

ENTREPRENEURIAL INITIATIVE AS A FACTOR FOR THE DEVELOPMENT OF THE INNOVATION ACTIVITY OF COUNTRY ENTERPRISES

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ABSTRACT

The purpose of the study is to determine the impact of entrepreneurial initiative on the development of innovation activity of country enterprises. The theory of entrepreneurship by clarifying the essence of entrepreneurial initiative got further elaboration in the article. The methodical approach to the analysis and evaluation of the entrepreneurial initiative and its impact on the innovation activity of the enterprises, the results of which are the basis for further development of proposals to stimulate entrepreneurial initiative and development of their innovation activity is suggested. The estimation of innovation activity of 1758 enterprises of Ukraine by calculating the integral indicator of innovation activity revealed its low level for innovation active enterprises. The method of one-dimensional linear regression has determined that an increase in the number of business structures per 10 thousand people of the country's population at a rate of 1.0 causes an increase in the indicator of innovation activity by 0.172. It is proved in the article that development of infrastructure of entrepreneurial environment and creation of centers for entrepreneurship development act as an important mechanism of increasing innovation activity of enterprises of the country.

Keywords: Entrepreneurial Initiative, Innovation Activity, Innovation Active Enterprise, One-Dimensional Linear Regression Method, Integral Indicator of Innovation Activity.

INTRODUCTION

The development of modern entrepreneurship is characterized by constant transformations, but like hundreds years ago, the basis of starting and further expansion of entrepreneurial activity is the entrepreneurial initiative, as a specific effort of a functioning firm or a new market member to introduce a new combination of resources (McGrath, 1999). To remain competitive or survive in modern economic environment entrepreneurs should constantly develop new opportunities (Kryvovyazyuk, 2014), thus the classic concept of entrepreneurship combines entrepreneurial initiative and innovation (Rodriguez-Pomeda et al., 2003). It is through times of upheaval that

entrepreneurs often take initiative by spotting opportunities in the environment and using their creativity to bring about innovation (Nsereko et al., 2018). An entrepreneur must remain being innovative when announcing their new products or services to all customers, even if competition is not significant. Currently among the countries where the business sector shows the highest innovation activity are Chile, Guatemala, Lebanon, Angola, Canada, India, United States and Luxembourg, Peru (Bosma & Kelley, 2019). Among the countries that have achieved the greatest development of the innovation direction are those characterized by low level of economic development. Therefore it is suggested to determine the impact of the entrepreneurial initiative on the development of innovation activity on the example of Ukraine, which is one of the countries with low level of economic development and sufficient conditions for the development of entrepreneurship and innovation activity.

LITERATURE REVIEW

Entrepreneurial activity is considered to be a fundamental force in the transformation of societies and economies in the former communist countries towards free markets and democracy, including Romania, Slovenia, Poland, Croatia, the Czech Republic, Russia and other countries (Mueller & Goic, 2002). Ukraine also belongs to such economies. Entrepreneurship development helps strengthen the competitiveness of national economy in Ukraine. Entrepreneurs drive the economy because they create wealth through innovations (Matviyishyn, 2016).

It is proved that there is a close correlation between entrepreneurship, innovation and economic growth of the country (Stel et al., 2005; Braunerhjelm, 2010; Zsuzsanna & Herman, 2012). Critical is the role of innovation and entrepreneurship in providing structural changes towards providing sustainable development (Youssef et al., 2017). At the same time, existing models of innovation pay too much attention to technologies and science, with much less research of organizational and client factors. But success in the future depends on the role of the entrepreneur, his ability to generate ideas, create new business and evaluate markets (Berkhout et al., 2011). In addition, there is a need to disseminate market information so that the entrepreneurs and enterprises can have better access to markets (Liang, 2003), to develop the logistics activity of the enterprise, actively introducing innovations in the management of logistic development, focusing on the indicators of demand and efficiency (Kryvoviaziuk, 2013; Kryvovyazyuk et al., 2015).

