

Innovation Entrepreneurial Activity: Gender Aspects

Emprendimiento innovador: aspectos de género

Empreendedorismo inovador: aspectos de gênero

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Abstract

The objective of study is to assess values of indicators, which characterize the current levels of innovation activity of men and women, who are entrepreneurs in different countries. The study used the results of surveys conducted in 59 countries during the implementation of the Global Entrepreneurship Monitoring project as initial information. We developed econometric models, which represent the density functions of the normal distribution. The study made it possible to assess the distribution of the values of the considered indicators of innovative activity of entrepreneurs by country in order to establish the average values of the indicators, and to identify countries with the maximum and minimum values of indicators of innovative activity of entrepreneurs. It is shown that the share of women entrepreneurs, in the countries under consideration, is slightly lower than the share of men entrepreneurs.

Keywords: Entrepreneurs, Innovations, Women, Men, Gender Differences.

Resumen

El objetivo del estudio es evaluar los valores de los indicadores que caracterizan el nivel actual de actividad innovadora de mujeres y hombres emprendedores en diferentes países. El estudio utilizó como referencia los resultados de encuestas realizadas en 59 países, esto durante el proyecto de vigilancia mundial de la empresa. Se han desarrollado modelos econométricos que representan funciones de densidad de distribución normal. El estudio permitió evaluar, por país, la distribución que se encuentra en los valores que arrojan los indicadores de la actividad de innovación de los empresarios, y establecer promedios de los indicadores e identificar los países con valores máximos y mínimos. Con ello se ha demostrado que la proporción de mujeres empresarias en los países objeto de examen es ligeramente inferior a la de hombres.

Palabras clave: Emprendedores, innovación, mujeres, hombres, diferencias de género.

Resumo

O objetivo do estudo é avaliar os valores dos indicadores que caracterizam o nível atual de atividade inovadora de mulheres e homens que são empreendedores em diferentes países. O estudo utilizou como referência os resultados de sondagens realizadas em 59 países durante a implementação do projeto de vigilância global da empresa. Desenvolvemos modelos econométricos que representam funções de densidade de distribuição normal. O estudo nos permitiu avaliar a distribuição dos valores dos indicadores

considerados de atividade inovadora de empreendedores por país, estabelecer valores médios de indicadores e também identificar países com valores máximos e mínimos de indicadores de atividade inovadora de empreendedores. É demonstrado que a proporção de mulheres empreendedoras nos países em questão é um pouco menor do que a proporção de mulheres empreendedoras.

Palabras-chave: empreendedores, inovação, mulheres, homens, diferenças de gênero.

1. Introduction

Entrepreneurship is currently one of the most important sectors of the economy in most modern countries. Entrepreneurs own about 93% of non-financial companies in the European Union and other economically developed countries, and they employ about half of the economically active population (Kraemer-Eis et al., 2017). They are the main sources of competitive advantage, economic growth, and job creation (Borbás, 2015; Luo et al., 2016). The survival of firms created by entrepreneurs in today's dynamic competitive environment depends largely on the level of innovation (Adams et al., 2006; Boly et al., 2013). Innovation enables entrepreneurs to better meet the needs of consumers, capitalize on strategic market opportunities, and align them with the strengths of their business (Rujirawanich et al., 2011).

Analysis of scientific publications has shown that the effectiveness of innovation has increased in recent decades

as a result of higher consumer demand for various goods and services (Schaarschmidt & Kilian, 2014; Tamayo & Huergo, 2017; Klewitz & Hansen, 2014). A number of studies have noted that innovation is also important for improving business performance and development (De Jong et al., 2014; Teirlink & Spithoven, 2013).

Entrepreneurs create, in most cases, small businesses and microenterprises. Due to their size and limited resources, it is more difficult for such enterprises to develop original technologies and to produce new products compared to large companies (Yadollahi & Toghraee, 2014; Diallo, 2012; Lee et al., 2010). In this regard, as well as the need for significant financial investments (Xie et al., 2013), the innovative activity of entrepreneurs in most countries is significantly hampered. However, as the research results show, in recent years, the innovative activity of entrepreneurs has been widely developed. They have significant innovative potential (Woschke & Haase, 2016;

Hervas-Oliver et al., 2016; Kim et al., 2018; Castela et al., 2018).

