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DOMINANT IMPACT OF STRUCTURAL TRANSFORMATION OF THE ECONOMY OF UKRAINE ON THE EFFICIENCY OF THE INVESTMENT POTENTIAL DEVELOPMENT OF ENTERPRISES UNDER CONDITIONS OF UNCERTAINTY

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Prokhorova V. V., Yukhman Y. V..

Dominant Impact of Structural Transformation of the Economy of Ukraine on the Efficiency of the Investment Potential Development of Enterprises under Conditions of Uncertainty

The article defines that the structural transformation of the economy is of great importance for the state, it determines the potential of its long-term development, as a result of which it becomes a strategic factor of general development not only for enterprises of a certain industry, but also for the country as a whole. That is why the structural transformation of Ukraine's economy has a dominant effect on the effectiveness of the development of the investment potential of all industrial enterprises, since today there is a decline in production, which directly depends on the latest innovative measures of the state's strategic development. On the basis of the structural priorities of the socio-economic development of Ukraine and the existing scientific, technical and innovative potential of the domestic economic sector, with the aim of ensuring competition in the scientific sphere, effective concentration of material, technical and financial resources to solve current problems in the economic sector of Ukraine, it is necessary to form long-term innovative programs in general industry in market conditions of management, where the main aspects of scientific and innovative activity of industrial enterprises are indicated. To date, in the economic field, innovations are not implemented very efficiently at effective industrial enterprises. It was concluded that the insufficient amount of financial and economic resources is one of the main reasons preventing the development of new types of products and technologies in the process of implementing innovative developments on the territory of our country. Financial institutions are reluctant to lend to risky innovative projects, and the existing financial and credit mechanism is imperfect and ensures the implementation of the results of applied scientific research in the domestic market and in the markets of developed countries of the world, where credit institutions are created with the participation of state authorities in order to provide guarantees, reducing the amount of use budgetary funds and distributing the risk between the borrower, the bank and the guarantor for the financing of innovative programs and the implementation of innovative projects. The development of industry on an innovative and scientific basis requires the training of a new generation of researchers and highly qualified specialists, ready to carry out innovative activities in market conditions.

Keywords: *structural transformation, impact, state, level, indicator, efficiency, sustainability, development.*

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Prokhorova Viktoriia V. *– Doctor of Sciences (Economics), Professor, Head of the Department of Economics and Management, Ukrainian Engineering and Pedagogical Academy (16 Universytetska Str., Kharkiv, 61003, Ukraine)*

E-mail: *vkprohkorova@gmail.com*

ORCID: *http://orcid.org/0000-0003-2552-2131*

Researcher ID: *https://publons.com/researcher/3623441/viktoriya-prokhorova/*

Scopus Author ID: *https://www.scopus.com/authid/detail.uri?authorId=57203623016*

Yukhman Yaryna V. *– Candidate of Sciences (Economics), Senior Lecturer of the Department of Economics and Business Investment, National University «Lviv Polytechnic» (12 Stepana Bandery Str., Lviv, 79013, Ukraine)*

E-mail: *yaryna2003@gmail.com*

ORCID: *htts://orsid.org/0000-0003-3535-731X*

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Прохорова В. В., Юхман Я. В. Домінантний вплив структурної трансформації економіки України на ефективність розвитку інвестиційного потенціалу підприємств в умовах невизначеності

У статті визначено, що структурна трансформація економіки має для держави велике значення, вона визначає потенціал її розвитку на довгострокову перспективу, унаслідок чого стає стратегічним чинником загального розвитку не тільки для підприємств певної галузі, але й країни загалом. Саме тому структурна трансформація економіки України має домінантний вплив на ефективність розвитку інвестиційного потенціалу усіх промислових підприємств, оскільки сьогодні є спад виробництва, який напряму залежить від новітніх інноваційних заходів стратегічного розвитку держави. На основі структурних пріоритетів соціально-економічного розвитку України та наявного науково-технічного й інноваційного потенціалів вітчизняної економічної галузі, з метою забезпечення конкуренції в науковій сфері, ефективної концентрації матеріально-технічних і фінансових ресурсів для вирішення актуальних проблем у економічній галузі України потрібне формування довгострокових інноваційних програм у загальній промисловості в ринкових умовах господарювання, де зазначені основні аспекти наукової та інноваційної діяльності промислових підприємств. На

сьогодні в економічній галузі інновації реалізуються не надто ефективно на дієвих промислових підприємствах. Зроблено висновок, що недостатність обсягу фінансово-економічних ресурсів є однією з основних причин, що стримують освоєння нових видів продукції та технологій у процесі впровадження інноваційних розробок на теренах нашої країни. Фінансові установи неохоче кредитують ризикові інноваційні проєкти, а наявний фінансово-кредитний механізм є недосконалим і забезпечує впровадження результатів прикладних наукових досліджень на вітчизняному ринку та на ринках розвинених країн світу, де створюються кредитні установи за участю державних органів влади з метою надання гарантій, зменшуючи обсяг використання бюджетних коштів і розподіляючи ризик між позичальником, банком і гарантом для фінансування інноваційних програм та реалізації інноваційних проєктів. Розвиток промисловості на інноваційних та наукових засадах потребує підготовки нового покоління дослідників і висококваліфікованих фахівців, готових до здійснення інноваційної діяльності в умовах ринку.

