



ГОРЯЩЕНКО Ю.Г.

докт. екон. наук, доц.

доцент кафедри підприємництва та економіки підприємства

Університет митної справи та фінансів

вул. Володимира Вернадського, 2/4, м. Дніпро, Україна, 49000

E-mail: julia.goryaschenko@gmail.com

ORCID: 0000-0001-7020-1412

АНАЛІЗ РІВНЯ ІННОВАЦІЙНОГО РОЗВИТКУ ТА СПРИЙНЯТЛИВОСТІ ПІДПРИЄМСТВ ДО ІННОВАЦІЙ НА ОСНОВІ ЕКСПЕРТНОГО ОПИТУВАННЯ

Актуальність. На часі розв'язання проблеми оцінювання та реагування її, першою чергою, виявлення та ранжування факторів із великої їх кількості, які прямо або опосередковано справляють вплив на інноваційний розвиток підприємств. Важливим етапом у процесі такої оцінки є встановлення найтипівіших рис, що характеризують загрози та можливості інноваційного підприємства, визначені у результаті експертного опитування. Тому дане дослідження послугує для розробки всеохоплюючих питань мікро- та макрооточення, які торкаються інноваційного розвитку будь-якого підприємства, і можуть бути покладені в основу типової анкети для керівників і власників бізнесу, а також менеджерів з інновацій і співробітників.

Мета та завдання. Метою статті є систематизація факторів інноваційного розвитку й розробка, на цій основі, пропозицій щодо створення профілю інноваційного розвитку підприємств. Вказана мета конкретизована в дослідницьких цілях: проведення вибірки експертів-фахівців за даним напрямом; визначення переліку нефінансових показників – факторів-стимуляторів, факторів-дестимуляторів та фокус-факторів інноваційного розвитку; створення профілю інноваційного розвитку підприємства, що відрізняється інтераційністю запланованих заходів підприємств для виключення несприятливих наслідків та врахування можливостей розвитку.

Результати. Отримана під час анкетного обстеження емпірична інформація дозволила виявити рівень інноваційного розвитку підприємств і ціннісні установки щодо сприйнятливості підприємств до інновацій. На основі проведеного анкетування (у тому числі онлайн-опитування) з метою оцінювання факторів-дестимуляторів внутрішнього середовища, макросередовища і мікросередовища підприємств, які справляють найбільший вплив на інноваційний розвиток підприємства, а також факторів, що створюють сприятливі умови для інноваційного розвитку підприємства, запропоновано авторський підхід, базований на застосуванні методів експертного опитування, економіко-математичного моделювання й ін.

Висновки. За допомогою застосування методів спостереження і абстрагування, порівняння, аналізу і синтезу, зведення, групування і моделювання, методу факторного аналізу та експертного опитування було вироблено методичний підхід до розробки профілю інноваційного розвитку підприємств, котрий рекомендується розробити та візуалізувати на кожному підприємстві, застосовуючи спеціально розроблене анкетування для керівників та співробітників інноваційно активних підприємств, базоване на принципах об'єктивності, конфіденційності, самодостатності та пріоритетності показників.

Ключові слова: інновації, підприємства, інноваційний розвиток, експертне опитування, економіко-математичне моделювання.

HORIASHCHENKO Yu.G.

Dr. Sc. (Economics), Associate Professor

Associate Professor of the Department of Entrepreneurship and Economics of Enterprise

University of Customs and Finance

Volodymyra Vernadskoho Street, 2/4, Dnipro, Ukraine, 49000

E-mail: julia.goryaschenko@gmail.com

ORCID: 0000-0001-7020-1412

ANALYSIS OF THE LEVEL OF INNOVATIVE DEVELOPMENT AND SUSCEPTIBILITY OF ENTERPRISES TO INNOVATION BASED ON AN EXPERT SURVEY

Topicality. It is time to solve the problem of evaluation and response and, first, to identify and rank the factors of their large number that directly or indirectly affect the innovative development of enterprises. An important step in the process of such an assessment is to establish the most typical features that characterize the threats and opportunities of an innovative enterprise, identified because of an expert survey. Therefore, this study serves to develop comprehensive

issues of micro and macro environment, which affect the innovative development of any enterprise, and can be the basis of a standard questionnaire for managers and business owners, as well as innovation managers and employees.