Given the above, for most developed and developing economies, an urgent problem is the assessment of indicators, which characterize the innovative activity of entrepreneurs. Our research was devoted to this problem. The study current level of innovation in entrepreneurship is important both for the state bodies regulating the activities in this sector of the economy, and directly for entrepreneurs. At the same time, based on the increasing role of gender studies in entrepreneurship (Patrick et al., 2016; Chhabra & Karmarkar, 2016; Zuraik et al., 2020), the main attention in this article is paid to the analysis of differences in the achieved levels of innovative entrepreneurial activity of men and women.

Despite the existence of extensive research on innovation, they did not find the necessary reflection of such problems as country and gender characteristics of entrepreneurial innovation activity. Thus, the article responds to calls for assessing the differentiation of the level in innovation development by country and the gender profile of innovation participants, expressed, in particular, in the works (Fagerberg, 2005; Belghiti-Mahut et al., 2016; Johansson & Lindberg, 2011).

The aim of the study is to assess the current level of innovative activity of men and women entrepreneurs in modern national economies. Exploratory scope – participation of men entrepreneurs and women entrepreneurs in product

and technological innovations in various countries. Our article is aimed at obtaining a certain empirical and methodological contribution to the knowledge on the development of innovations in entrepreneurship. This contribution consists of the fact that the author's methodology for modeling the assessment of the level of innovation development in modern countries, by using the density functions of the normal distribution is proposed. The empirical contribution is related to the determination of the average values and standard deviations for modern countries of such indicators as the share of women engaged in innovation activities in the total number of women entrepreneurs; the share of men engaged in innovation activities in the total number of men entrepreneurs; the ratio of the values of indicators, which characterize the innovative activity of men entrepreneurs and women entrepreneurs by country. In addition, countries with the maximum and minimum values of these indicators are identified, and a comparative analysis of indicators for Russia and other countries is carried out. Our article has significant limitations. It describes research, which directed only to describe indicators of innovation entrepreneurship among men and women, in the analyzed countries.

The structure of this work is as follows. Section 2 provides an overview of the literature on the role and place of innovation, as well as its significance in the modern economy, by including entrepre-

neurship. Section 3 describes the methodology, source data, and design used in writing the article.

The results of the simulation are presented in section 4 of this article. Section 5 provides a discussion of the results. The last sections contain conclusions and bibliographic references.

2. Literature review

The theoretical concepts and principles of firm innovation are described in detail in (OECD. Eurostat, 2018; OECD innovation strategy, 2020). They indicate that innovations include both the production of new or improved products (goods and services), which are significantly different from previously produced products, and the introduction of new or more advanced production processes in firms, which are significantly different from those, which were previously used. Accordingly, innovations can be of two types. The first type of innovation involves better products and services, and the second type is associated with changes in production processes. The second type of innovation also includes new marketing methods and new organizational forms used in the activities of firms, more efficient organization of workplaces, as well as the construction of new external relations and connections.

Innovations act as a key element to solve current problems. Innovation, according to the authors of scientific publications, provides progress in engineering and technology (Cramond & Fairweath-

er, 2013), the development of established businesses (De Clercq & Pereira, 2019), implementation of new ideas (Soleas, 2020), as well as applied creativity (Horkoff et al., 2019).

In the twenty-first century, innovation is aimed at improving people's lives and increasing their comfort (Kotsemir & Meissner, 2013). In addition, as indicated in the article (Leiponen & Helfat, 2010) innovation improves the efficiency of firms, and often their survival. In articles (Hu & Aziz, 2016; Dereli, 2015; Damanpour & Aravind, 2012) it is concluded that globalization, as well as increasing competition in modern markets, force firms to develop and to implement new innovative products and technologies. Innovation makes a great contribution to social and economic achievements.

