Assessment of specialization of early stage entrepreneurs in different countries in 2018

Оценка специализации начинающих предпринимателей различных стран в 2018 году

Evaluación de la especialización de emprendedores en etapa inicial en diferentes países en 2018

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Abstract

Entrepreneurship is of great value in the modern economy. It provides a significant increase in the production of goods, works and services in the vast majority of countries, creates new jobs, increases the level of competitiveness and innovation. The article is devoted to the study of involvement in different type entrepreneurship activity. The study was based on data results on the adult population survey, i.e. between the ages of 18 and 64 years. The global monitoring process collected data on a wide range of indicators characterizing female and male entrepreneurship for 48 countries in 2018. During the made study, following two hypotheses were confirmed: indicators of specific weight of early entrepreneurs that specialize in certain types of activities differ significantly according to the countries; in most countries, activities such as trade and variety of services predominate in the early stages of entrepreneurial activity. The results of the research, which have scientific novelty, are as follows: analyze of the existing levels of sector specialization of early entrepreneurs; high quality approximation of the initial data by the dependences given in the article is proved; proved the predominance in most countries of early entrepreneurs, specialized in wholesale and retail trade; installed countries with high and low levels of the considered indicators.

Аннотация

Предпринимательство имеет большое значение в современных национальных экономиках. Оно создает предпосылки увеличения обеспеченностью населения товарами, работами и услугами во многих странах, создания новых рабочих мест, повышения уровня конкурентоспособности и инноваций. В статье рассматриваются индикаторы специализации ранних предпринимателей. В исследовании были использованы итоги социологического опроса начинающих бизнесменов в возрасте от 18 до 64 лет. В 2018 году такое обследование включало данные по 48 странам. Тестировались и были подтверждены две гипотезы: конкретные показатели веса ранних предпринимателей, специализирующихся на определенных видах деятельности, существенно различаются по странам; в большинстве стран такие виды деятельности, как торговля и разнообразие услуг, преобладают на ранних стадиях предпринимательской деятельности. К результатам исследования, которые имеют оригинальность, относятся: определение сложившихся уровней отраслевой специализации ранних предпринимателей; высокое качество разработанных математических моделей; доказано, что в большинстве стран преобладают ранние предприниматели, специализирующиеся на оптовой и розничной торговле; выявлены страны, с высокими и низкими уровнями рассматриваемых показателей.

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Resumen

El emprendimiento es de gran valor en la economía moderna. Proporciona un aumento significativo en la producción de bienes, obras y servicios en la gran mayoría de los países, crea nuevos empleos, aumenta el nivel de competitividad e innovación. El artículo está dedicado al estudio de la participación en diferentes tipos de actividad empresarial. El estudio se basó en los resultados de los datos de la encuesta de población adulta, es decir, entre las edades de 18 y 64 años. El proceso de monitoreo global recopiló datos sobre una amplia gama de indicadores que caracterizan el emprendimiento femenino y masculino para 48 países en 2018. Durante el estudio realizado, se confirmaron dos hipótesis: los indicadores del peso específico de los primeros empresarios que se especializan en ciertos tipos de actividades difieren significativamente segun los paises; En la mayoría de los países, actividades como el comercio y la variedad de servicios predominan en las primeras etapas de la actividad empresarial. Los resultados de la investigación, que tienen novedad científica, son los siguientes: analizar los niveles existentes de especialización sectorial de los primeros empresarios; se demuestra una aproximación de alta calidad de los datos iniciales por las dependencias dadas en el artículo; demostró el predominio en la mayoría de los países de los primeros empresarios, especializados en el comercio mayorista y minorista; países instalados con niveles altos y bajos de los indicadores considerados.

Palabras clave: Emprendimiento, tipos de actividad económica, países, monitoreo de la actividad emprendedora, actividad emprendedora temprana.

Introduction

Entrepreneurship plays an important role in the modern economy. It provides a significant increase in the production of goods, works and services in the vast majority of countries, creates new jobs, increases the level of competitiveness and innovation. Theoretical work and empirical research confirm that entrepreneurship is a key factor in the development of national economies. Thus, the work (Acs and Naudé, 2012) emphasizes that earlier industrial policy was aimed at the creation and growth of state-owned companies, and now such a policy should be based on a partnership between entrepreneurs and the state. Moreover, such relationship depends on the level of economic development of a particular country. The article (Gupta and Guha, 2013) describes how internal and external factors affect the development of entrepreneurship. Problems of entrepreneurial activity in Russia were considered in several papers (Pinkovetskaya et al., 2019a; Pinkovetskaya et al., 2019b).

The article is devoted to the study of involvement in different type entrepreneurship activity. The aim of the study is to assess the indicators describing the proportion of entrepreneurs specializing in basic type economic activities in the total number of early entrepreneurs in 48 countries. The study was based on data of the Global Entrepreneurship Monitor (Global Entrepreneurship Monitor, 2019) report. The report includes results based on the Adult Population Survey, i.e. between the ages of 18 and 64 years. The global monitoring process collected data on a wide range of indicators characterizing female and male entrepreneurship for 48 countries in 2018. Thus, the sample of countries considered in the research is 25% of the total number of independent countries. These 48 countries represent six geographical regions. The distribution of the countries by region is as follows: Europe - 20 countries, Latin America - 9 countries, East and South Asia – 7 countries, Middle East - 5 countries, Africa - 5 countries, North America - 2 countries. These countries belong to one of the three main groups in terms of population income: high-income - 30 countries, middle-income – 11 countries, low-income - 7 countries.