Ключові слова: *структурна трансформація, вплив, інвестиційний потенціал підприємств, держава, рівень, показник, ефективність, стійкість, розвиток.*

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Прохорова Вікторія Володимирівна *– доктор економічних наук, професор, завідувач кафедри економіки та менеджменту, Українська інженерно-педагогічна академія (вул. Університетська, 16, Харків, 61003, Україна)*

E-mail: *vkprohkorova@gmail.com*

ORCID: *http://orcid.org/0000-0003-2552-2131*

Researcher ID: *https://publons.com/researcher/3623441/viktoriya-prokhorova/*

Scopus Author ID: *https://www.scopus.com/authid/detail.uri?authorId=57203623016*

Юхман Ярина Василівна *– кандидат економічних наук, старший викладач кафедри економіки підприємства та інвестицій, Національний університет «Львівська політехніка» (вул. Степана Бандери, 12, Львів, 79013, Україна)*

E-mail: *yaryna2003@gmail.com*

ORCID: *htts://orsid.org/0000-0003-3535-731X*

Introduction. Structural transformation of an economy is of great importance for a country, as it defines the capacity of its long-term development, hence it becomes a strategic factor for the general development not only for enterprises of particular branch of economy, but for the country as a whole as well. Consequently, the structural transformation of Ukraine's economy exerts a profound impact on the efficiency of the investment potential advancement of all industrial enterprises, since nowadays they are experiencing falling-off of production, which directly depends on the latest innovative measures taken for the state's strategic development.

The indeterminacy of the strategic vector of economic development is connected with the fact that every model of the national economy in the process of its evolution has had certain attributes of structural and functional deformation and patterning, which, of course, forms a particular scenario of the development of each of the economies, determining the model of the economic system, taking into account the bifurcation points as those that characterize the state of the economic system, meaning the slightest influence can lead to a significant change in traditional functioning processes. The socio-economic environment, which determines the organization of Ukrainian social system, proves the absence of a unified concept of the impact that the uncertainty state makes on sustainable economic growth.

Actual scientific researches and issues analysis. Structural transformation of our country's economy is being researched by many scientists. In particular, T. Belualov [1], Yu. Bezugla [2,3], R. Charan [4], B. Daisley [5] and others.

Unsolved parts of the research problem. Many scientific works of economists are marked by the emphasis on the actuality of the issue of structural transformation of our country's economy under conditions of uncertainty, which are among the most found as acute, complex and extremely relevant not only in the scientific, but also, first of all, in the practical aspect.

Objective of the research article is to improve the integrated model of managerial decision-making, taking into account the dominant impact of the structural transformation of Ukraine's economy on the efficiency of investment potential development of enterprises under conditions of uncertainty.

Key results of the study research. Based on the priorities of the socio-economic development of Ukraine and the existing scientific, technical and innovative potential of the domestic industry and in order to to ensure competition in the scientific field, effective concentration of material, technical and financial resources to solve the current problems of the Ukrainian economy, it is found necessary to establish and launch long-term innovation programs into the industry, in the market economy environment, where the main aspects of scientific and innovative activity of industrial enterprises are indicated.

Considering a substantial dependence of Ukraine on the import of oil and natural gas in the near future and in long term, the only reliable resource base of the fuel and energy complex will remain the domestic industry, which is a supplier of its own type of energy carriers, potentially sufficient to almost fully meet the needs of the national economy, thereby guaranteeing energy security for the state and industrial enterprises themselves. Nowadays, by evaluating the effectiveness of innovations in the economy of Ukraine and industrial enterprises, the following provisions are taken into account: the possible impact of innovations on technical, economic and financial indicators in general; the possibility of using fixed assets, material stocks and labor resources that each industrial enterprise has for the implementation of the measures; tax payments and corresponding benefits are determined at each enterprise

separately for a defined innovation project; conditions for the termination of the implementation of a single innovation project at an industrial enterprise are additionally agreed with the financial indicators of all enterprises participating in the implementation of the specified project.

At every participating enterprise and entire group of them, in which the implementation of a single innovative project is planned or is being implemented, there is evaluated not only its overall efficiency, but also the scope of impact the implementation of innovative measures makes on the indicators of production, as well as economic and financial activity of each industrial enterprise. The execution of specified estimates is a necessary measure for decision-making in the field of innovative activity while substantiating the economic norms and levels of the state's planned indicators. However, the issue of renewing the fund remains unsolved, as the existing scientific and technical policy does not allow overcoming their obsolescence and depreciation promptly. There is a large number of industrial enterprises with two-thirds of their main stationary equipment having expired service life and needing urgent renewal. The consequence of the above specified processes is an efficiency decrease of the equipment's operation and an increase in the costs of their operation maintaining. In order to overcome such negative operation conditions, significant attention has been paid recently to the scientific and technical activities of institutes of the economic branch in the most priority areas of activity.