As shown in the study (Kayal, 2008), innovation accounts for about 50% of economic growth in developed countries. The importance of innovation in both developed and developing countries is emphasized in the articles (Audretsch, & Frisch, 2003; Galindo & Mendez, 2008), which draw attention to the fact that innovation can increase GDP, as well as create jobs and reduce poverty. The innovation potential created will contribute to the production of new products not only in the near future, but also in the long term (Furman et al., 2002).

Innovation in entrepreneurship allows for its accelerated development (Audretsch, 2002; Wong et al., 2005). Entrepreneurial innovations have become wide-

spread in a variety of economic activities. They have made it possible to increase production efficiency not only in high-tech industries, such as electronics, mechanical engineering, information and biological technologies, chemistry (Blake & Hanson, 2005), but also in healthcare, manufacturing of most consumer goods, retail, and education (Robb & Coleman, 2014).

Considerable attention in scientific publications is paid to the peculiarities of innovation activity in different countries. Thus, in the article (De Oliveira Sousa et al., 2020) indicate that the level of innovation development in modern countries depends on such factors as the innovation orientation of legislation and government activities, the presence of a formed innovation environment, as well as the degree of immersion in this problem of most companies and firms, as well as educational and research institutes. Differentiation of innovation activity by country, as shown in the article (Savrula & Incekara, 2015) seems to be quite significant. Similar conclusions are also drawn in the work (Incekara & Savrul, 2013), which notes that the development of innovation takes place in countries with high, middle, and low incomes. The absence of the influence of income, as well as the territorial location of countries, on the innovation activity of firms is studied in the work (Doyle & O'Connor, 2013).

Relatively little attention in scientific publications has been paid to the gender aspects of the development of innovation in entrepreneurship. At the same

time, most of them show that the innovative activity of men entrepreneurs is slightly higher than that of women entrepreneurs. Thus, such conclusions were drawn in the following studies (Cross & Linehan, 2006; Ranga & Etzkowitz, 2010; Orji, 2010). However, in the article (Ahl, 2006) shows a decrease in the differences in the innovation activity of men entrepreneurs and women entrepreneurs in modern national economies.

3. Methodology and design

The research process was made up of five stages. At the first stage, baseline data describing the share of men and women involved in innovation activities in the total number of men entrepreneurs and women entrepreneurs in different countries, respectively, were formed. At the second stage, the values of indicators characterizing the levels of innovation activity of men and women, who have developed in national economies, were evaluated. In the third stage, the average values of the indicators for the countries under consideration and the ranges in which the values of these indicators are located for most of them were determined. At the fourth stage, a comparative analysis was carried out, during which countries with high and low values of indicators characterizing entrepreneurs, by using innovations were identified. At the fifth stage, the comparison of the considered indicators for Russia and other countries was carried out.

The study used the results of surveys of entrepreneurs aged 18-64 years, conducted in 59 countries, during the implementation of the Global Entrepreneurship Monitoring Project (2019). The report on this project included information on two rounds of the survey of respondents: in 10 countries, entrepreneurs were interviewed in 2017, and in 49 countries - in 2018. In each of the countries, responses were received from at least two thousand respondents, including men and women. The total number of respondents in all countries exceeded 120,000 entrepreneurs. The countries in which the survey was conducted differed in terms of the level of income of the population. According to the World Bank classification, 32 countries had high incomes, 17 countries had average incomes, and 10 countries had low incomes. The geographical location of the countries is as follows: Europe - 22 countries, Asia - 17 countries, Latin America - 11 countries, Africa - 6 countries, North America - 2 countries, and Australia. The countries where the survey of entrepreneurs was conducted included all the largest economies in the world, as well as other countries. In the course of surveys, entrepreneurs answered, in particular, the question of whether their business is innovative. These surveys provided information on the use of innovation by entrepreneurs in their activities. The share of entrepreneurs with an innovative business was defined as the ratio of entrepreneurs, who indicated that their business is innovative to the total

number of entrepreneurs surveyed for each of the countries. Their gender strata were taken into account.

