private sector, the export of goods of the creative economy, the volume of microfinance loans, the presence of firms offering formal training, the state of cooperation between universities and production, agreements with venture capital. It is proved that the problem of improving the financial mechanism for ensuring innovation processes in the economic system of Ukraine requires a priority solution. Developments on increasing the innovative component of increasing Ukraine's international competitiveness are impossible without adequate financial support. The article examines the foreign experience of state support for innovation activities. It is revealed that in developed countries — the world's leading innovation leaders, public policy provides for direct funding of scientific research and through tax measures encourages private sector R&D spending. The concept of financial support for increasing the innovative component of Ukraine's international competitiveness, which should be implemented at the strategic, tactical and operational levels, is proposed. To ensure a sustainable level of international competitiveness of the country through increasing the innovation component, it is important to implement a system of measures to monitor threats even at the stage of their origin and prevent the spread of their negative impact. Therefore, the methods and tools for implementing the proposed concept contain components of threat prevention: economic (tax incentives; transfers ;direct budget investments; grants; concessional lending; cooperation with foreign institutions, etc.), organizational (development of innovative infrastructure; consulting assistance; personnel support; creation of clusters using the potential of education, business, government, public; creation of regional clusters with innovation and industry production, etc.), institutional (techno parks, business incubators, analytical centres, etc.), regulatory (strategies, concepts, plans, programs) and social levers (conducting business trainings, implementing joint social projects, etc.).

***Keywords*:** innovation, Global Innovation Index, financial support for innovative development, international competitiveness, cluster.

JEL Classification O11, O19, O16, O33, E62, F20

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КОНЦЕПТУАЛЬНІ ЗАСАДИ ФІНАНСОВОГО ЗАБЕЗПЕЧЕННЯ НАРОЩЕННЯ ІННОВАЦІЙНОЇ СКЛАДОВОЇ МІЖНАРОДНОЇ КОНКУРЕНТОСПРОМОЖНОСТІ УКРАЇНИ

Анотація. Охарактеризовано динаміку позицій України у Глобальному індексі інновацій за 2015—2019 рр. Виявлено, що вітчизняна економіка має високий освітній і науковий потенціал, здатний продукувати різноманітні новації у формі ідей, наукових розробок, патентів; вузькими місцями України у стані інноваційного розвитку є стан розвитку кластерів, частка прямих іноземних інвестицій у ВВП, онлайн-сервіс уряду, використання інформаційно-комунікаційних технологій, наявність спільних угод про стратегічні альянси, стан внутрішнього кредитування приватного сектору, експорт товарів креативної економіки, обсяги кредитів мікрофінансування, наявність фірм, що пропонують формальне навчання, стан співробітництва університетів і виробництва, угоди з венчурним капіталом. Обґрунтовано, що першочергового розв'язання потребує проблема вдосконалення фінансового механізму забезпечення інноваційних процесів в економічній системі України. Напрацювання щодо нарощення інноваційної складової нарощення міжнародної конкурентоспроможності України є неможливим без адекватного фінансового забезпечення. Досліджено зарубіжний досвід державної підтримки інноваційної діяльності. Виявлено, що в розвинених країнах — світових інноваційних лідерах державна політика передбачає пряме фінансування наукових досліджень і за допомогою податкових заходів стимулює витрати на НДДКР приватного сектору. Запропоновано концепцію фінансового забезпечення нарощення інноваційної складової міжнародної конкурентоспроможності України, реалізація якої повинна відбуватись на стратегічному, тактичному та оперативному рівнях. Для забезпечення стійкого рівня міжнародної конкурентоспроможності країни через нарощення інноваційної складової важливо впроваджувати систему заходів з моніторингу загроз ще на стадії їх зародження і недопущення поширення їхнього негативного впливу. Тому методи та інструменти реалізації пропонованої концепції містять складові попередження загроз: економічні (податкові пільги; трансферти; прямі бюджетні інвестиції; гранти; пільгове кредитування; співпраця з іноземними інституціями та ін.), організаційні (розбудова інноваційної інфраструктури; консультаційна допомога; кадрове забезпечення; створення

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кластерів з використанням потенціалу освіти, бізнесу, влади, громадськості; створення регіональних кластерів з інноваційно-галузевим виробництвом та ін.), інституційні (технопарки, бізнес-інкубатори, аналітичні центри та ін.), нормативно-правові (стратегії, концепції, плани, програми) та соціальні важелі (проведення бізнес-тренінгів, реалізація спільних соціальних проєктів та ін.).