Design solutions, technical characteristics and parameters of the new generation of cleaning, tunneling and transport equipment and machinery meet utmost their complex application need within the operation conditions of Ukrainian enterprises. Determining the increase in operational indicators of new machines in terms of productivity, power supply, and reliability compared to outdated domestic analogues will allow to ensure the transition to increased profits. The introduction of new technologies to the industrial enterprises of a modern innovative level ensures increased capacity compared with previously obtained one in similar conditions, with outdated commercial machines, as well as providing a rapid decline in the amount of manual labor, and an increase in productivity and safety of workers.

The main content of the processes of transformation and transition of Ukrainian industry to the innovative path of development should include a complex of economic and organizational and legal measures aiming at stimulating innovative activity on the territory of our country. In the course of the above defined process, both business entities willing to industrially master technological innovations and creators of technical innovations are facing significant challenges. The reason is that there is practically no mutual connection between scientific and technical developments and their implementation on the market: scientific organizations do not take into account the needs of product manufacturers. At the current level of scientific and technical developments, scientists experience difficulties in commercializing their work due to the lack of opportunities to assess the market potential of Ukrainian products. There is also no mechanism for attracting investments in the innovation sphere, as well as the existence of market-oriented structures that could act as a customer for scientific and technical products. There is also a lack of a mechanism for attracting investments in the innovation sphere, as well as the existence of market-oriented structures that could act as a customer for scientific and technical products. The insufficient amount of financial resources is one of the main reasons that hinder from the development of new types of products and technologies in the process of introducing innovative developments at enterprises, which could contribute to structural transformation (Fig. 1).

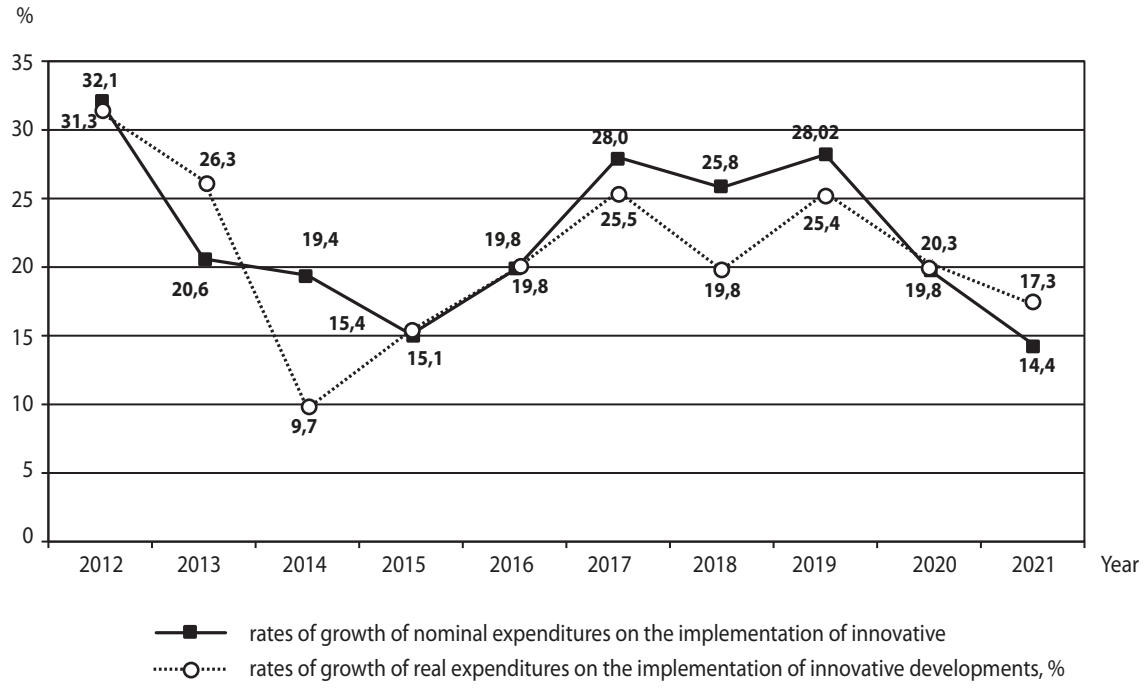

Fig. 1. Nominal and objective rates of additions of expenditures on the innovative solutions implementation in Ukraine for 2012–2021

Source: compiled by the authors

In 2021, the growth of nominal expenditures on the implementation of innovative developments in Ukraine was at the level of 14.4%, while real expenditures were 17.3%. Therefore, the transition from the system of expenditure planning based on cost management to the system of managing the country's financial results will help to improve the mechanism of planning expenditures for the structural transformation of the economy.

The analysis of target programs for the structural transformation of the economy of our country allows us to highlight the following features (Fig. 2): a large number of programs; lack of connection of these programs with budget planning; having a large number of programs with a short implementation period; having programs funded behind time; underfunding of programs; a small number of programs aimed at the economic growth of manufacturing enterprises; defunding of yet expired programs.