Our study examined the assessment of three indicators, which characterize the innovative activity of men entrepreneurs and women entrepreneurs:

- the share of women engaged in innovative activities in the total number of women entrepreneurs;
- the share of men engaged in innovative activities in the total number of men entrepreneurs;
- the ratio of indicators values describing the innovative activity of men entrepreneurs and women entrepreneurs.

In general, a small number of empirical studies consider the gender aspects of innovation activity. At the same time, in most of the scientific publications devoted to this problem, conclusions are drawn about the presence of gender differences in the innovative activity of the economically active population. These differences are shown. For example, in the works listed below (Steyn & De Bruin, 2020; Fairlie & Robb, 2009; Ranga & Etzkowitz, 2010; Orji, 2010; Pablo-Martí et al., 2014; Alsos et al., 2013). Based on this, we formulate the first hypothesis:

hypothesis 1 - in most countries, there are gender differences in the participation of entrepreneurs in innovation.

As studies show (Savrula & Incekara, 2015; Acs et al., 2014) the national institutional context has a significant impact on the current level of innovation development. Similar conclusions about the pres-

ence of country differences are typical for male and female entrepreneurship, are given in the works (Blake & Hanson, 2005; Nahlinder et al., 2012). Thus, we can assume that there is a significant differentiation in innovation activity in different countries. This allows us to formulate the second hypothesis:

hypothesis 2 - the values of the three indicators under consideration have a significant differentiation between different countries.

Cross-country comparisons of the level of innovation development conducted in recent years have shown that innovations have been developed in companies located in all parts of the world (Doyle & O'Connor, 2013; Innovation and the Development Agenda, 2010; Gilman, 2010; Xiao et al., 2017). In research (Incekara & Savrul, 2013; Stepniak-Kucharska, 2014; Komlosi et al., 2019; Gossling & Rutten, 2007) showed the absence of a link between the level of income of the population and the development of innovative goods and services in the respective countries. At the same time, these studies emphasize that high and low levels of innovation activity in individual countries are not affected by such indicators as the geographical location of countries and the income of the population in them. Based on this, we proposed to consider the third and fourth hypotheses in our study:

hypothesis 3 – countries, which are characterized by maximum and minimum values each of three indicators, have var-

ious geographical location among parts of world;

hypothesis 4 – countries, which are characterized by maximum and minimum values each of three indicators, have various indexes level of income of the population.

The estimation of the values of the three indicators under consideration was based on the economic and mathematical modeling of the initial empirical data. As models, we used the density functions of the normal distribution, the method of development of which for estimating the values of specific indicators was proposed by the author. Some aspects of the use of the technique are given in the author's works (for example, Pinkovetskaia & Slepova, 2018). Note that in the process of developing the functions, the initial empirical data were grouped according to the ranges of changes in the values of the indicators. These data groups can be geometrically represented as corresponding histograms. Data approximation using normal distribution functions was performed, by using generally accepted statistical methods. It is important to note that the average value of the considered indicators, as well as their standard deviations for the density functions of the normal distribution, were displayed in the formulas of the developed functions themselves. Therefore, having constructed a specific function, we get the specified parameters of the considered indicators without additional calculations.

The obtained functions allowed us to determine the average values of each of the three indicators for the countries under consideration, as well as the ranges of their variation, which are typical for most countries. In addition, the study identified countries in which the indicators under consideration have values higher than the upper and lower than the lower limits of the ranges. The boundaries of the indicator range for 68% of the countries were determined based on the average values of the indicators and the corresponding standard deviations. The lower bound of the interval is equal to the difference between the mean and the standard deviation, and the upper bound is equal to their sum.