The development of entrepreneurship theory leads to the need to clarify the essence of its concepts, among which one of the key ones is 'entrepreneurial initiative'. In order to promote innovations, it is also important to pay attention to the behavior of economic agents, assessment of which is based on the results of social network theory research (Hilorme et al., 2018). That is why quite often this concept is compared with the initiative of managers efforts (Clercq et al., 2011) or personal initiative, which include innovation, resourcefulness, creativity, dedication, vision, resilience, and optimism among others (Nsereko et al., 2018). Three main areas of the scientific literature on the highlighting co-relation between entrepreneurial initiative and innovations development can be distinguished: through the influence of business owners and managers and their departments, through the distinction between non-innovative and innovative firms, between less innovative entrepreneurship and innovative entrepreneurship (Qudah, 2018). At the same time, the degree of manifestating entrepreneurial initiative depends on the leadership qualities of the entrepreneur (Röschke, 2018; Sani et al., 2018). Therefore, at the present stage entrepreneurial initiative should be considered as a factor of development of innovation activity on the basis of introduction and realization of new ideas and opportunities through the use of leadership qualities

of entrepreneur, ownership of resources, which in mutual use make it possible to achieve positive economic effect and implementing the idea in life, satisfaction of consumer needs.

RESEARCH METHODOLOGY

The development of descriptive research is applied in the article using such scientific research methods as analytical, index, calculation of integral indicator and one-dimensional linear regression method. In order to get information database, the target sampling method was used, based on a summary and generalisation of official statistical information. In this study, the statistical sample consists of 1,758 enterprises that are involved in innovation activities in the industrial sector of the economy. The period of research covers from 2010 to 2017. Ukraine was chosen as the study site, where the proper conditions for entrepreneurship development were formed and the innovation activity of the enterprises was considerable.

The methodological approach to the analysis and evaluation of the entrepreneurial initiative and its impact on the innovation activity of enterprises is suggested to be carried out in 4 stages:

- a. Analysis of the state of entrepreneurial initiative in the country.
- b. Analysis and evaluation of innovation activity of enterprises in the country.
- c. Determining the impact of the entrepreneurial initiative factor on the final innovation activity indicator.
- d. Developing directions for increasing entrepreneurial initiative and innovation activity.

In order to study the state of entrepreneurial initiative in the country, it is advisable to analyze the quantitative changes of business entities per 10 thousand people of the country's population. An increase in enterprises per 10 thousand people is defined as the number of newly created enterprises minus liquidated per 10 thousand people.

It is suggested to use an integral indicator in order to determine the level of innovation activity of enterprises in the country. This indicator is determined based on the following criteria: breadth of coverage of enterprises by innovative activity, range of distribution of innovation activity types among innovation active enterprises, degree of financial support of innovation activity of enterprises. Each of the selected criteria is met by: the share of innovative enterprises in their total quantity, the share of the volume of shipped innovative products in the total volume of industrial production, the average number of new types of industrial products per one innovation active enterprise, the average number of new technologies per one innovation active enterprise, the average size of innovation costs per one innovation active enterprise, the level of providing funding of R&D. The calculated values of the indicators are subject to standardization, the weight coefficients of the criteria of innovation activity and their indicators are determined by the Fishburn rule (Fishburn, 1973). It is revealed that the most important factor influencing the development of innovation activity is the breadth of coverage of enterprises with innovation activity in the region (0.50), followed by the degree of financial support for innovation activity of enterprises (0.33), and the least significant is the range of distribution of innovation activities types (0.17). The integral indicator is calculated as the sum of the outputs of the standardized indicators with the corresponding weighting coefficients within the selected evaluation criteria and the level of their influence. Evaluation of the integral indicators is suggested to realise by grouping the obtained results by the Sturges method (Sturges, 1926). Accordingly, the state of innovation activity of enterprises is divided into five evaluation groups: [0; 0.2)–very low level of innovation activity; [0.2; 0.4)–low level of

innovation activity; [0.4; 0.6)–average level of innovation activity; [0.6; 0.8)–a sufficient level of innovation activity; [0.8; 1.0)–a high level of innovation activity.

The influence of the ‘entrepreneurial initiative’ factor on the final indicator ‘Innovation activity’; is carried out by the method of one-dimensional linear regression by plotting the corresponding function of dependence, where IA – dependent variable ‘innovation activity’, b_0 –free term, b_1 –coefficient of factor impact significance, EI –independent variable ‘entrepreneurial initiative’:

$$IA = b_0 + b_1 EI \quad (1)$$

The initial data for its calculation will be the growth of enterprises by 10 thousand people of population of Ukraine, as well as the obtained values of the indicator of innovation activity. Development of directions for enhancing entrepreneurial initiative and innovation activity is carried out based on the research results and should aim at a comprehensive solution to set tasks.

