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Х А Б А Р Ш Ы С Ы

ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы «ҚР ҰҒА Хабаршысы» ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуеге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруды. Web of Science зерттеушілер, авторлар, баспашилар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енүі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке ададығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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Demchyshak N.^{1,*} Bahriy M.², Brychka B.², Vyslobodska H.²

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²Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv, Lviv, Ukraine.

E-mail: nazar.demchyshak@lnu.edu.ua

SELECTION OF FINANCIAL STIMULATION INSTRUMENTS OF ENTERPRISE'S INNOVATION ACTIVITY IN OPEN ECONOMY: THE CASE OF UKRAINE

Abstract: the article's purpose is the priorities justification during the selection of the financial stimulation instruments of the enterprise innovative activities under the conditions of the economic openness. For the research of interdependencies between various indicators it was used the econometrical approaches. Based on analysis of chosen indications with the example of Ukrainian case it is proved that the efficiency of usage the indirect influence instruments is higher in comparison with direct. The importance of national innovation system development was reasoned as a basis for forming of the appropriate level of trust among economical subjects and institutional modernization of the financial regulation system of the innovational activity. The arguments of the conducted research in favor of the indirect instruments usage of innovations financial stimulation in Ukraine are simultaneously the arguments in favor of the creative component development of the national economy. The stress was made on the perspectives of the implementation of the crowdfunding and crowdsourcing instruments for the optimization of enterprise innovational activity structure.

Key words: enterprise innovative activity, financial stimulation instruments, open economy, efficiency of instruments, crowd-technologies, Ukraine.

Introduction. The modern economies of numerous countries are lacking the attention to the studies of the potential investors' behavior and the specifics of their decision-making process. Those strategical miscounts negatively influence on the choice efficiency of financial stimulation instruments of the innovative activity in the process of developing measures of state financial policy, especially taking into account the openness of national economies. At the same time, under new competitive conditions the specific stimulation instruments are not efficient anymore, whereas the clear conceptual and scientifically proven comprehension of their usage priorities are not developed yet, especially it is valid for the counties with "young" market economy. In the meantime, the intensity of the innovative processes in the specific country depends on the level of national innovative system's completeness and effectiveness, its economical openness, what is crucial for the opportunity to involve foreign investments, and the trust level of economical subjects to the regulation institutions.

Literature Review. The classic innovation theory is based on the works of Schumpeter J., namely the theory of economic development [1],

where main specific aspects of the innovation process stimulation are considered. Herewith, from the state institute point of view as the object of the regulatory (stimulating) influence can be considered the national innovative system, treating it as the relations collectivity of the innovation's creation, distribution and usage processes within a country, conditioned by national sociocultural specifics, geopolitical characteristics and the economic development strategy. The proposed interpretation of the national innovative system corresponds the point of view on its essence of scientists, who laid out the main principles of national innovative systems for the first time – Nelson R. & Freeman C. [2,3,4]. Further this conception was developed and extended by Lundvall B.-A. & Peters S. [5,6]. Also, we consider, that the forming of approach to institutional modernization of the financial regulation system and innovative activity stimulation in the part of the usage of the regulatory potential of formal institutes should to be implemented in the context of modern institutional theory, whose main principles were laid down in works of North D., the Nobel Prize winner [7].

As important ones could be considered the achievements of Nobel Prize winners in the sphere

of the behavioral economy researches Kahneman D., Tversky A. & Thaler R. [8,9,10], and also researches of Fukuyama F. of the public trust influence on various economic subjects' activity [11]. The particular aspects of confidence as a pricing factor in the national economy are revealed in the works of Ukrainian scientists Pidkhomnyi O., Demchyshak N. & Dropa Ya. [12; 13]. Priorities for the development of education and science in the context of evolving open information society in innovative economies were analysed in investigations of Ukrainian, Kazakh and Russian scientists [14,15,16]. All these scientific approaches are relevant, in particular, for the economy of Ukraine, Kazakhstan, the Russian Federation, Belarus.