4. Modeling and results

In the course of the computational experiment, economic and mathematical modeling was carried out on the basis of empirical data. The models that describe the distributions (y_1, y_2, y_3) of the three indicators $(x_1, \%; x_2, \%; x_3)$ across all 59 countries are shown below:

- the proportion of women engaged in innovative activities in the total number of women entrepreneurs

$$; y_1(x_1) = \frac{547.85}{11.08x_1\sqrt{2\pi}} \cdot e^{-\frac{(x_1 - 25.28)^2}{(2x_1 \cdot 108x_1 \cdot 108)}} \quad (1)$$

- the share of men engaged in innovative activities in the total number of men entrepreneurs

$$; y_1(x_2) = \frac{442.52}{9.96x_2\sqrt{2\pi}} \cdot e^{-\frac{(x_2 - 26.45)^2}{(2x_2 \cdot 9.96x_2 \cdot 9.96)}} \quad (2)$$

- the ratio of the values of indicators describing the innovative activity of women entrepreneurs and men entrepreneurs

$$; y_3(x_3) = \frac{11.14}{0.28x_3\sqrt{2\pi}} \cdot e^{-\frac{(x_3 - 0.96)^2}{(2x_3 \cdot 0.28x_3 \cdot 0.28)}} \quad (3)$$

The quality of functions (1)-(3) that we tested, by using such criteria as the Kolmogorov-Smirnov, the Pearson, and the Shapiro-Wilk tests. Calculated values of criteria are given in Table 1.

Information given in column 2 of Table 1 showed that all calculated values are less than the critical value by the Kolmogorov-Smirnov test (0.174) at significant level equal 0.05. Data in column 3 are less than critical value of Pearson criterion (9.49). Data in column 4 exceed critical value 0.93 Shapiro-Wilk test with significant level of 0.01. Thus, the computational experiment showed that all nine developed functions have high quality.

At the next stage of the study, the values of indicators characterizing the involvement of men and women in innovative entrepreneurship were identified. The values of the indicators, the country averages, are shown in column 2 of Table 2. Average values were identified on base functions (1)-(3). In the third column is standard deviation for discussing indicators. The values of the indicators, which characterize the upper and lower boundaries of the intervals corresponding to most countries are shown in column 4. We calculate lower limits as the difference between average value and standard deviation. We calculate upper limits as the sum of the average value and the standard deviation.

Table 1. Calculated values of criteria

Indicators	Criteria		
	The Kolmogorov-Smirnov test	The Pearson test	The Shapiro-Wilk test
proportion of women engaged in innovative activities in the total number of women entrepreneurs, %	0.10	3.56	0.94
proportion of men engaged in innovative activities in the total number of men entrepreneurs, %	0.07	1.09	0.97
ratio of the values of indicators describing the innovative activities of women entrepreneurs and men entrepreneurs	0.09	2.01	0.96

Source: The data in the table are based on the results of calculated functions.

Table 2. Values of indicators describing the innovative activity of entrepreneurs

Indicator numbers	Average values	Standard deviation	Values for most countries
1	2	3	4
proportion of women engaged in innovative activities in the total number of women entrepreneurs, %	25.28	11.08	14.20-36.36
proportion of men engaged in innovative activities in the total number of men entrepreneurs, %	26.45	9.96	16.49-36.41
ratio of the values of indicators describing the innovative activities of women entrepreneurs and men entrepreneurs	0.96	0.28	0.68-1.24

Source: The calculations are carried out by the author on the basis of functions (1)-(3).

5. Discussion

The data shown in Table 2 shows that the average share of entrepreneurs involved in innovation activities ranges from 25.3% to 26.5%, depending on their gender identity. Consequently, more than a quarter of all men and women, who are entrepreneurs, are involved in innovation processes in the 59 countries under review. Thus, despite some difficulties in the development of entrepreneurial innovations, as indicated in the introduction, it can be concluded that, at present, a relatively large proportion of entrepre-

neurs are involved in innovation activities in modern countries. Further development of innovations in small and medium enterprises according to a number of researchers (Williamson & De Meyer, 2012; Zeng et al., 2010; Tomlinson & Fai, 2013), can be achieved through networking among entrepreneurs. This approach can help them through economies of scale, as well as combining and integrating complementary technologies and competencies.