RESULTS

Results of the Analysis of the State of Entrepreneurial Initiative in the Country

It is established that in the period 2010-2017 there is a steady increase in the number of business entities per 10 thousand people of population: in 2010 it is 282.81; 2011–290.09; 2012–294.55; 2013–302.07; 2014–326.99; 2015–271.24; 2016–288.85; 2017–291.37.

The changes are caused by the creation of sufficient conditions for the development of entrepreneurship in Ukraine. The negative factor is the decline in population in the country. The increase of enterprises per 10 thousand people of population in the period 2010-2017 was 7.90, 6.32, 4.80, 6.55, 6.92, 10.75, 16.44 and 13.64, respectively. Irregularities in increase explain the differences between the number of start-ups and liquidated enterprises.

Results of Analysis and Evaluation of Innovation Activity of Enterprises

It is determined that the analysis of the dynamics of indicators of innovation activity of Ukrainian enterprises did not reveal their stable changes or patterns (Table 1).

Evaluation Criteria	Indicators	Period of the research								
		2010	2011	2012	2013	2014	2015	2016	2017	
1. The breadth of coverage of enterprises by innovation activity	The share of innovation active enterprises in their total number, %	13.78	16.22	17.42	16.83	16.07	17.29	18.86	16.15	
	The share of innovative products in the volume of industrial, %	3.23	3.25	2.64	2.71	1.80	1.30	0.95	0.67	
2. The range of distribution of innovation activities types among innovation active enterprises	The average number of new products types per innovation active enterprise	1.65	1.93	1.94	1.83	2.28	3.81	4.96	3.14	
	The average number of new technologies per innovation active enterprise	1.40	1.49	1.24	0.92	1.08	1.48	4.18	2.41	

3. The degree of financial support of innovation activity of enterprises	The average size of innovation costs per innovation active Enterprise, million UAH.	5.50	8.54	6.53	5.58	4.78	16.76	27.85	12.01
	The level of providing financing for R&D per innovation active Enterprise, million UAH.	0.68	0.64	0.68	0.96	1.09	2.48	2.95	2.86

The breadth of coverage of industrial enterprises by innovation activity is insignificant: the share of innovation active enterprises in their total number is 13.78-18.86%, the share of innovative products in the volume of industrial is only 0.67-3.25%. The range of distribution of innovation activities among innovation active enterprises is also insufficient: the average number of new products types per innovation active enterprise in the researched period was 1.65-4.96 units of products, and the average number of new technologies per innovation active enterprise is insignificant, only 0.92-4.18. The degree of financial support of innovation activity of enterprises is preferable: the average size of innovation costs per innovation active enterprise is 4.78-27.85 million UAH, and the level of providing financing for R&D per innovation active enterprise varies in the range 0.64-2.95 million UAH.

The results of the analysis of innovation activity of enterprises indicate its decrease at the end of researched period. The reasons for this were the reduction in sales of innovation products and the reduction of the average innovation costs per innovation active enterprise.

It is established that the calculated integral indicator of innovation activity of Ukrainian enterprises during researched period did not reach high levels (Table 2).

Table 2 DYNAMICS OF INTEGRAL INDICATOR OF INNOVATION ACTIVITY OF UKRAINIAN ENTERPRISES								
Indicator	2010	2011	2012	2013	2014	2015	2016	2017
Meaning	0.270	0.421	0.396	0.376	0.258	0.497	0.750	0.374
Significance level	low	average	low	low	low	average	sufficient	low

The highest level was reached in 2016 due to a significant increase in the activity of enterprises in the production of new products (4.96 types on average per enterprise), the use of new technologies (4.18), an increase in the average size of innovation costs per one innovation active enterprise (27.85), and also the highest level of R&D funding for per innovation active enterprise (2.95). The achieved figures were highest during 2010-2017.

In 2017, the level of innovation activity of Ukrainian enterprises has reached a low level due to the deterioration of the values of all indicators included in the analyzed sample, compared to the previous year.

One-Dimensional Linear Regression Analysis

To develop mathematical relationships between the independent and dependent variables of the study, one-dimensional linear regression analysis was conducted using Statistica 10.0 software. These equations used to build a model for determining the impact of a change in entrepreneurial initiative on the innovation activity of Ukrainian enterprises. Based on the collected data, a regression equation is plotted that explains the direct influence of 'entrepreneurial initiative' on the dependent variable 'innovation activity'.