Moreover, today the problems of innovative development of enterprises are exacerbated by the emergence of barriers to communication due to the pandemic, disorientation in the goals and objectives of the enterprise as a purposeful system, huge distrust and uncertainty and outflow of specialists.

Aim and tasks. The purpose of this study is to systematize the factors of innovative development and development, on this basis, proposals for creating a profile of innovative development of enterprises. The specified goal was concretized in following research tasks: to make a sample of experts in this field; determine the list of non-financial indicators - stimulants, disincentives and focus factors; to create a profile of innovative development of the enterprise, which differs in the interaction of the planned activities of enterprises to avoid adverse consequences and take into account the possibilities of innovative development.

Research results. Empirical information obtained during the questionnaire revealed the level of innovative development of enterprises and values regarding the susceptibility of enterprises to innovation. On the basis of the survey (including online surveys) to assess the disincentives to the internal environment, macro-environment and micro-environment of enterprises that have the greatest impact on the innovative development of the enterprise, as well as factors that create favorable conditions for innovative entrepreneurship an approach based on the use of expert survey methods and economic-mathematical modeling.

Conclusion. Using methods of observation and abstraction, comparison, analysis and synthesis, summarization, grouping and modeling, factor analysis and expert survey, a methodological approach to developing a profile of innovative development of enterprises was developed, which is recommended to develop and visualize at each enterprise for managers and employees of innovative enterprises, based on the principles of objectivity, confidentiality, self-sufficiency and priority indicators.

Keywords: innovations, enterprises, innovation development, expert survey, economic and mathematical modeling.

Problem statement and its connection with important scientific and practical tasks. One of the main features of innovations is to highlight the constant change in the content and types of innovative works and performers, the short-term nature of works on the creation and implementation of innovations, the complexity of establishing criteria and indicators of the assessment of innovations, which are generally perceived difficult and ambiguously by managers and owners, top management, employees and other stakeholders.

Analysis of recent publications on the problem. The innovative development of the enterprise as an open system, on the one hand, and an innovative purposeful system, on the other, depends entirely on the complementary factors of external and internal environment prevailing in the innovation space and submicroenvironment and microenvironment of the enterprise, respectively.

At the time of increasing genuine interest in the problematic issues of the innovation society, the theoretical and methodological and practical characteristics of the innovative space of entrepreneurship turns to a small circle of scientists, among them O. Iermak [3, 12], K. Zhadko [14], T. Nosova, O. Ilyash, S. Yermak, L. Frolova [12] (devoted his work to the problems of creating clusters of industrial enterprises, research institutions and higher education institutions as key players in the innovation ecosystem), given the current conditions of open innovation models (L. Lisovska) [5, 8], cluster policy of EU countries (O. Hryhor) [2], grouping of regions depending on the prospects of public-private partnership (O. Mykytyuk, I. Plets, R. Shchur) [10] and others. Scientists T. Hrynko [1], P. Drucker [11], S. Illiashenko [4], L. Fedulova, S. Filyppova [7], N. Chukhrai [8] and others, studied problems of management of innovative development of enterprises due to the lack of culture of innovation, insufficient support of top management and employees within enterprises.

Allocation of previously unsolved parts of the general problem. There are very few practical studies in Ukraine that concerned the assessing the level of innovative development of enterprises and the susceptibility of enterprises to innovation.

Formulation of research objectives (problem statement). The purpose of this study is to systematize the factors of innovative development and development, on this basis, proposals for creating a profile of innovative development of enterprises. The specified goal was concretized in following research tasks:

- To make a sample of experts in this field;
- To determine the list of non-financial indicators - stimulants, disincentives and focus factors;
- To create a profile of innovative development of the enterprise, which differs in the interaction of the planned activities of enterprises to avoid adverse consequences and take into account the possibilities of innovative development.

An outline of the main results and their justification. The procedure for assessing the innovative development of enterprises by means of specially organized observation includes standard stages: setting tasks, choosing tools, compiling, grouping, modeling and summarizing results. At the same time, the main principles are such as objectivity, confidentiality, self-sufficiency and priority of indicators.

Requirements for the questions asked in the questionnaire:

- Simply and clearly formulated;
- Unambiguous interpretation;
- Consistent presentation;
- are significant and significant in this discontinuous observation.