***Ключові слова*:** інновації, глобальний індекс інновацій, фінансове забезпечення інноваційного розвитку, міжнародна конкурентоспроможність, кластер.

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Introduction. In the context of increased international competition, constant modernization of equipment and technologies, and increasing the role of partnership, innovation is an important factor that can ensure the efficiency of the economic system. The global innovation system is currently characterized by increased dynamism: the intensity of innovation processes increases, the period for creating innovations is reduced, the range of subjects of innovation activity is expanded and their functions are modernized. Transformations in the global innovation system and the dynamism of innovation processes make it necessary to build an up-to-date model of innovation activity that will meet the modern globalization conditions for the development of the world economy.

Activation of the innovation process is an important factor in shaping the innovation policy of any country, in particular those that are trying to overcome negative trends in their development and reach a qualitatively new level of competitiveness in general and international in particular. Solving the issue of organizing and implementing the innovation process at the state level involves creating an effectively functioning and optimal management system. Effective management of the innovation process contributes to the mobilization of all necessary resources to accelerate innovative development. Only based on an intensive innovation process can the national economy of Ukraine ensure the development of import-substituting and export-oriented production.

Therefore, it is the financial support of innovative development, acquiring a systematic character that will contribute to the formation of innovative opportunities for the growth of the national economy in the context of modern world economic trends.

Analysis of research and problem statement. A large number of scientific works of domestic and foreign scientists are devoted to the theoretical and practical aspects of the innovation paradigm, problems of innovation activity and innovative development. Namely: A. Smith, J. Condorce, D. Ricardo, J. Say, M. Tuhan-Baranovskyi, J. Schumpeter, M. Abramowitz, A. Anchishkin, Yu. Bazhal, L. Baryutin, L. Vodachek, O. Vodachkova, V. Heiets, E. Denison, A. Kazantsev, D. Kendrick, M. Kodratiev, S. Kuznets, V. Kushlin, O. Lapko, K. McConnell, E. Mansfield, G. Mensch, R. Muller, K. Poznanskyi, M. Porter, H. Rihs, E. Rogers, B. Santo, R. Solow, B. Twiss, R. Foster, P. Hariv, M. Hoochek, N. Chukhrai, Y. Yakovets, M. Avsyannikov, L. Antoniuk, I. Balabanov, O. Bohashko, O. Datsii, V. Dubichenko, B. Zablotskyi, V. Zanko, M. Zubovets, S. Iliashenko, A. Kruhlikov, V. Medynskyi, S. Mochernyi, R. Nelson, Z. Peresunko, A. Poruchnik, O. Prokopenko, V. Savchuk, N. Syrotynska, S. Tyvonchuk, I. Tidd, V. Thompson, S. Winter, P. Khariv and others.

A significant contribution to the study of the problems of financing innovation activities was made by such foreign scientists as A. Gradov, P. Drucker, P. Zavlin, S. Ilienkova, M. Kondratiev, S. Kuznets, E. Mansfield, G. Mensch, A. Nikolaev, B. Santo, D. Sakhal, R. Solov, B. Twiss, J. Tyrol, R. Fatkhutdinov, R. Forrester and others: I. Alekseev, A. Bilyuk, V. Boronos, D. Vankovych, V. Glushchenko, N. Demchyshak, Ya. Dropa, I. Epifanova, I. Zhuhgan, V. Yokhna, V. Kovalenko, O. Kolodiziev, V. Kostetskyi, M. Krupka, O. Melnyk, S. Onyshko, V. Oparin, Yu. Pasichnyk, B. Pshyk, I. Revak, P. Sviderskyi, V. Stadnyk, V. Fedosov, Z. Yurinets and others.