The results of plotting a model for determining the impact of a change in entrepreneurial

initiative on the innovation activity of Ukrainian enterprises are presented in Table 3.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	p<
1	0.7649	0.5851	0.5160	0.1078	0.0270

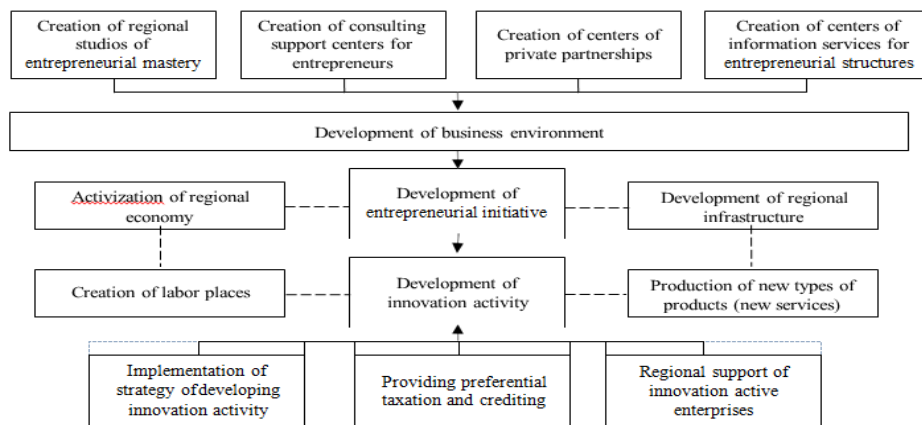
The obtained function of the dependence of the final indicator ‘innovation activity’ on the factor ‘entrepreneurial initiative’ has the following expression:

$$IA = 0,141 + 0,031 \times EI \tag{2}$$

Marks of the coefficient have the correct signs—the innovation activity is higher, the higher the entrepreneurial initiative. The independent variable explains 76.49% for the function. The standard regression error indicates a small scatter of values relative to the regression line and is 0.02702. The function is interpreted as follows: an increase in the number of entrepreneurial structures per 10 thousand people of the population of Ukraine at a rate of 1.0 causes an increase in the indicator of innovation activity by 0.172.

Directions for Increasing Entrepreneurial Initiative and Innovation Activity

It is determined that for the development of an entrepreneurial initiative it is advisable to create regional studios of entrepreneurial mastery, use of the mechanism of activization of the business environment development, the implementation of the strategy of infrastructural support, which will involve forming a network of consulting support centers for entrepreneurs, centers of private partnerships, centers of information services for enterprises, where all conditions will be formed to stimulate entrepreneurial initiative. In turn, the implemented entrepreneurial initiative will be base for the emergence of new ideas, new knowledge, new specialties, new forms of interaction with counterparties, new approaches to the protection of social and labor relations, new methods of regulation of entrepreneurial activity, as well as contribute to the country economy development as a whole (Figure 1).



**FIGURE 1
DIRECTIONS FOR INCREASING ENTREPRENEURIAL INITIATIVE AND INNOVATION ACTIVITY IN
THE UKRAINE**

The expediency of realization with the purpose of increase of the entrepreneurial initiative and development of innovation activity of the following projects is established: creation of a department in the structure of the Centers providing administrative services for promoting the development of entrepreneurship; development of business environment infrastructure in the regions of the country; creation of centers providing information and consulting services to business entities. An important feature of projects implementation is that they require a high quality approach to its implementation. Bad implementation of the projects can lead to low entrepreneurship development, and with a professional approach, the country will achieve a high level of entrepreneurial and innovation activity.

CONCLUSION

Further development of the theory of entrepreneurship is the basis of deepening theoretical and methodological principles and development of practical recommendations aimed at justifying the increase of entrepreneurial initiative and innovation activity of enterprises. Research of entrepreneurial initiative as a factor of development of innovation activity of enterprises based on the suggested methodological approach to the analysis and evaluation of entrepreneurial initiative and determination of its impact on innovation activity of enterprises is important from the point of view of determining its state in the country, analyzing and evaluating the degree of innovation activity of enterprises, establishment of dependence of dynamism of innovation activity of enterprises from changes in entrepreneurial initiative.

As mechanisms for increasing entrepreneurial initiative and innovation activity in the country, the main attention is suggested to focus on the development of infrastructure of the entrepreneurial environment and the creation of centers of business development.