For the means of empiric testing of theoretical provisions regarding the tax behavior of indicators in the process of implementing the structural transformation of the economy, it is important to determine the scope of informal economy. The calculation of the variables used in the study of tax behavior

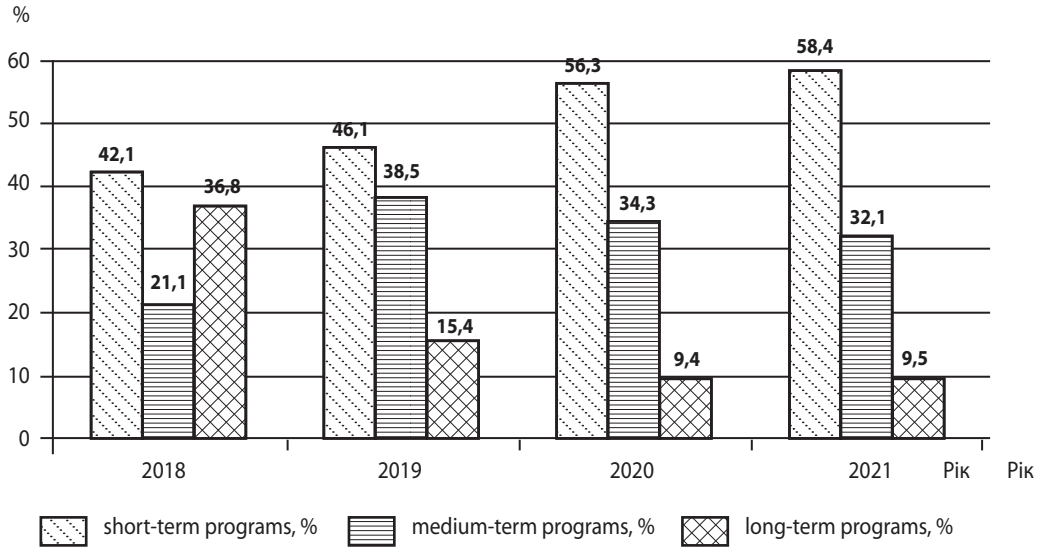

Fig. 2. Distribution of target programs for the implementation of structural transformation of the country's economy depending on the implementation period

Source: compiled by the authors

can be carried out in three stages. At the first stage, there are defined the volumes of a_1^t, a_2^t of gross added value obtained, respectively, from the official conduct of operations and by hidden means in the t-period of time, t = 1, 2,..T. Then, in accordance with a_1^t, and, a_2^t the shares p_t^e of the official conduct of operations by the agent in each t-period are calculated.

At the second stage, in order to exclude the random component, an obtained time series p_t^e (t = 0, ...T) is smoothed by moving average method with half-period, which is equal 1:

$$p_t^3 = \frac{p_{t-1}^e + p_t^e + p_{+1}^e}{3} \ (t = 1, \ldots T).$$

At the third stage, the parameters s_0, s_1, β and λ, are calculated. They are determined by the values p_t^3 (t = 0, 1, 2,...T-1). Then there are found the values p_t (t = 1, 2, ...T), that correspond to the theoretical model $p_t = s_0 + s_1 p_{t-1}$ and $p_t = \beta - (\beta - p_0)e^{-\lambda t}$.

The accuracy of the identification of the parameters s_0, s_1 can be estimated by the values of K^T, K^3 of the average fractions of the absolute deviations of the values obtained according to the theoretical model from the initial values p_t^e calculated on the basis of statistical data (K^T) and from the smoothed values p_t^3 (K^3):

$$K^T = \frac{1}{T}\sum_{t=0}^{T-1}\frac{\left|p_{tt}^e - p\right|}{p_t^e}, K^3 = \frac{1}{T}\sum_{t=0}^{T-1}\frac{\left|p_{tt}^3 - p\right|}{p_t^3}.$$

The method of quantitative identification of model parameters provides the way to determine the value of these parameters in accordance with statistical data on the dynamics of structural transformation behavior. Knowledge of the values of model parameters provides opportunities for predicting the behavior of taxpayers not only while assuming no changes in the taxation system, but also in the event of a wide range of changes in the indicators that determine it. In addition, they serve an opportunity to provide certain estimates of the degree of influence of various factors on taxpayers' behavior. Knowing the values of the parameters β and λ empowers predicting the behavior of structural transformation in the future, assuming the absence of changes over time in the parameters a, b, c, q_0 and n. To make such a forecast, it is sufficient to have solely the statistical data on the behavior of the structural transformation over past periods of time, thus, the knowledge of the quantitative values of the parameters a, b, c, q_0 and n is not required. But using information about the values of q_0 and n, the values of parameters a, b, and c can be calculated, which allows to interpret the reasons for one or another structural transformation behavior. In addition, the knowledge of parameters a,

b and *c* provides opportunities for predicting the behavior of taxpayers in the conditions of changes in parameters q_0 and *n*, which in an aggregated form reflect the impact on the behavior of the structural transformation of the current taxation system (Fig. 3).