The object of evaluation was the importance of factors for the expert. The experts were the heads of small (including micro-enterprises) and medium-sized enterprises (institutions) and the main divisions of the following types of economic activity:

- professional, scientific and technical activities in the fields of accounting, engineering, activities of main departments (head offices), management consulting, research and development, advertising and market research, other professional, scientific and technical activity);

- information and telecommunications (computer programming, consultancy and related activities, telecommunications (telecommunications), activities in the field of broadcasting and television broadcasting, production of television programs, publishing of sound recordings, publishing, provision of information services);

- Education (higher, secondary education, other types of education, support activities in the field of education);

- processing industry (production of computers, electronic and optical products; production of electrical equipment; production of machinery and equipment; metallurgical production; food production; printing).

54 experts took part in the survey in a total (survey period – January 2021 – March 2021). Based on their theoretical and practical experience, the main factors-disincentives of the internal environment, macro-environment and microenvironment of enterprises that have the greatest impact on innovative development of the enterprise, and factors that create favorable conditions for innovative development of entrepreneurship were identified.

The distribution of experts involved in the statistical survey by type of economic activity is:

- Professional, scientific and technical activities – 14%;
- Information and telecommunications – 13%;
- Education – 44%;
- Processing industry – 25%;
- Agriculture – 2%;
- Trade – 2%.

Geographically, five groups of experts were created: from Dnipro and Dnipropetrovsk regions, Kyiv, Poltava and Lviv regions.

In the Table 1 presents the focus factors-disincentives of the internal environment of the enterprise.

Table 1

Factors-disincentives of the internal environment of the enterprise, which have the greatest impact on innovation development

Factors	Total score	Average rating
1	2	3
Insufficient resources for innovation	424	7.85
Lack of creative knowledge, competitive intelligence and comparative analysis of technologies, low level of skills and abilities of employees	404	7.48
Insufficient relevance of knowledge about the strategy of the enterprise, industry, trends in other countries	366	6.78
Lack of innovation culture in the enterprise	324	6.00
Lack of cooperation and exchange of information between development teams and other divisions of the enterprise	305	5.65

1	2	3
Loss of control over the organization of processes and / or lack of the position of Innovation Manager (Director of Innovation / Digital Products / New Business or Technology)	266	4.93
Low wages according to the position held	244	4.52
Weak IT infrastructure	223	4.13
Insufficient support of top management and employees within the enterprise	212	3.93
Lack of motivation and reward system	202	3.74

Source: author's development based on the results of an expert survey

As can be seen from Table 1, the most significant obstacles to the innovative development of enterprises, according to experts, identified the lack of resources for innovation with a high score of 7.85 points (out of 10). As can be seen from the rest of the survey, this factor includes, first, lack of financial resources (lack of financing within and outside the enterprise, low level of investment attractiveness (lack of loans or direct investments), immaturity of venture capital market, etc.). Another significant factor was the lack of creative knowledge, competitive intelligence and comparative analysis of technologies, as well as the low level of skills and abilities of employees, the lack of qualified employees within the enterprise (7.48 points).

There are concerns about the outflow of human capital, low levels of knowledge and skills due to distance learning during a pandemic. It should be noted that the gap between the first and second rank is insignificant, which confirms the exceptional importance of the first two factors. The third most important factor is the lack of up-to-date knowledge of enterprise and industry strategy, trends in other countries, which indicates the disorientation of the management of enterprises and departments in the planning and strategy of innovation. Unfortunately, a significant number of strategies designed to build an innovation ecosystem in Ukraine are not effective enough. Stimulators with a medium level of significance include the following obstacles to innovation development, which can be eliminated in the short term: lack of innovation culture in the enterprise (6.00 points), lack of cooperation and exchange of information between development teams and other departments and generally synchronized vision for development prospects and strategies (5.65 points), loss of control over the organization of processes or lack of position of innovation manager (director of innovation / digital products / new business or technology) (4.93 points) and low pay according to the position (4.52 points). Closes the rating of disincentives to the internal environment of the enterprise, which have the greatest impact on innovation – three factors with a relatively low level of importance: weak IT infrastructure (4.13 points), insufficient support for top management and employees within the enterprise (3.93 points), lack of motivation and reward system (3.74 points).