However, despite the large number of works and the value of research, the system of financial support for innovative development of the national economy requires further research in

the direction of its improvement in the context of modern requirements, in particular, ensuring the country's economic security through increasing international competitiveness.

The purpose of this article is substantiation of the conceptual foundations of financial support for increasing the innovative component of Ukraine's international competitiveness.

Research results. The current stage of development of World Economic processes develops under the influence of constantly transforming processes of globalization and internationalization, and the main sign of the level of economic development and competitiveness are, nevertheless, indicators of innovation — continuity of development, the level of development of innovations, the tendency to update, the level of scientific development, the ability to form and use effective information and intellectual potential, improving indicators of well-being and quality of life, etc.

The report of the National Academy of Sciences of Ukraine «Innovative Ukraine 2020» states that «the lack in Ukraine of interest in innovative development at the political level, the inhibition of support for innovation activities, and even direct opposition to it by the main ministries in conditions when the environment of Ukraine intensively develops the scientific and technical sphere (primarily EU member states), requires an analysis of the social and economic reasons for this situation. The main reason for non-compliance with legislation in the field of Science and innovation in Ukraine, the difficulties of its development and adoption are related to the fact that regulatory legal acts are adopted in the absence of an innovative directed economic strategy of Ukraine» [1, p. 239].

The main indicator of international comparison of the level of innovation in the national economy is the Global Innovation Index (GII). In *Table 1* and *Fig. 1* let us reflect Ukraine's position in the Global Innovation Index for 2015—2019.

Table 1

Ukraine's place in the Global Innovation Index ranking 2015—2019

Components of the GII	2015	2016	2017	2018	2019
	place / point	place / point	place / point	place / point	place / point
Global Innovation Index	**64 / 36,5**	**56 / 35,7**	**50 / 37,9**	**43 / 38,5**	**47 / 37,4**
Login «Sub index» (Innovation Input)	**84 / 39,1**	**76 / 38,9**	**77 / 41,0**	**75 / 40,5**	**82 / 40,7**
Domestic market development	89 / 43,9	75 / 42,1	81 / 43,2	89 / 42,7	90 / 43,3
Infrastructure development	112 / 26,3	99 / 32,3	90 / 39,3	89 / 38,1	97 / 36,0
Business development	78 / 32,4	73 / 30,6	51 / 35,3	46 / 34,5	47 / 34,8
State of human capital and science development	36 / 40,4	40 / 40,8	41 / 39,6	43 / 37,9	51 / 35,6
State of the institutional environment (political, regulatory, business)	98 / 52,2	101 / 48,7	101 / 47,9	107 / 49,1	96 / 53,9
Exit «Sub index» (Innovation Output)	**47 / 33,9**	**40 / 32,5**	**40 / 34,2**	**35 / 36,6**	**36 / 34,1**
Results of creative activity	75 / 31,3	58 / 31,0	49 / 35,6	45 / 36,5	42 / 33,5
Development of technology and knowledge economy	34 / 36,4	33 / 34,1	32 / 32,8	27 / 36,7	28 / 34,6
Innovation efficiency coefficient	15 / 0,9	12 / 0,8	11 / 0,8	5 / 0,9	10 / 0,8

Source: compiled by [2—5].