Under conditions of the informational society and the IT-industry development and implementation of its products in all spheres and branches of national economics, the role of crowd-technologies (crowdfunding and crowdsourcing) increases. Nowadays the crowdfunding for young market economies is a relatively clear, but not that widespread instrument for rapid mobilization of financial resources via online platforms mainly from the random citizens. Crowdsourcing for "young" market economies is a new instrument itself that in fact is rarely used. However the potential of its usage is mainly in the possibility to involve creative thoughts and innovative ideas of various types in various sphere to solve concrete enterprise issues or needs. In particular, some scientists (Ogawa, S., & Piller, F.) have the opinion that this is crucial in the decrease part of marketing innovation financing with the simultaneous rise of its effectiveness for business, especially taking into account the fact of the increase of economies openness level in the modern globalized world [17].

The abovementioned is a theoretical and methodological basics for researching the chosen topic, in particular scientific positions formulated in works of latter scientists are new instrument for the researches in the innovative sphere of any country, herein important for young market economies.

Methodology. For the research of interdependencies between various indicators it was used the econometrical approaches, which enable to conduct the analysis of various economical processes and objects in a proper quality and quantity, provide possibility to prove or discard theoretical models in various economic spheres, in particular in the innovative, predict and regulate complex economic process. The expediency of its usage is conditioned by stochastic nature of macroeconomic indicators. While building economic models there is a necessity to form the sufficient volume of samples of researched objects, what is

quite problematic under Ukrainian economic conditions. The root cause for that is the insufficient level of structure in Ukrainian economy and the fact, that the economy is under the influence of various external factors, has transitional character nowadays, despite is recognized as a market economy on the official level (thus, we will use the concept "young market economy"). Therefore the rapid change of the direction and specifics of the trends is inherent for the macro-economic indicators, especially it appears during the global crisis occurrences. In order to evaluate the unknown parameters of economic models it is used the least squares method with correlation-regression model build-up, economical interpretation of their parameters, research of the tightness of interdependencies within researched indicators with the of Pearson Linear Correlation Coefficient (r). Also the logical method has been used to formulate hypotheses and to explain the revealed relations. A graphical method has been used to improve data visualization and analysis in order to identify the corresponding patterns of the investigated indicators relations. A table method has been applied to summarize statistical data.

Results and discussion. The financial regulation system of the enterprise innovative activity is traditionally considered through the implementation of respective instruments of influence. From the classical point of view there are fiscal (budget and tax) and monetary subsystems with the respective instruments within subsystems. From another point of view, there are instruments of direct and indirect stimulation. We recommend to concentrate on the research of the instrument choice topic based on the latter classification. Herewith we mainly stress on the fact that research is conducted on the example of usage those instruments under the conditions of young market economy of Ukraine, which is simultaneously open, taking into account the high level of its integrity in the world economy.

Therefore, we will conduct the analysis of the usage efficiency of the direct and indirect instruments of the innovative activity in Ukraine. Herein it is appropriate to highlight the compensation of interest, which is paid by enterprises for innovative credit (which is a monetary instrument by its nature), and also tax privilege and the level of tax pressure in the country (fiscal instruments). In the direct instruments it is appropriate to highlight for the further researches the public financing of the innovative projects, as well as financing the implementation of scientific and scientific-technical projects as the basics for the appearance of those projects in general (both instruments contain the fiscal nature). Therefore chosen key indicators for the assessment of applying efficiency of the indirect stimulation instruments are

following: 1) interest rates for credit for the business in the national currency; 2) tax revenues, in the absolute measurement; 3) tax pressure level in the national economy, in the % to GDP. For the analysis of the expediency of the direct instruments usage it was chosen the following indicators: 1) the financing of the innovative activity from state and local budget (in particular the influence of growth rate of such financing); 2) volume of completed scientific and scientific-technical works in sphere of fundamental researches (in absolute measurement); 3) volume of completed scientific and scientific-technical works in sphere of applied researches (in absolute measurement). Herewith we will research the influence of abovementioned indicators on the change

of enterprise's number, which implemented innovations in Ukraine (calculated with chain method). The successful financing of enterprises, which have commercialized innovations, is a key indicator of the usage efficiency of the regulating (stimulating) instruments'. Commercialization is especially important under the conditions of open economy, where the large deficit of commercial innovations is observed (hence results of researches and implementations are not being patented), therefore trouble of the innovation cycle finishing exists, what relates to Ukraine. The output data, used for the calculations conduction, are formed based on the official statistical information, presented in the table 1.