The average share of women entrepreneurs engaged in innovation activities

was almost 25.3%. The value of the same indicator for men was almost 26.5%. That is, on average, in the countries under review, women entrepreneurs were 1.2% less likely to innovate than men entrepreneurs. The trend of exceeding the values of the considered specific indicators for men was observed in 27 countries. In 24 countries, the values of indicators for women were higher than for men. In eight countries, the values of indicators for women and men were the same. The average value of the ratio of indicators characterizing the innovative activity of women entrepreneurs and men entrepreneurs was 0.96. All this leads to the conclusion that there are gender differences in the participation of entrepreneurs in innovation activities in most countries. Thus, hypothesis 1 was confirmed.

In general, the above analysis allowed us to draw the following conclusions:

- almost every fourth entrepreneur in the 59 countries under review was involved in innovation activities;
- overall, in the countries under review, women were 1.2% less likely to innovate than men;
- the number of countries in which men entrepreneurs were more likely to use innovations is not much, only 3 countries more than those in which innovators predominate among women entrepreneurs.

To test hypothesis 2, on the differentiation of indicators by country, an analysis of the extent of variation of each of the indicators presented in table 2 was carried out. For this, we used standard devi-

ations, which are shown in column 3. Variation indices are as follows: for the first indicator - 44%; for the second indicator - 38%; for the third indicator - 29%. This analysis showed a significant differentiation of the values of each of the three indicators in the countries under consideration. Thus, hypothesis 2 was confirmed.

The next step was to identify the countries where the maximum and minimum values of each indicator were noted. In this case, the maximum values are those, which exceed the upper limits of the ranges specified in column 4 of Table 2, and the minimum values are those that are less than the lower limits of the specified ranges. The results of this analysis are shown in Table 3. Along with the lists of countries, this table also provides a division of the identified countries by their geographical location and income level.

Table 3. Characteristics of the countries where the maximum and minimum indicators were observed

Indicators	Countries	Geographical position	Population income
1	2	3	4
	With maximum values of indicators		
	Austria	Europe	High
	Canada	North America	High
	Lebanon	Asia	Low
	Chile	Latin America	High
	Luxembourg	Europe	High
	India	Asia	Low
	With minimum values of indicators		
Proportion of women engaged in innovative activities in the total number of women entrepreneurs	Bosnia and Herzegovina	Europe	Medium
	Brazil	Latin America	Medium
	Panama	Latin America	High
	Bulgaria	Europe	Medium
	Indonesia	Asia	Low
	Iran	Asia	Low
	Ecuador	Latin America	Medium
	Russian Federation	Europe	Medium
	Colombia	Latin America	Medium
	Sudan	Africa	Low
	With maximum values of indicators		
	Lebanon	Asia	Low
	Cyprus	Europe	High
	Canada	North America	High
	Israel	Asia	High
	India	Asia	Low
	Chile	Latin America	High
	Luxembourg	Europe	High
Proportion of men engaged in innovative activities in the total number of men entrepreneurs	Guatemala	Latin America	Medium
	With minimum values of indicators		
	Brazil	Latin America	Medium
	Russian Federation	Europe	Medium
	Madagascar	Africa	Low
	Poland	Europe	High
	Panama	Latin America	High
	Vietnam	Asia	Low
	Morocco	Africa	Low
	Sudan	Africa	Low
	Bosnia and Herzegovina	Europe	Medium

Indicators	Countries	Geographical position	Population income
1	2	3	4
Ratio of the values of indicators describing the innovative activities of women entrepreneurs and men entrepreneurs	With maximum values of indicators		
	France	Europe	High
	Kazakhstan	Asia	Medium
	Uruguay	Latin America	High
	Australia	Australia	High
	Puerto Rico	Latin America	High
	Morocco	Africa	Low
	Madagascar	Africa	Low
	Netherlands	Europe	High
	Russian Federation	Europe	Medium
	With minimum values of indicators		
	Iran	Asia	Low
	Bosnia and Herzegovina	Europe	Medium
	Ecuador	Latin America	Medium
	Indonesia	Asia	Low
	Bulgaria	Europe	Medium
Taiwan	Asia	High	
China	Asia	High	
South Africa	Africa	Medium	

Source: Developed by the author on the basis of data from Table 2 and the Global Entrepreneurship Monitoring project.