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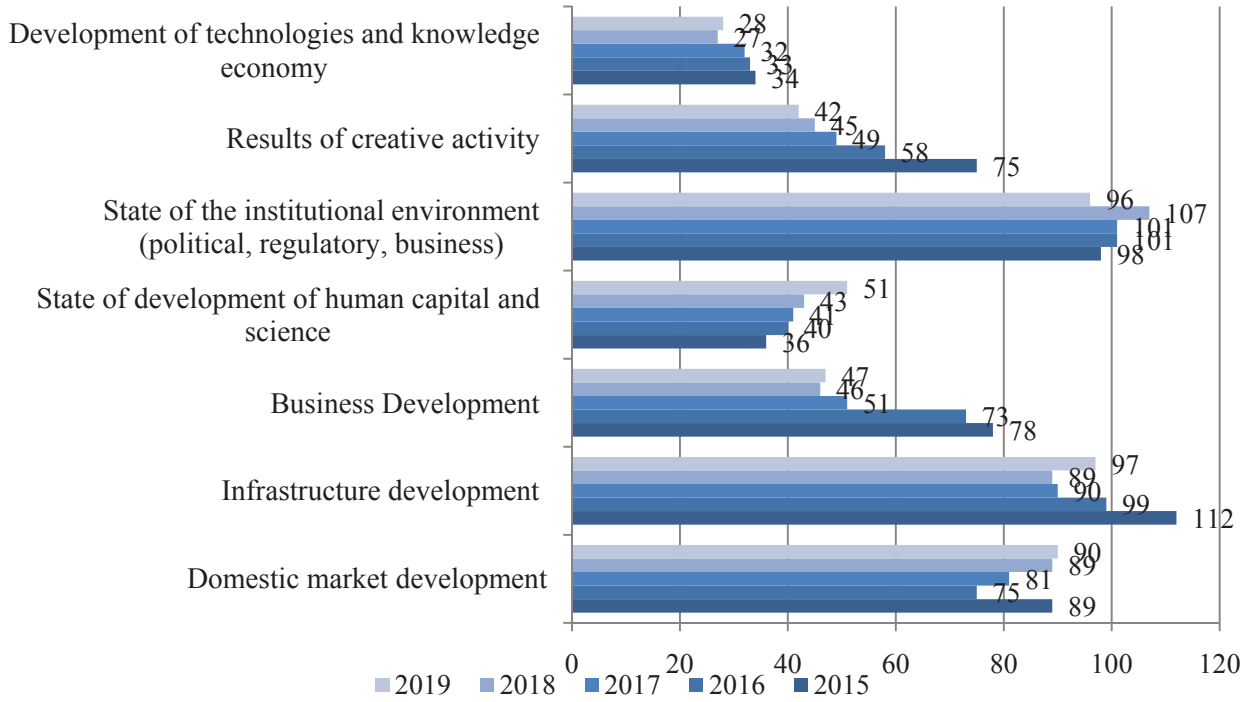

Fig. 1. **Dynamics of GII sub indexes for Ukraine for 2015—2019**
Source: built according to [2—5].

Data from *Table 1* and *Fig. 1* prove that Ukraine in the GII 2015 rating was on the 64th position with an indicator of the level of innovation of 36.5 points out of 100 possible, and at the end of 2016, Ukraine rose by 8 positions relative to 2015 and took 56th place with a score of 35.7, in 2017 — 50th place in the rating with a score of 37.9, in 2018 — 43rd place with a score of 38.5, and in 2019 Ukraine relative to in 2018, it lost 4 positions and dropped to 47th place with a score of 37.4 [2; 4].

In addition, it is obvious that the development of technology and the knowledge economy is at the heart of domestic innovative international competitiveness. According to this indicator GII, Ukraine for the period 2015—2019 constantly improved its position from 34th place in 2015 to 27th place in 2018 and 28th place in 2019. The business development indicator also shows positive dynamics for the study period: 78th place in 2015 and 47th place in 2019. Similar dynamics are typical for the PID Index «Results of creative activity»: 75th place in 2015 and 42nd place in 2019. These three sub-indices can be considered the basis of Ukraine's competitive advantage in the innovation space. The remaining structural elements of GII during the five-year period studied did not show such a comforting situation:

— according to the sub-index «State of the institutional environment», Ukraine shows a consistently rather low position: the worst indicator in 2018 is 107th place, the best in 2019 is 96th place;