It can be argued that the sample survey reflects the general situation in the country in terms of readiness and receptivity of enterprises to innovation. The exceptional significance of the first two factors in Table 2 is due to a small gap in the total and average scores obtained from the survey of experts. Thus, according to experts, the most significant obstacles to the macro-environment of enterprises for innovative development are financial disincentives (lack of financing outside the enterprise, low level of investment attractiveness, immaturity of the venture capital market, etc.) and economic factors. Unfortunate market conditions, recurring financial and economic crises, trade wars: deteriorating export conditions and integration into global chains, etc.). Political, legal and institutional factors (instability of legislation, disharmony in political relations, corruption and / or bureaucracy; lack of predictability of government action) and socio-economic and technological factors are inferior in rank (high poverty, declining scientific potential, outflow of human resources). Low share of high-tech, innovative, creative enterprises in priority sectors). The average (defined as the average value of average scores – 5.5 points) and below the average level of significance of the factors were as follows: international situation, globalization, digitalization (5.5 points), lack of marketing opportunities abroad, problems of patent purity (5.30 points); lack of infrastructure to support innovation (5.24 points); mental and cultural factors (changes in the basic values of society, low level of innovation culture) (5.24 points); environmental and demographic factors (threat to social security due to population decline) (4.07 points); extraordinary circumstances that could not be prevented by business leaders (force majeure) (2.07 points). Significant differences in the assessment of macro-environmental factors of enterprises (the range of variation is 5.49 points) due to their complexity and various indirect effects of exogenous innovation ecosystem on a particular enterprise.

Table 2

Factors-disincentives of the macro-environment of the enterprise (external environment of indirect influence), which have the greatest impact on innovation development

Factors	Total score	Average rating
Financial factors (lack of financing outside the company, low level of investment attractiveness, immaturity of the venture capital market)	408	7.56
Economic factors (deformed economic structure, poor market conditions, recurring financial and economic crises, trade wars: deteriorating export conditions and integration into global chains)	402	7.44
Political, legal and institutional factors (instability of legislation, disharmony in political relations, corruption and / or bureaucracy; lack of predictability of government action)	368	6.81
Socio-economic and technological factors (high level of poverty, downward trend in scientific potential, outflow of human capital; low share of high-tech, innovative, creative enterprises in priority sectors)	311	5.76
International situation, globalization, digitalization	297	5.50
Lack of marketing opportunity to perform sales activities abroad, the problem of patent purity	286	5.30
Lack of infrastructure to support innovation	283	5.24
Mental and cultural factors (changes in the basic values of society, low level of innovation culture)	283	5.24
Environmental and demographic factors (threat to social security due to population decline)	220	4.07
Extraordinary circumstances that could not be prevented by business leaders (force majeure)	112	2.07

Source: author's development based on the results of an expert survey

The most significant obstacles to the microenvironment of enterprises for innovative development, as can be seen from Table 3, according to experts, there is a relationship between suppliers and the company without setting innovation priorities (this factor was highly rated by experts almost unanimously) (average score – 7.70 points), in second place – corruption and bureaucracy (7.56 points), on third – lack of controllability and insufficient support for innovation at the local level (7.39 points).

Table 3

Factors-disincentives of the microenvironment (external environment of direct influence), which have the greatest impact on innovation development

Factors	Total score	Average rating
Relationships between suppliers, partners and the company without setting innovation priorities	416	7.70
Corruption and/or bureaucracy	408	7.56
Lack of controllability and insufficient support for innovation at the local government level	399	7.39
Competitive environment caused by the nature of innovation	362	6.70
Low level of cooperation with local authorities, parties, public organizations	340	6.30
Insufficient cooperation with universities and research institutes	313	5.80
Dominance in the market of already established enterprises	233	4.31
Uncertain market demand	213	3.94
Critical attitude from partners	209	3.87
Sharp differentiation of consumer demands, elasticity of needs, dynamism and diversity of their structure	204	3.78