In accordance with the received model, over time, the share of officially conducted operations monotonically decreases or increases from the initial value to a certain steady state, which is determined by the parameters of the payers' motivation. The inertia of behavior is due to the fact that changes in tax status are associated with time costs and material losses risks. Therefore, financial institutions are reluctant to grant a credit to risky innovative projects, and the existing financial and credit mechanism is imperfect and ensures the implementation of the results of applied scientific research on the domestic market and on the markets of developed countries of the world, where credit institutions are created with the participation of the state authorities of Ukraine for the purpose of providing guarantees, reducing the use of budget funds and distributing the risk between a borrowing entity, a bank and a guarantor, while financing the innovative programs and the implementation of innovative projects.

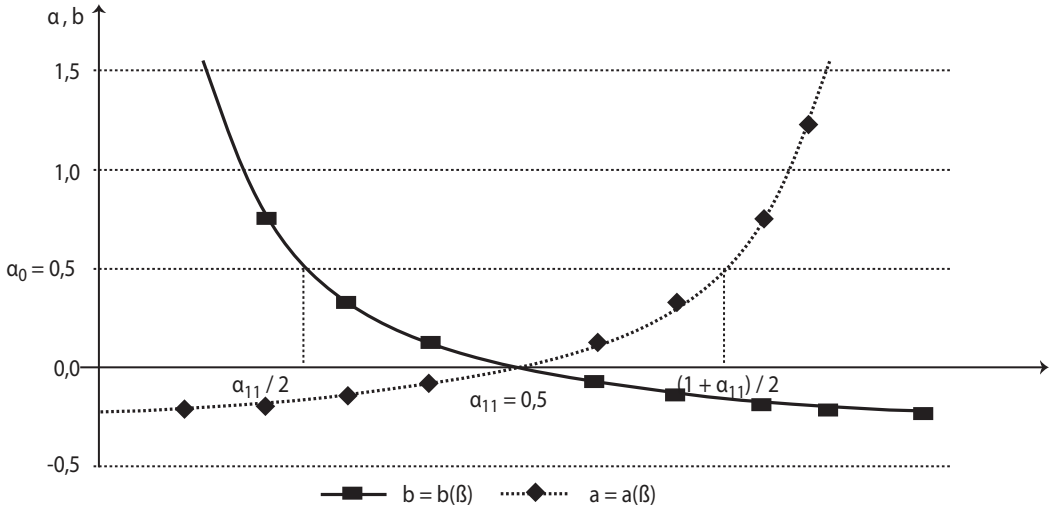

Fig. 3. Dependence diagram for a(β), b(β) for $n = 0,5$, $q_0 = 0,5$, $\alpha_{Ц}^{(2)} = 0,75$ regarding the tax behavior of indicators in the process of economy structural transformation implementing

Source: compiled by the authors

The development of the economy and industry on innovative and scientific bases, taking into account the peculiarities of transformational processes, requires substantial training of a new generation of researchers and highly qualified specialists, ready to carry out innovative activities in market conditions (Fig. 4).

The professional qualification of the new generation of creative managers should authorize, in the mode of permanent adjustment, the development of an integrated model of management decision-making regarding the structural transformation of the economy of Ukraine in conditions of uncertainty, using creative management technologies (Fig. 5).

Special attention should be paid to the training, retraining and upgrading of the qualification of scientific manpower capable of participating in the effective structural transformation of our country in modern conditions.

On the one hand, the existing trend towards economic growth has not yet become comprehensive and sustainable, and on the other hand, the revealed efforts of the state are aimed at reforming the economic sector, which thus can ensure a positive dynamic to the growth of the country's development indicators.

Based on the structural priorities of socio-economic development of Ukraine and the existing scientific, technical and innovative capacity of the domestic economic sector, with the aim of ensuring competition in the scientific sphere, efficient concentration of material, technical and financial resources in order to solve current problems in the economic sector of Ukraine, it is necessary to establish long-term innovative programs in general industry within a market economy management, where the main aspects of scientific and innovative activity of industrial enterprises are indicated. To date, in the economic branch the innovations are not implemented efficiently enough at operating industrial enterprises. While evaluating their efficiency, the following provisions are taken into account:

1) Possible impact of innovations on the technical, economic and financial indicators of the country in general;
2) Probability of using fixed assets, material stocks and labor resources, possessed by each industrial enterprise for the innovation implementation;
3) Tax payments and corresponding benefits are determined at each enterprise separately according to the defined innovation project of the country;
4) Conditions for termination of the implementation of a single innovative project are additionally agreed with the financial indicators of all participants in the implementation of the specified project.