— according to the sub-index «State of human capital development and science», Ukraine has lost 15 positions since 2015: 36th place in 2015 and 51st place in 2019. This deterioration is explained by a decrease in spending on education and science as a percentage of GDP;

— according to the infrastructure development sub-index, Ukraine, as well as the state of the institutional environment, occupies one of the lowest rating places in the world: the worst indicator was recorded in 2015 — 112th place, the best in 2018-89th place, according to the results of 2019, Ukraine lost 8 positions relative to 2018;

— according to the sub-index «Development of the domestic market» in 2019, the worst indicator was recorded-90th place, although in 2016 Ukraine was on the 75th Place [2; 4; 6; 7].

Despite the presence of Ukraine's bottlenecks in the GII, the innovation efficiency coefficient showed quite good dynamics in 2018: in 2018, Ukraine was on the 5th place, which is 6 positions higher than in 2017, which was evidence of an increase in the efficiency of innovation activities in the country. However, in 2019, the situation worsened: Ukraine lost 5 positions relative to 2018 and is on the 10th place [2; 4; 6; 7].

Based on the results of GII 2019, we will highlight the strengths and weaknesses of Ukraine in the innovation sphere (*Table 2*).

Table 2

Strengths and weaknesses of Ukraine in the innovation sphere according to GII — 2019

Strong positions (place / value of the indicator)	Weak positions (place / value of the indicator)
Login «Sub index» (Innovation Input)	
Domestic market development: 90 / 43.3 points	
Easy to get a loan: 29 / 75. 0 points Trade, competition and market scale: 42 / 67.8 points	Domestic credit to the private sector: 86 / 38.4% of GDP Gross microfinance loans: 79 / 0.0% of GDP Investment: 115 / 31.6 points Venture capital transactions: 6 62 / 0 0.0 billion. USA
Infrastructure development: 97 / 36.0 points	
Electricity output: 55 / 3,620 GWh / million population.	Use of information and communication technologies: 90 / 39. 9 points Online government service: 92 / 96. 9 points Environmental sustainability: 120 / 23. 9 points GDP / unit of energy use: 115 / 3.4
Business development: 47 / 34.8 points	
Women employed with academic degrees: 2 / 29.9% of the total number Gross domestic research and development expenditures funded abroad: 15 / 24.4%	Cooperation between universities and production: 64 / 41.3 points Firms offering formal training: 69 / 22.6% of firms Cluster development status: 98 / 37.3 points Joint strategic alliance agreements: 8 88 / 0.0 billion. USA dollars Knowledge absorption: 73 / 31.7 points Import of information and Communication Technology Services: 79 / 0.9% of total foreign trade
State of human capital and science development: 51 / 35.6 points	
Ratio of the number of students per teacher in secondary school: 3 / 7.2 Higher education: tertiary enrolment (higher education coverage): 14 / 83.4 %	Average spending of global R&D companies, Top 3: 43 / 0.0 billion USA dollars
State of the institutional environment (political, regulatory, business) : 96 / 53.9 points	
Ease of starting a business: 48 / 91.1 points	Political and operational stability: 125 / 45.6 points Rule of Law: 107 / 27.6 points Easy resolution of insolvency: 115 / 31.7 points
Exit «Sub index» (Innovation Output)	
Creative activity results: 42 / 33.5 points	
Intangible assets: 17 / 55.8 points Trademarks by origin: 6 / 128.6 billion. USA Industrial designs by origin: 8 / 13.4 billion USA Mobile app creation: 19 / 24.3 billion USA dollars	Use of information and communication technologies in creating a business model: 109 / 49.1 points Creative products and services: 91 / 8.8 points Making national feature films: 94 / 0.6 per 1 million population Printing and other media: 62 / 1.0% production Export of creative economy goods: 82 / 0.2% of total foreign trade
Technology development and knowledge economy: 28 / 34.6 points	
Knowledge creation: 17 / 42.5 points Patents by Origin: 17 / 66.2 billion USA dollars Utility models by Origin: 1 / 24.3 billion USA dollars Computer software spending: 19 / 0.5% of GDP Export of information and Communication Technology Services: 11 / 4.8% of total foreign trade	ISO 9001 quality certificates: 70 / 3.5 points Foreign direct investment: 96 / 0.1% of GDP

Source: built according to [2].