Table 1 - Output data for the analysis of the usage efficiency of the instruments of financial stimulation of innovative activity in Ukraine

Year	GDP, billion UAH	Financing of innovative activity from the national budget, the	Financing of innovative activity from the local budget, million	Growth ratio of financing of innovative activity from local budget, %	Volume of completed scientific and scientific-technical works (fundamental researches), millions UAH	Volume of completed scientific and scientific-technical works (applied researches), millions UAH	Interest rates of Banks on credit for business in national currency, %	Tax revenues, billion UAH	The level of tax pressure in the national economy, %	Number of enterprises implementing innovations	The change in the number of implementing innovations
2006	457,325	28,1	14,9	88%	902,1	708,9	14,6	98,1	21,4	810	142
2007	565,018	114,3	14	94%	1 141	841,5	14,1	125,7	22,3	999	189
2008	751,106	144,8	7,3	52%	1 504	1 132,6	13,5	161,3	21,5	1 186	187
2009	990,819	337	15,8	216%	1 927,4	1 545,7	16	227,2	22,9	1 160	-26
2010	947,042	127	7,4	47%	1 916,6	1 412	18,3	208,1	22	1 180	20
2011	1120,585	87	5,7	77%	2 188,4	1 617,1	14,6	234,4	20,9	1 217	37
2012	1349,178	149,2	12,3	216%	2 205,8	1 866,7	14,3	334,7	24,8	1 327	110
2013	1459,096	224,3	17,6	143%	2 621,9	2 057,7	15,5	360,6	24,7	1 371	44
2014	1522,657	24,7	157,7	896%	2 695,5	2 087,8	14,4	354	23,2	1 312	-59
2015	1586,915	344,1	5,7	4%	2 475,2	1882,7	15	367,5	23,2	1 208	-104
2016	1988,544	55,1	38,4	674%	2 465,6	1960,6	17,5	507,6	25,5	923	-285
2017	2383,182	178,9	99,2	258%	2225,7	2561,2	15,9	644,2	27	735	-188
2018	2983,88	227,3	95,6	96%	2924,5	3163,2	15,8	828,2	27,8	672	-63

Source: calculated by the authors based on data from the State Statistics Service of Ukraine, the National Bank of Ukraine, the Ministry of Finance of Ukraine

First of all, we will conduct the analysis of the efficiency usage of the direct instrument of the innovations stimulation. We will analyze the influence of volume of the completed scientific and scientific-technical works in sphere of fundamental researches on the change of enterprise's number, which implemented innovations in Ukraine (figure 1). Herewith we need to note, that the majority of those researches, as well as applied ones, is conducted at the expense of public financing in Ukraine. As we can see

from the figure 1, there is a inverse relationship between researched indicators, besides that, the tightness of the relationship is quite high, taking into account the value of correlation coefficient $r = -0,93$. It is interesting to state, that pretty much the same value of the correlation coefficient ($r = -0,94$) is present for inverse relationship for the case of influence modelling of the volume of the completed scientific and scientific-technical works in sphere of applied works researches (figure 2).

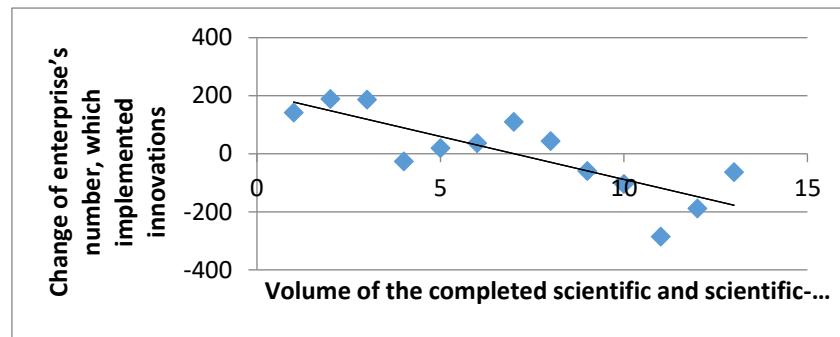


Figure 1 - The relationship between the volume of the completed scientific and scientific-technical works (fundamental researches) and the change of enterprise's number, which implemented innovations in Ukraine within 2006-2018 years.