Source: author's development based on the results of an expert survey

According to experts, the lowest level of significance is uncertain market demand (3.94 points), critical attitude to innovation by partners (3.87 points) and a sharp differentiation of consumer demand,

elasticity of needs, dynamism and diversity of their structure (3.78 points). It is important to note that hyper-attention to relationships with suppliers of equipment, materials, components and software is inherent in the vast majority of managers of Ukrainian enterprises, as they (primarily industrial enterprises) work best with companies at the lower stages of the value chain (23.8 %). According to a study by the National Institute for Strategic Studies, the results of which are reflected in the analytical note «Priority areas of state support for the development of new models of production and innovation in industry in Ukraine» [9], in second place among partners In 2016, there was a share of enterprises that cooperated within their group of enterprises (13.1%), in the third – the share of enterprises that cooperated with customers (12.9%). Unfortunately, the least industrial enterprises developed cooperation with research organizations (8.9%) and higher education institutions (6%) [9].

Evaluation of the factors listed in Table 4, provides an opportunity to determine favorable conditions for innovative development of entrepreneurship now and in the near future. These tables show insignificant differentiation in the estimates of certain factors (the minimum average score is 4.19 points, the maximum – 7.46 points). As can be seen from the table, domestic enterprises engaged in innovation activities need to cooperate with research and production and research associations and centers in order to transfer (diffuse) technology.

Table 4

Factors that can be considered to create favorable conditions for innovative development of entrepreneurship

Factors	Total score	Average rating
Establishment of research and production and research associations and centers that provide services in the field of technology transfer	403	7.46
The development of digital technologies (Internet, virtual reality, augmented reality, artificial intelligence, additive technologies) requires meeting the demand for specialists in IT, education, professional, scientific and technical activities	382	7.07
Growing demand for information services	355	6.57
Compliance with EU integration requirements	330	6.11
Establishing information exchange through distance education and training: seminars, symposia, exhibitions	329	6.09
Creation of technologies under the order of intermediaries	303	5.61
High added value of innovative products	301	5.57
Possibility of carrying out joint developments and researches (joint projects) by different enterprises and scientists	268	4.96
The growing role of dual-use technologies, reducing the need to use production capacity	244	4.52
Selective growth and aggressive development	226	4.19

Source: author's development based on the results of an expert survey

The actual number of organizations in Ukraine that carried out research increased by sectors of the economy as follows:

- number of organizations that carried out research in the business sector – from 376 in 2017 to 409 in 2019;
- number of organizations that carried out research in the public sector – from 441 in 2017 to 408 in 2019;
- number of organizations that carried out research in the higher education sector – from 146 in 2017 to 133 in 2019 (there was a decrease in the indicator).

The business sector is barely increasing its scientific potential, while the higher education sector is losing it. Therefore, we observe distrust in the joint development and research of enterprises and scientists (4.96 points out of 10 possible). Ranking factors, the second place is given by experts to the development of digital technologies, which in turn requires meeting the demand for specialists in IT, education, professional, scientific and technical activities. Second place – the development of digital technologies. Third place – the growing demand for information services – an objective factor due to the requirements of civilization. Other factors, taking into account which can really create favorable conditions for innovative business

development, according to experts, are: compliance with the requirements for integration into the European Union (6.11 points), establishing information exchange through distance education and training (6.09 points), creation of technologies under the order of intermediaries, creation of the center of technology transfer (5,61 points), high added value of innovative production (5.57 points), possibility of carrying out by various enterprises and scientists of joint developments and researches (joint projects) (4.96 points), increasing the role of dual-use technologies (especially in the context of the conflict in eastern Ukraine) and reducing the need to make full use of production capacity (4.52 points), selective growth and aggressive development (4.19 points), the lowest significant factor experts, but in the innovative development of entrepreneurship can play an important role for small businesses organized in this way to achieve the benefits of large enterprises (software production, electrical activities, etc.) [13].