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Thus, Ukraine has a high educational and scientific potential, is able to produce various innovations in the form of ideas, scientific developments, patents, but the mechanism for implementing them in the sphere of economic activity is weak. In this regard, first, it is necessary to develop an effective mechanism for implementing the results of innovation activities and create an effective institutional environment that will ensure the development of talents and increase the level of human development. All this should ensure a further increase in the standard of living of the population [8].

The conducted research proves that the problem of improving the financial mechanism for ensuring innovation processes in the economic system of Ukraine requires a priority solution. Developments on increasing the innovative component of increasing Ukraine's international competitiveness are impossible without adequate financial support.

World experience shows that in developed countries — the world's leading innovation leaders, public policy provides for direct funding for scientific research and through tax measures encourages private sector R&D spending. In the developed countries of the OECD, the ratio of public and private sector expenditures on R&D is 1:3 and 1:4 [9, p. 45—46].

Improving financial mechanisms for ensuring innovation activities should begin with the creation by the state of a favourable climate for the implementation of innovation processes [10, p. 30]. The EU countries are characterized by a constant increase in investment in innovation processes using special software tools and an innovative localization system. Thus, the European Framework program Horizon 2020, launched in 2014, is aimed at expanding scientific research and activating innovation activities in the EU.

The budget of the Horizon 2020 program shows that about 38% of the total amount of funding is allocated for social projects, and the average annual amount of capital investment in innovative processes of regional investment funds is quite significant (11.2 billion euro), grant competitions are available to both specialized research teams, small research teams, and individual specialists [11, p. 18].

Foreign experience of state support for innovation shows that the preferential loan regime is available mainly to small and medium-sized technology companies; the terms of granting loans are characterized by an individual approach; different countries are characterized by different interest rates on soft loans: from 0% in Germany to 4.5% in Brazil; as a rule, there are special agencies or banks to service state programs to support innovation [11, p. 18—24]; the system of fiscal incentives is used at certain phases of the economic process (budget transfers or tax credit for commercialization of R&D results, exemption from income taxes, tax credit [12, p. 150]; improving the financial support of innovation processes cannot be achieved by using subsidies, and state support should be aimed at the development of the enterprise itself, which, having increased the efficiency of its activities, will independently ensure attracting investment to finance innovation activities; the development of innovation infrastructure should be among the strategic priorities of the innovation policy of highly developed states [13]; using the potential of cluster structures as an effective method of ensuring an appropriate level of financial support for innovation activities [14, p. 381].

In *Fig. 2* a conceptual approach to improving the financial support of the innovative component of increasing the international competitiveness of the domestic economy is proposed [15, p. 81; 16, p. 162—163].

The purpose of the concept is to realize the innovative potential of the country and ensure its economic security in the context of globalization and internationalization of social production

Subjects:
- national, regional and local authorities;
- business entities;
- institutions of higher education, scientific institutions, innovative institutions;
- the public;
- interested non-residents.

Objects:
1. Economic potential
2. Environmental potential
3. Socio-demographic potential
4. Infrastructure potential
5. Tourism potential
6. Intellectual property objects
7. Natural Environment, Culture
8. Science and education, etc.

- **Tasks of implementing the concept:**
  - monitoring the state of innovation potential and financial support for its implementation (SWOT-analysis of innovation potential through the prism of the country/region's financial security strategy and ensuring an appropriate level of international competitiveness of the country);
  - monitoring and analysis of factors of innovative cooperation of the country's regions;
  - formation of an innovation management strategy taking into account the need to increase the level of international competitiveness of the country.