Figure 2 - The relationship between the volume of the completed scientific and scientific-technical works (applied researches) and the change of enterprise's number, which implemented innovations in Ukraine within 2006-2018 years.

From the first glance, the revealed inverse relationship looks unlogical. However after the explanation of their nature it is obvious that Ukraine is characterized with the low quality of such researches. The necessity for conduction of some researches are put under the doubt, as well as their conformity to market needs and to the priorities of the development of the respective economy branches and sectors. It is obvious, that there is one factor that influences negatively, namely the public financing of applied and fundamental researches, whereas it is understandable that public servants usually can't set the priorities of those financing under the conditions of the competitive environment.

At the same time, we consider, that the volume of such researches is insufficient and their results don't impact the real indicators of innovative

enterprise's functioning. Herewith the revealed tight relationship between researched indicators is a basics for statements, that those fundamental and especially applied researches have strategical importance. In particular, this situation can be improved only in case of the provision of the integrity in the triangle science-innovations-business with ultimate commercialization of the results of those developments.

We will consider in more detail the experience of using such an instrument in Ukraine for innovative activity financing from the state and local budgets. For this purpose we find out the influence of the amount of financing of innovative activity from the Ukrainian state budget on the change in the number of enterprises that have implemented innovations (figure 3).

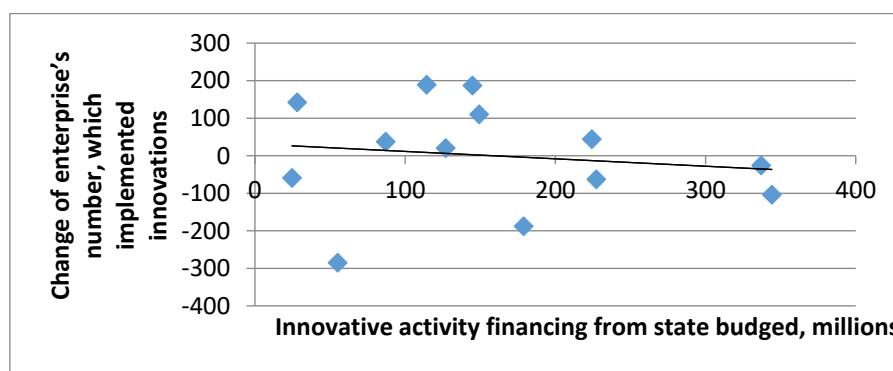


Figure 3 - The relationship between the financing volume of innovative activity from the Ukrainian state budget and the change in the number of enterprises that have implemented innovations during 2006-2018 years.

There is an inverse relationship between the studied indicators under conditions of practically no relationship (correlation coefficient $r = -0.03$). This leads to the conclusion that the financing from the state budget obviously in principle does not affect the innovators and their activity, which is also illogical. However, we consider the explanation for this

situation is that this financial incentive instrument is quite inefficient in Ukraine and is likely to be the same for other young market economies. The tightness of relationship is somewhat different with local budget financing, especially if we study the impact of such growth rates (by the chain method), although the nature of the relationship will remain

unchanged (figure 4). As we can see from figure 4, there is an inverse relationship between the growth rate of innovation funding from local budgets and the change in the number of innovative enterprises. However, some potential for using this instrument indicates a correlation coefficient of $r = -0.37$,

although the relationship is weak. Such potential can be implemented in Ukraine through decentralization and creation of integrated territorial communities. At the same time, excessive centralization, in particular in terms of the allocation of budgetary funds, is a problem for many young market economies.

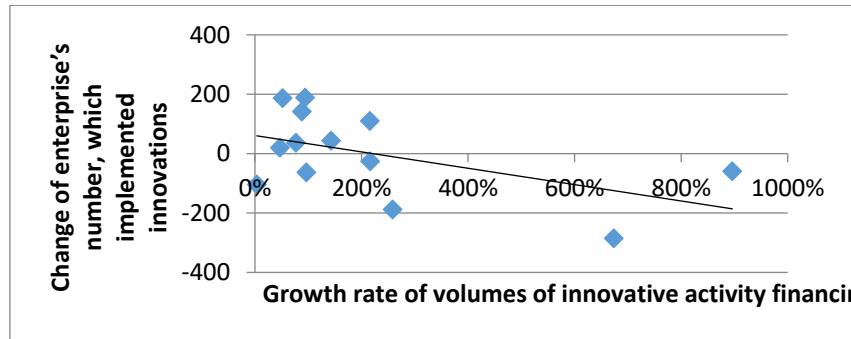


Figure 4 - The relationship between the growth rates of volumes of innovative activity financing from local budgets and the change in the number of enterprises that have implemented innovations during 2006-2018 years.