Table 3 provides information on the geographical location of countries (column 3) and the income of the population in them (column 4). The analysis of this information showed that there is no relationship between the maximum and minimum values of indicators and the territorial location of countries, as well as the level of income of the population in these countries. Thus, countries with high and low values of indicators are located in different parts of the world, and they are characterized by different levels of income of the population. Thus, we can state the confirmation of hypotheses 3 and 4.

A comparative analysis of the values of the considered indicators for Russia and other countries showed the following:

- the value of the indicator of the share of women engaged in innovative activities in the total number of women entrepreneurs in Russia was 12.2%, which is significantly (more than 2 times) less than the average value for other countries;

- the value of the indicator of the share of men engaged in innovative activities in the total number of men entrepreneurs was 5.7%, which is significantly (4.6 times) less than the average value for other countries;

- the ratio of the values of indicators describing the innovative activity of female entrepreneurs and male entrepreneurs is 2.1, which is 2 times higher than the average value for other countries.

Thus, it can be concluded that entrepreneurs in Russia are less involved in innovative activities in comparison with other countries. Moreover, this trend is observed in both female and male entrepreneurship. This situation, in our opinion, is due to the weak transfer of innovations from large enterprises and corporations to small- and medium-sized businesses in Russia. In addition, scientific researchers rarely transfer their achievements to established firms.

In addition, the information provided shows that in Russia, the share of women entrepreneurs engaged in innovative activities is significantly higher compared to the same indicator for men entrepreneurs. According to the author, this phenomenon is due to the higher educational level characteristic of women in our country.

6. Conclusion

In general, it should be noted that our research makes a number of important contributions to the literature on entrepreneurial innovation. While most academic publications have focused on innovation at the firm level, our study analyzes innovation by entrepreneurs at the country level and gender strata. In addition, it offers a methodology for modeling the distribution of indicator values across countries. The aim of our study was to evaluate the indicators, which characterize men and women, who carry out innovative activities as entrepreneurs. Conclusions, that have scientific

novelty and originality, are shown below. In the research, a method for evaluating the indicators, which characterize participation of entrepreneurs in innovation activities was proposed, by using density functions of the normal distribution.

On the basis of the proposed methodology, the distribution of indicators characterizing the share of women entrepreneurs and men entrepreneurs in the total number of relevant gender strata in 59 countries was estimated. Results of calculating experiment proved that every fourth entrepreneur participates in innovation activities in the countries under consideration. We showed that the share of women entrepreneurs in the countries under consideration is slightly lower than the share of men entrepreneurs. Also, it demonstrated that the share of women entrepreneurs in 27 countries was lower than the share of men entrepreneurs.

The opposite trend was observed in 24 countries. In 8 countries, these indicators were approximately equal. The existence of a gender gap in the participation of men and women in innovative entrepreneurship has been proven. Analysis of achieved results showed that in 2018 there were significant differences in the values for each of the three indicators considered by country. The countries, which were characterized by the maximum and minimum values of these three indicators were identified. It is shown that the geographical location of countries and the level of income of their population do not significantly affect the max-

imum and minimum values of indicators. It is shown that the involvement of entrepreneurs in innovation activities in Russia is less than in other countries. The innovative activity of women entrepreneurs in Russia was significantly higher than that of men entrepreneurs there.

The practical significance of the study for government bodies and entrepreneurs is to take into account the existing gender differences in innovation activities. Results of the work can be used in the activities of federal and regional structures related to the support and development of entrepreneurial activity, when justifying their planned activities, expanding the level of innovation, and developing new types of products. For entrepreneurs, especially beginners, data on the achieved levels of innovative solutions in the activities of their colleagues, may be of particular interest.

The new knowledge gained is of interest and can be used in the educational process at universities.

The study had limitations on empirical data due to the fact that only 59 countries were considered. Moreover, our research was directed only to describe indicators of innovation entrepreneurship among men and women in these countries.

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