Every participating enterprise and an entire group of them, where the implementation of a single innovative project is planned or has already commenced, is being evaluated

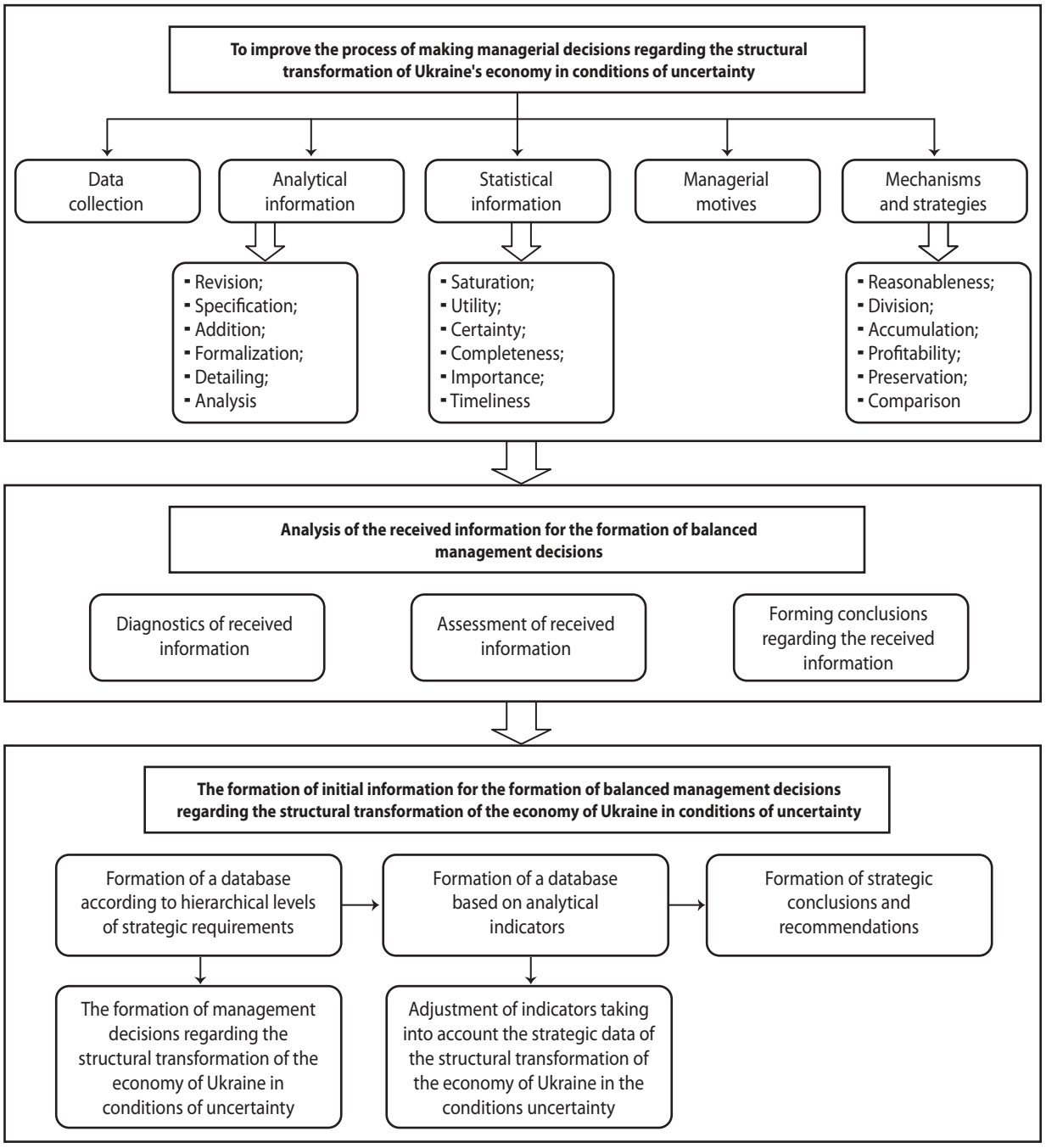

Fig. 4. General structure of management decision-making regarding the structural transformation of the economy under conditions of uncertainty

Source: author's development

in terms of not only its overall efficiency, but with the account on the way the implementation of innovative measures affects the indicators of production, economic and financial activity of each industrial enterprise. The provision of specified estimates is a necessary measure for decision-making in the field of innovative activity while justifying economic norms and levels of planned indicators of Ukraine. However, the problem of renewing the special fund remains unsolved; the existing scientific and technical policy does not allow to overcome their obsolescence and worn out state in a short period of time. At many industrial enterprises there is two-thirds of the main stationary equipment with expired service life and needs urgent renewal. The introduction of new technologies at industrial enterprises of a modern innovative level allows them to ensure a new operation load that exceeds previously obtained one, having similar conditions but using commercial machines; and meanwhile it brings a sharp reduction in the amount of manual labor, an increase in the productivity and safety of workers, which will contribute to the development of the economy of our country.