Thus, we can argue about the ineffectiveness of the indirect instruments, as it was evidenced above. This is an argument for continuing the researches to prove alternatives in instruments under modern circumstances. We will consider the experience of

Ukraine in the usage of instruments to indirectly stimulate innovations. We analyze the impact of tax revenue on the change in the number of enterprises, that have implemented innovations (figure 5).

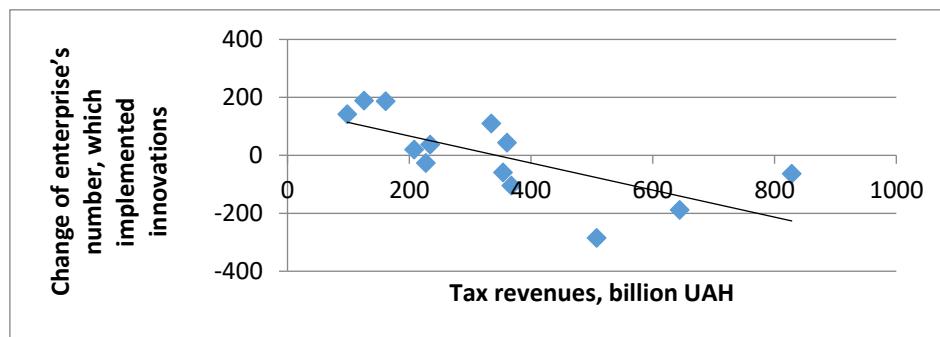


Figure 5 - The relationship between tax revenue volume and the change in the number of enterprises that have implemented innovations during 2006-2018 years.

The detected inverse relationship (figure 5) is quite understandable and predictable, while the relationship between the studied indicators is significant ($r = -0.68$). Similar results are provided by the analysis

of the relationship between the level of tax pressure and the change in the number of innovative enterprises (figure 6).

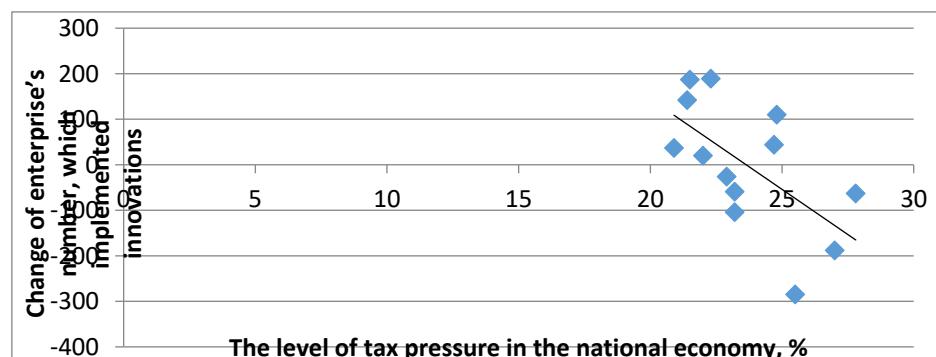


Figure 6 - The relationship between tax pressure and the change in the number of enterprises that have implemented innovations during 2006-2018 years.

Herewith, it is quite logical that the detected relationship is inverse, while a quite tight correlation between the above indicators $r = -0,52$. The identified trends give the basics for the conclusion that the tax system of Ukraine needs to be reviewed to determine the deterrents, probably reducing the number and rates of tax payments while simultaneously reducing the level of tax pressure on innovators. It is mentioned about creating the conditions for the development of

innovative business without directly interfering with the competitive environment (its inefficiency was proved above).

Consideration of the effect of interest rates of banks on loans for business in national currency on the change in the number of enterprises introducing innovations in Ukraine also deserves special attention (figure 7).