Table 5

Directions for stimulating innovation by the degree of influence on the innovative development of the enterprise (industry) within the «knowledge triangle»

Factors	Total score	Average rating
State support in the direction of wide access of the population to various forms of education (introduction of training courses on the basics of entrepreneurship; retraining and advanced training in business; affordable technical education; training seminars, trainings, forums, round tables, conferences; attracting students – future professionals to competitions on problems of innovative development; non-formal education; lifelong learning); infrastructure to support small and medium enterprises (business centers, business incubators, investment funds, etc.)	401	7.43
Partnership with universities, conducting pilots with startups and implementing innovative solutions	357	6.61
Creating an innovative outpost as part of the company to monitor the innovative development of leaders and competitors	333	6.17
Creation of startups (including internal ones) as a special type of entrepreneurial activity, which is characterized by active development, scalability and direct impact on innovation culture, including the willingness to do business	327	6.06
Starting your own accelerator / finding an acceleration partner program / organizing own venture fund	301	5.57
Creation of a technology transfer center	299	5.54
Opportunity to involve scientists and conduct joint development and research	270	5.00
Organization of «innovation tours» to leading companies in the industry	248	4.59
Implementation of international projects, for example, TEMPUS: VETLOG, UMRU, WENET, EcoBRU, HORIZON 2030, FKTBUM	232	4.30
Involvement in the European Green Deal	202	3.74

Source: author's development based on the results of an expert survey

Separately, an assessment of the directions of stimulating innovation by the degree of impact on the innovative development of the enterprise within the «knowledge triangle»: «education-science-innovation» (Table 5). As can be seen from Table 5, among the areas of stimulating innovation by the degree of influence on the innovative development of enterprises within the «knowledge triangle» – education-science-innovation, experts identify as the most effective government support for broad access to various forms of education and infrastructure to support small and medium enterprises. Education reform is currently underway, and the state is actively supporting open education. Regarding infrastructure support for SMEs, it can be argued that it is very weak. Thus, as of January 1, 2019, there were only 67 business incubators in Ukraine (of which 13 – in Kyiv), 386 business centers (of which 157 – in Kyiv), 92 industrial and technology parks (of 33 of them – in Kyiv), 541 leasing centers (of which 429 – in Kyiv), 168 business support funds (of which 57 – in Kyiv), 2083 investment funds and companies (of which 1466 – in Kyiv, 237 – in Donetsk region and 142 – in Kharkiv region), 769 innovation funds and companies (476 of them – in Kyiv region). Of particular note is the number of infrastructure facilities created with the participation of local authorities. In the regional context, it is 40 units – in the Dnipropetrovsk region, 30 units – in the Kirovohrad region, 20 units – in the Odessa region, 13 units – in the Lviv region, 11 units – in the Cherkasy region. In other

regions, the value of the indicator does not exceed 10, and in Zakarpattia, Luhansk, Poltava, Rivne, Ternopil and Kherson infrastructure facilities with the participation of local authorities have not been created at all. Instead, the largest number of educational institutions in which the basics of entrepreneurship were introduced was observed in Lviv region (158 units) and Poltava region (78 units) [6]. At the second level of importance is the factor of partnership with universities, conducting pilots with startups and implementing innovative solutions, which confirms the willingness of business to cooperate in this direction.

Table 6

Approaches to best evaluate innovative projects

Factors	Total score	Average rating
Growth of investments in the enterprise	407	7.54
Revenue and profit growth through innovation	393	7.28
Ability to implement planned organizational activities	366	6.78
Significant changes in production results, processes or information, materials, raw materials, etc.	319	5.91
Compliance with financial metrics standards (IRR, ROI, NPV, etc.)	302	5.59
Number of implemented innovation projects	296	5.48
Another approach	274	5.07
Using other indicators to assess the effectiveness of innovative projects without taking into account the time factor	221	4.09
Using other indicators to assess the effectiveness of innovative projects taking into account the time factor	214	3.96
Complex technique based on a combination of real options and fuzzy sets	179	3.31

Source: author's development based on the results of an expert survey

Based on the first identified positions of factors it is possible to form a profile of innovative development of the enterprise (Tables 1-6).

Conclusions and perspectives of further research. The main results of the study are the development of a methodological approach to developing a profile of innovative development of enterprises. Taking into account the total and average assessment of stimulus factors and disincentives, the influence of focus factors on the level of innovative development and receptivity of enterprises to innovation is determined. According to the expert study, it is advisable to propose a visualization of the profile of threats and opportunities for innovative development of the enterprise, which will reflect the main typical features that characterize the threats and opportunities of innovative enterprises, respectively. The development of the profile of innovative development of the enterprise, which is planned in the further research, differs in the interactivity of the measures planned by the enterprise to exclude adverse effects and take into account the possibilities of innovative development of enterprises.

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