The main content of the processes of transformation and transition of industry to the structural and innovative path of

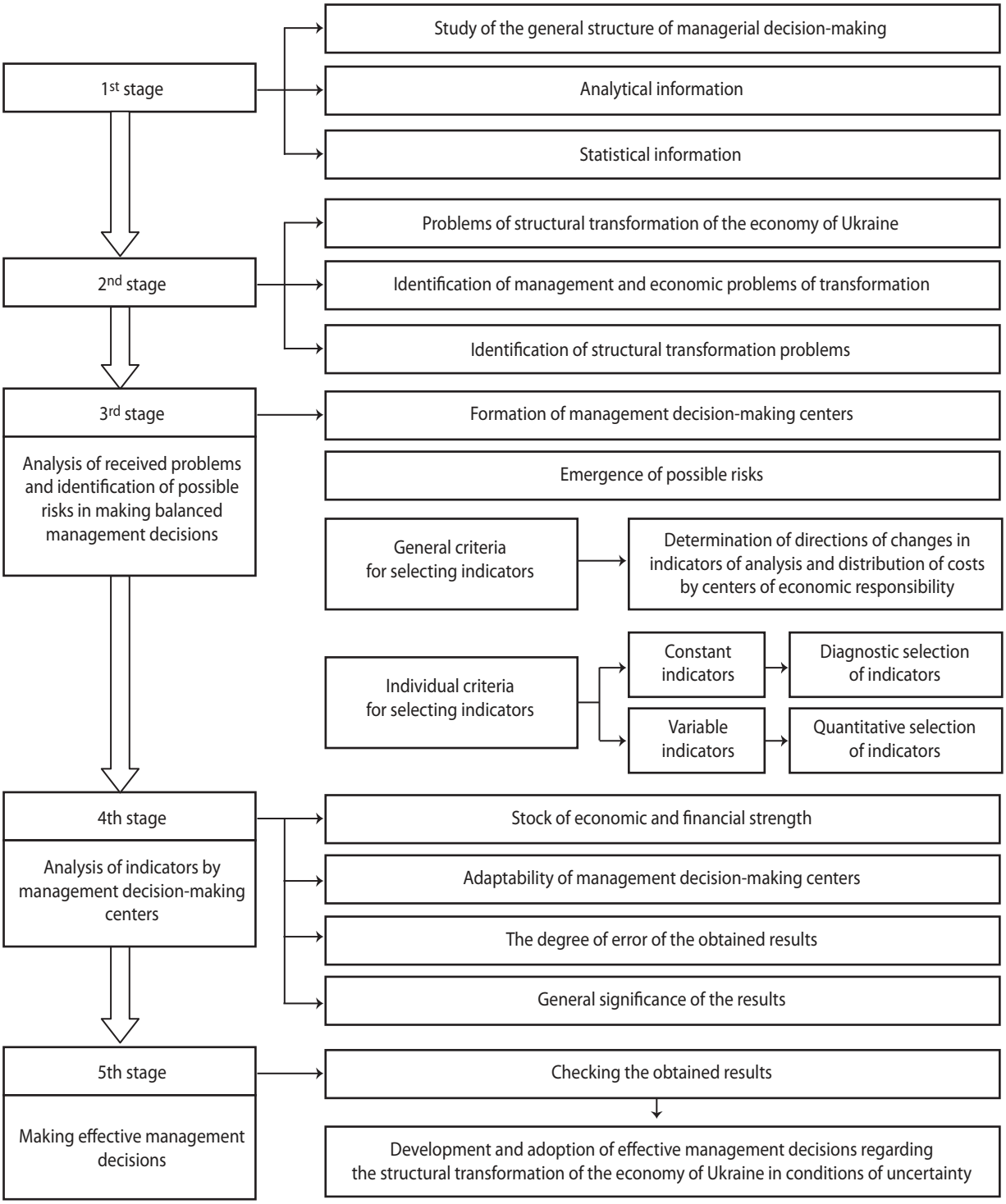

Fig. 5. An integrated model of management decision-making, with account of dominant impact of the structural transformation of Ukrainian economy on the effectiveness of the development of the investment potential of enterprises in conditions of uncertainty

Source: author's development

development should include a complex of economic and organizational and legal measures to stimulate innovative activity on the territory of Ukraine. In the defined process, problems arise both for business entities willing to industrially master technological innovations, and for creators of technical innovations. The reason is that there is practically no mutual connection between scientific and technical developments and their implementation on the market: scientific organizations do not take into account the needs of product manufacturers. At the current level of scientific and technical developments, scientists experience difficulties in commercializing their work due to the lack of opportunities to assess the market potential of

the created products. There is also no mechanism for attracting investments in the innovation sphere, as well as the existence of market-oriented structures that could act as a customer for scientific and technical products. There is also a lack of a mechanism for attracting investments in the innovation sphere, as well as the existence of market-oriented structures that could act as a customer for scientific and technical products.

Conclusions. The lack of financial and economic resources is one of the main reasons that prevent the development of new types of products and technologies in the process of implementing innovative developments in the territory of our country. Financial institutions are reluctant to lend to risky innovative projects, and the existing financial and credit mechanism is imperfect and ensures the implementation of the results of applied scientific research on the domestic market and on the markets of developed countries of the world, where credit institutions are created with the participation of state authorities in order to provide guarantees, reducing the amount of use budgetary funds and distributing the risk between the borrower, the bank and the guarantor for the financing of innovative programs and the implementation of innovative projects.