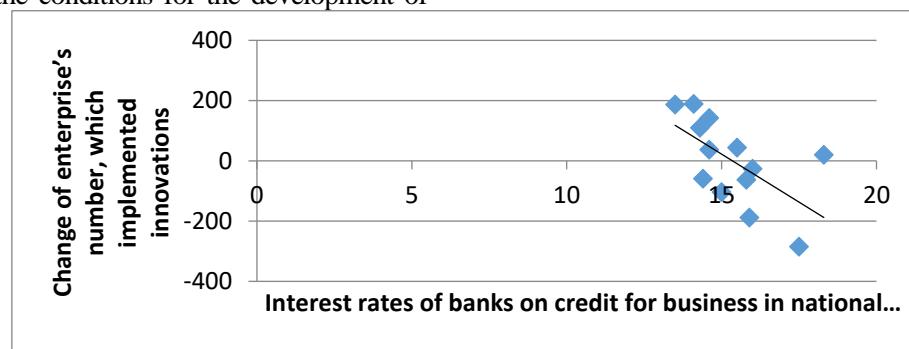


Figure 7 - The relationship between bank interest rate on credit for business in the national currency and the change in the number of enterprises that have implemented innovations during 2006-2018 years.

Given the fluctuations in the foreign exchange market of Ukraine, it is fundamentally important for innovators to be able to obtain credit in national currency. The inverse relationship between the indicators with a sufficiently close relationship in-between is also quite logical, taking into consideration the correlation coefficient $r = -0,53$. This gives grounds to state the effectiveness of using such instruments to financially stimulate innovators. It is much more expedient to redistribute funds that are inefficiently spent in Ukraine through a system of direct incentives through mechanisms of partial or full compensation for the interest paid by innovative enterprises to banks.

Conclusion. The argument in favor of the above, as well as in favor of using indirect financial instruments for innovation activity as much more effective in young market economies compared to direct ones, is that they are more flexible in a competitive environment. The formation of a system of financial regulation (stimulation) based on such principles is conceptually consistent with the policy of most EU countries in the sphere of innovation. Also, considering the position of the behavioral economy and the problem of forming a certain level of confidence in the innovators of the regulatory institutions, we consider the following: economic entities obviously do not want to deal with the state, it is easier and more convenient for them to work with counterparties on a free market under a loyal banking system and under conditions of not too high levels of tax pressure as well as burdensome tax administration mechanisms. The role of the state is in creating the

conditions and in applying indirect instruments of influence, since direct state funding does not produce results, moreover, entrepreneurs can lose competitive skills, which is typical for almost all young market economies. If the use of direct instruments can produce a short-term positive effect, then in the context of entering the international markets, such enterprises are likely to be less competitive. The emphasis in public financial policy on the use of indirect incentives will encourage them not only to be more competitive but also more creative. Only under such conditions is it possible to use in Ukraine, as well as in other countries with young market economy, crowd-technologies, first of all crowdfunding and crowdsourcing.

The principals of the behavioral economy is one of the most effective instruments for explaining the logic of actions of innovators and outlining new approaches to solving the problems of trust in the innovation sphere. The theory of institutionalism should be the basis for the development of institutions for the financial regulation of innovative activities (both formal and informal). All this is the basis for the formation of the state financial policy in terms of stimulating innovations, and obviously also relevant for other countries, which nature of economic development has similar features. As the outcomes of conducted empirical studies on the example of the Ukrainian economy, identified dependencies between the indicators make it possible to confirm the priority of the usage of indirect instruments, which will become a global trend due to their successful application by the leading countries.

Демчишак Н.Б.^{1,*} Багрий М.В.², Бричка Б.Б.², Вислободская Г.П.²

¹Иван Франко атындағы Львов ұлттық университеті, Львов, Украина;

²С.З. Гжитский атындағы Львов ұлттық ветеринарлық медицина және биотехнология университеті, Львов, Украина.