Components of the concept of financial support for increasing the innovative component of Ukraine's international competitiveness

Principles :
- ✓ Timeliness
- ✓ Complexity
- ✓ Continuity
- ✓ Rule of law
- ✓ Flexibility
- ✓ Rationality

Ensuring the implementation of the concept:
- ✓ Personnel Management
- ✓ Material
- ✓ Technical information
- ✓ Information Centre
- ✓ Software
- ✓ Financial
- ✓ Regulatory and legal framework
- ✓ Analytical

Methods and tools:
1. Economic (tax incentives ;transfers; direct budget investments; grants; concessional lending; cooperation with foreign institutions for financial support of innovation activities; increasing the share of GDP aimed at financing innovation processes; attracting household funds, international grants as investments for the implementation of the concept of innovative development of the country's economy, etc.)
2. organizational (development of innovation infrastructure; consulting assistance; personnel support; creation of clusters using the potential of education, business, government, public; creation of regional clusters with innovation and industry production; increasing the role of non-state institutions in ensuring financial support for innovation activities, etc.).
3. regulatory (strategies, concepts, plans, programs).
5. institutional (technology parks, business incubators, analytical centres, etc.).
6. Social (Business trainings, social projects, etc.)

State of international competitiveness of the country

business climate	**social development**	**industrial development**	**sustainability of the economic system**

STATE OF ECONOMIC SECURITY

High	**Sufficient**	**Pre-Crisis**	**Crisis**

Maintaining an optimal level of use of innovation potential and economic security

Development of an action plan for changes and improvement of the mechanism for using innovative potential and ensuring economic security

Fig. 2. **Concept of financial support for increasing the innovative component of Ukraine's international competitiveness**

The implementation of the proposed concept of financial support for increasing the innovative component of Ukraine's international competitiveness should take place at strategic (elimination of contradictions or their localization or weakening), tactical (elimination of threats themselves or prevention of their impact) and operational (elimination of the consequences of threats) levels. To ensure a sustainable level of international competitiveness of the country through increasing the innovation component, it is important to implement a system of measures to monitor threats even at the stage of their origin and prevent the spread of their negative impact. Therefore, the methods and tools of implementing the concept of financial support for increasing the innovation component of Ukraine's international competitiveness should have components of threat prevention and should

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include economic levers (tax incentives; transfers; direct budget investment; grants; concessional lending; cooperation with foreign institutions for financial support of innovation activities; increasing the share of GDP aimed at financing innovation processes; attracting household funds, international grants as investments for the implementation of the concept of innovative development of the country's economy, etc.), as well as organizational (development of innovative infrastructure; consulting assistance; personnel support; creation of clusters using the potential of education, business, government, public; creation of regional clusters with innovative and industry production; increasing the role of non-state institutions in ensuring financial support for innovation activities, etc.), institutional (techno parks, business incubators, analytical centres, etc.), regulatory (strategies, concepts, plans, programs) and social (conducting business trainings, implementing joint social projects, etc.).

Conclusions. Increasing the innovation of the country's economy in the modern globalizing conditions of world economy development is of exceptional importance, because countries with a low level of investment in innovation have a relatively low level of economic development and, in fact, belong to the third world countries.

Thus, innovation activity helps the country to level out the negative aspects associated with the cyclical nature of economic development in the context of modern global transformations at any stage of development. Compared to national economies that do not pay attention to the development of innovations, innovatively developed countries show higher rates of economic growth in the long-term trend. This is especially clear in those countries that build their own national innovation system based on a combination of stimulating State Innovation Policy, science, education, business community and the country's participation in international innovation clusters in order to create and implement innovations as a priority of economic development. Of all these determinants, joint innovations are not only a tool for the country's economic growth through increased labour productivity, but also create opportunities for innovative novelty in the global aspect. Joint innovations make it possible to create a completely new product, the promotion of which in the global innovation market ensures the growth of competitiveness of the national economy on a global scale.

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