The development of industry on an innovative and scientific basis requires the training of a new generation of researchers and highly qualified specialists, professionally capable of making management decisions, taking into account the dominant influence of the structural transformation of the economy of Ukraine on the effectiveness of the development of the investment potential of enterprises in conditions of uncertainty.

Special attention should be paid to the training, retraining and upgrading of the qualifications of scientific personnel of industrial enterprises capable of participating in investment and innovation activities in modern conditions. On the one hand, the existing trend towards economic growth has not yet become comprehensive and sustainable, and on the other hand, the revealed efforts of the state are aimed at reforming the economic sector, which as a result can provide a positive dynamic to the growth of indicators of the economic development of our country.

LITERATURE

1. Белялов Т. Е. Олійник А. В. Фінансова стійкість підприємства та шляхи її зміцнення. *Інтернаука.* 2016. № 12 (2). С. 22–26. URL: http://nbuv.gov.ua/UJRN/mnj_2016_12%282%29__6

2. Bezuhla J. Y. Scenarios of enterprises economic activity development. *Actual Problems of Economics.* 2015. No. 170 (8). P. 402–408.

3. Bezuhla J., Kononenko Ya., Bytiak O., Zacharchyn H., Korin M. Renovation and sustainable development of the industrial energy enterprise: economic and legal management mechanism. *IOP Conference Series: Earth and Environmental Sciencethis.* 2021. No. 628 (1). P. 012009.

4. Чаран Р., Кэри Д., Бартон Д. Талант побеждает. О новом подходе к реализации HR-потенциала. Москва : Олимп-Бизнес, 2019. 224 с.

5. Daisley B. New rules of work. Generator of productive peace. Bombora, 2020. 368 p.

6. Rigby Darrell. Bilodeau Barbara. Management. Tools and Trends, 2013. 16 c. URL: https://www.bain.com/contentassets/f8361c5cd99e4f40bbbf83c17d6a91b9/bain_brief-management_tools_and_trends.pdf

7. Rogers E. M. Diffusion of innovations. New York : The Free Press, 1995. 453 p.

8. Rowe W. An anatomy of risk. N.-J. : John Wiley, 1997. 488 p.

9. Rothwell R. Towards the fifth-generation innovation process. *International Marketing Review.* 1994. Vol. 11, No. 1. P. 7.

10. Stalk G. J. Time – the next source of competitive advantage. *Harvard Business Review*. 1988. Vol. 66, (July-August) No. 4. P. 41–51.

11. Згуровський М. Глобальне моделювання сталого розвитку: якість життя та безпека населення світу. Київ : Вид-во «Політехніка», 2007. 218 с.

12. Zgurovsky M. Z. Sustainable development global simulation: Opportunities and threats to the planet. *Russian Journal of Eearth Sciences*. 2007. Vol. 9.

DOI: 10.2205/2007ES000273

REFERENCES

Belialov, T. E., and Oliinyk, A. V. "Finansova stiikist pidpryiemstva ta shliakhy yii zmitsnennia" [Financial Stability of the Enterprise and Ways to Strengthen It]. Internauka. 2016. http://nbuv.gov.ua/UJRN/mnj_2016_12%282%29__6

Bezuhla, J. et al. "Renovation and sustainable development of the industrial energy enterprise: economic and legal management mechanism". *IOP Conference Series: Earth and Environmental Sciencethis*, no. 628(1) (2021): 012009.

Bezuhla, J. Y. "Scenarios of enterprises economic activity development". *Actual Problems of Economics*, no. 170(8) (2015): 402-408.

Charan, R., Keri, D., and Barton, D. *Talant pobezhdayet. O novom podkhode k realizatsii HR-potentsiala* [Talent Wins. About a New Approach to the Implementation of HR Potential]. Moscow: Olimp-Biznes, 2019.

Daisley, B. *New rules of work. Generator of productive peace*. Bombora, 2020.

Rigby, D. "Bilodeau Barbara. Management". Tools and Trends, 2013. https://www.bain.com/contentassets/f8361c5cd99e4f40-bbbf83c17d6a91b9/bain_brief-management_tools_and_trends.pdf

Rogers, E. M. *Diffusion of innovations*. New York: The Free Press, 1995.

Rothwell, R. "Towards the fifth-generation innovation process". *International Marketing Review*, vol. 11, no. 1 (1994): 7-.

Rowe, W. *An anatomy of risk*. N.-J.: John Wiley, 1997.

Stalk, G. J. "Time - the next source of competitive advantage". *Harvard Business Review*, vol. 66, (July-August), no. 4 (1988): 41-51.

Zgurovsky, M. Z. "Sustainable development global simulation: Opportunities and threats to the planet". *Russian Journal of Eearth Sciences*, vol. 9 (2007).

DOI: 10.2205/2007ES000273

Zhurovskyi, M. *Hlobalne modeliuvannia staloho rozvytku: yakist zhyttia ta bezpeka naselennia svitu* [Global Modeling of Sustainable Development: Quality of Life and Security of the World's Population]. Kyiv: Vyd-vo «Politekhnika», 2007.

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