E-mail: nazar.demchyshak@lnu.edu.ua

УКРАИНАНЫ МЫСАЛҒА АЛА ОТЫРЫП, АШЫҚ ЭКОНОМИКАДАҒЫ КӘСІПОРЫНДАРДЫҢ ИННОВАЦИЯЛЫҚ ҚЫЗМЕТІН ҚАРЖЫЛЫҚ ЫНТАЛАНДЫРУ ҚҰРАЛДАРЫН ТАҢДАУ

Аннотация: мақаланың мақсаты – экономикалық ашықтық жағдайындағы инновациялық қызметтің қаржылық ынталандыру құралдарын таңдау кезіндегі басымдықтарды негіздеу. Әртүрлі көрсеткіштер арасындағы өзара тәуелділікті зерттеу үшін эконометриялық тәсілдер қолданылды. Украина ісінің мысалында таңдалған көрсеткіштерді талдау негізінде жанама әсер ету құралдарын қолдану тиімділігі тікелей әсер ету құралдарына қарағанда жоғары екендігі дәлелденді. Ұлттық инновациялық жүйені дамытудың маңыздылығы экономикалық субъектілер арасында тиісті сенімділікті қалыптастыру және инновациялық қызметтің қаржылық реттеу жүйесін институционалды модернизациялау үшін негіз болды. Украинада инновацияларды қаржылық ынталандырудың жанама құралдарын қолдану пайдасына жүргізілген зерттеулердің дәлелдері бір мезгілде ұлттық экономиканың шығармашылық компоненттерін дамытудың дәлелдері болып табылады. Қәсіпорынның инновациялық қызметі құрылымын оңтайландауды үшін краудфандинг пен краудсорсинг құралдарын енгізу перспективаларына база назар аударылды.

Түйін сөздер: кәсіпорындардың инновациялық қызметі, қаржылық ынталандыру құралдары, ашық экономика, құралдардың тиімділігі, краудтық технологиялар, Украина.

Демчишак Н.Б.^{1,*} Багрий М.В.², Бричка Б.Б.², Вислободская Г.П.²

¹Львовский национальный университет имени Ивана Франко, Львов, Украина;

²Львовский национальный университет ветеринарной медицины и биотехнологий имени С.З. Гжицкого, Львов, Украина.

E-mail: nazar.demchyshak@lnu.edu.ua

ВЫБОР ИНСТРУМЕНТОВ ФИНАНСОВОГО СТИМУЛИРОВАНИЯ ИННОВАЦИОННОЙ ДЕЯТЕЛЬНОСТИ ПРЕДПРИЯТИЙ В ОТКРЫТОЙ ЭКОНОМИКЕ: ПРИМЕР УКРАИНЫ

Аннотация: целью статьи является обоснование приоритетов при выборе инструментов финансового стимулирования инновационной деятельности предприятия в условиях экономической открытости. Для исследования взаимозависимостей между различными показателями использовались эконометрические подходы. На основе анализа выбранных показаний на примере Украины доказано, что эффективность использования инструментов косвенного воздействия выше по сравнению с прямым. Обоснована важность развития национальной инновационной системы как основы для формирования должного уровня доверия между экономическими субъектами и институциональной модернизации системы финансового регулирования инновационной деятельности. Аргументы проведенного исследования в пользу использования косвенных инструментов финансового стимулирования инноваций в Украине одновременно являются аргументами в пользу развития творческой составляющей национальной экономики. Акцент был сделан на перспективах внедрения инструментов краудфандинга и краудсорсинга для оптимизации структуры инновационной деятельности предприятий.

Ключевые слова: инновационная деятельность предприятий, инструменты финансового стимулирования, открытая экономика, эффективность инструментов, крауд-технологии, Украина.

Information about authors:

Demchyshak N.B. – ScD in Economics, Professor, Ivan Franko National University of Lviv, Lviv Ukraine; nazar.demchyshak@lnu.edu.ua, <https://orcid.org/0000-0001-6852-7405>;

Bahriy M.V. – PhD in Economics, Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv, Lviv, Ukraine; kachmar.marjana@ukr.net, <https://orcid.org/0000-0002-7357-9418>;

Brychka B.B. – PhD in Economics, Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv, Lviv, Ukraine, BrychkaBh@gmail.com, <https://orcid.org/0000-0003-2547-7828>;

Vyslobodska H.P. – PhD in Economics, Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv, Lviv, Ukraine, vyslgal@i.ua, <https://orcid.org/0000-0002-0518-4553>.

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