REFERENCES

- Berkhout, A.J., Hartmann, D., & Trott, P. (2011). The role of entrepreneurship in innovation. *International Journal of Entrepreneurship and Innovation Management*, 14(1), 60-79.
- Bosma, N., & Kelley, D. (2019). Global entrepreneurship monitor. Global Report 2018-2019. Gráfica Andes, Chile: The Korea Entrepreneurship Foundation.
- Braunerhjelm, P. (2010). *Entrepreneurship, Innovation and Economic Growth*. Past experiences, current knowledge and policy implications. Working Paper Series in Economics and Institutions of Innovation 224, Royal Institute of Technology, Centre of Excellence for Science and Innovation Studies.
- Clercq, D., Castañer, X., & Belausteguigoitia, I. (2011). Entrepreneurial initiative selling within organizations: Towards a more comprehensive motivational framework. *Journal of Management Studies*, 48(6), 1269-1290.
- Fishburn, P. (1973). *The Theory of Social Choice*. Princeton, N. J.: Princeton University Press.
- Hilorme, T., Nazarenko, I., Okulicz-Kozaryn, W., Getman, O., & Drobyazko, S. (2018). Innovative Model of Economic Behavior of Agents In The Sphere of Energy Conservation. *Academy of Entrepreneurship Journal*, 24(3), 1-7.
- Kryvovyazyuk, I. (2014). Crisis and innovative activity of Ukraine's industrial enterprises. *Actual Problems of Economics*, 159(9), 218-223.
- Kryvoviaziuk, I. (2013). Implementation of matrix approach to management of enterprise's logistic development based on a concept of "demand-driven techniques. *Economic Annals-XXI*, 9-10(1), 60-64.
- Kryvovyazyuk, I., Volynchuk, Y., & Pushkarchuk, I. (2015). Methodological approach to the efficiency evaluation of innovative processes in logistical activity of enterprises. *Actual Problems of Economics*, 174(12), 408-414.
- Liang, T.W. (2003). Entrepreneurship and Innovation in the Knowledge-based Economy: Challenges and Strategies. Report of the APO Symposium on Entrepreneurship in Knowledge-based Industry, Taipei,

- Republic of China, 23–26 July 2002. Japan, Tokyo, Chiyoda-ku.
- Matviyishyn, Y. (2016). Entrepreneurship development support in Ukraine. *Actual Problems of Economics*, 184(10), 107-112.
- McGrath, R.G. (1999). Falling Forward: Real Options Reasoning and Entrepreneurial Failure. *Academy of Management Review*, 24(1), 13-30.
- Mueller, S., & Goic, S. (2002) Entrepreneurial potential in transition economies: A view from tomorrow's leaders. *Journal of Developmental Entrepreneurship*, 7(4), 399-414.
- Nsereko, I., Balunywa, W., Munene, J., Orobial, L., & Muhammed, N. (2018). Personal initiative: Its power in social entrepreneurial venture creation. *Cogent business & management*, 5(1), 1-15.
- Qudah, M.A. (2018). The impact of entrepreneurship initiatives in enhancing creativity and innovation. *International Journal of Business and Management*, 13(7), 157-168.
- Rodriguez-Pomeda, J., Casani-Fernandez de Navarrete, F., Morcillo-Ortega, P., & Rodriguez-Anton J.M. (2003). The figure of the intrapreneur in driving innovation and initiative for the firm's transformation. *International Journal of Entrepreneurship and Innovation Management*, 3(4), 349-357.
- Röschke, A. (2018). The concept and evolution of entrepreneurial leadership: A Bibliometric Analysis. In Leitch, C. M. & R. T. Harrison (eds.) *Research handbook on entrepreneurship and leadership*. Cheltenham, UK: Edward Elgar Publishing, 37-64.
- Sani, A., Maharani Ekowati V., Suardi Wekke, I., & Idris I. (2018). Respective contribution of entrepreneurial leadership through organizational citizenship behaviour in creating employees performance. *Academy of Entrepreneurship Journal*, 24(4), 1-11.
- Stel, A., Carree, M., & Thurik, R. (2005). The effect of entrepreneurial activity on national economic growth. *Small Business Economics*, 24(3), 311-321.
- Sturges, H. (1926). The choice of a class-interval. *Journal of the American Statistical Association*, 21(153), 65-66.
- Youssef, A.B., Boubaker, S., & Omri, A. (2017). Entrepreneurship and sustainability: The need for innovative and institutional solutions. *Technological Forecasting and Social Change*, 129(C), 232-241.
- Zsuzsanna, S.K., & Herman, E. (2012). Innovative entrepreneurship for economic development in EU. *Procedia Economics and Finance*, 3, 268-275.