The conducted research will provide new information on entrepreneurial activity. The availability of such information is necessary for

potential entrepreneurs to make informed decisions about starting a business. In addition, government agencies need relevant data for the formation of development plans and programs for business sector.

The main body of the paper is organized as follows. Section two examines the literature describing the problems of entrepreneurial activity, as well as the current difference between the sectors entrepreneurship rates in different countries. The third section presents the methodology of the study, its design, data source. The fourth section provides the results of the computational experiment according to empirical data early-stage entrepreneurial activity for 2018. The fifth section describes a discussion of the simulation results. The conclusion section completes the study.

Literature review

In recent years, scientists have conducted a number of studies related to the study of industry specialization of entrepreneurs. The most interesting among them are the following studies.

The article (Kuzminov and Shirokov, 2015) deals with the sector aspects of entrepreneurial activity in the Rostov region. Similar work according to the Saratov region was performed by S. M. Alferova (2018). It shows the sectoral structure of entrepreneurship in 2017 and shows that more than a third of all entrepreneurs carried out trade business. The predominance of wholesale and retail trade (32%), real estate transactions (21%) and construction (18%) is noted as the main activities of small entrepreneurs in the Tyumen region (Machmudova and Koroleva, 2015). Sector preferences of medium entrepreneurs in Russia are given in article (Zilbershtein et al., 2017).

Specialization of entrepreneurs in Kazakhstan and Azerbaijan is given in articles (Tazabekova, 2016; Aliev 2018), respectively. The study (De Massis et al., 2017) examines sector entrepreneurial opportunities, determinants and processes of entrepreneurship. The work (Baker et al., 2005) conducted a comparative analysis of entrepreneurship in different countries. Article (Klapper and Parker, 2011) is devoted to the analysis of economic activities in which more women entrepreneurs than men participate. These are generally labor-intensive services, in particular trade. Features of specialization of businessmen in the countries of Europe are given in works (The Entrepreneurial Dimension, 2010; EIB Papers, 2011).

The analysis of the published works showed that the study did not pay enough attention to the comprehensive assessment of the sector specialization of early entrepreneurs in modern economies.

Research design

Our article is devoted to the analysis of the existing branch structure of early entrepreneurial activity in the economy of modern countries. The objectives of the study are related to the definition of indexes characterizing the proportion of entrepreneurs related to different sectors in different countries. We used data of entrepreneurship monitoring for 2018. The current methodology of this project divides early entrepreneurs into nine main groups according to the types of activities they are engaged in:

– Agriculture;
– Mining;
– Manufacturing;
– Transportation;
– Wholesale and retail;
– Administrative, professional, financial services;
– Health, education and social services;
– Information service;
– Personal service.

During the early made study, following two hypotheses were tested:

– Indicators of specific weight of early entrepreneurs that specialize in certain types of activities differ significantly according to the countries;
– In most countries, activities such as trade and variety of services predominate in the early stages of entrepreneurial activity.

To check hypothesis, modeled the allocation of indexes across 48 countries based on an estimate of normal distribution functions. The expediency of using normal distribution functions is determined by the following motives. Each entrepreneur acts as an autonomous enterprise, defines purpose taking into account the specific situation, and conducts risky economic activities. In all considered countries their number is large enough. They act independently of each other, so we can suppose a random distribution of indicator importance.

In the paper (Casella and Berger, 2001) it is pointed out that if the parameter is the result of the summation of many random weakly interdependent indicators, each of which makes a small contribution relative to the total, the distribution of such a parameter tends to a normal distribution with an increase in the number of observations. Thus, the relative values of indicators characterizing the entrepreneurial activity across countries are random variables. They may have a significant variation, but we can predict their arithmetic mean.

The estimation of the proportion of early entrepreneurs specialized in each of the above types of economic activity was founded on the construction of functions of normal distribution. The construction of such functions, as shown by previous studies, allow to obtain unbiased characteristics of the studied economic processes. The methodology of applications these functions for the evaluation of specific and relative indicators is given in article (Pinkovetskaia, 2015). The initial data were considered, respectively, the spatial data describing the specific gravity of early-stage entrepreneurs by sectors in each of 48 countries.

Results of the computational experiment

An assessment of the current sectors structure of entrepreneurial activity was based on the information obtained in the process of global monitoring. These data were used to determine the share of the main types of economic activity characteristic for entrepreneurs in 48 countries.

The computational experiment on the modeling of data for all the countries in question was based, as stated in the methodology, on the development of normal distribution density functions.

The developed density functions of normal distribution which describe the specific gravities of enterprises specialized in the above of the types of economic activity are listed below:

– Agriculture

$$y_1(x_1) = \frac{144}{3.41 \times \sqrt{2\pi}} \cdot e^{\frac{-(x_1 - 4.28)^2}{2 \times 3.41 \times 3.41}} ;$$

(1)

– Mining

$$y_2(x_2) = \frac{150,86}{3.83 \times \sqrt{2\pi}} \cdot e^{\frac{-(x_2 - 5.29)^2}{2 \times 3.83 \times 3.83}} ;$$

(2)

– Manufacturing

$$y_3(x_3) = \frac{126,00}{3.95 \times \sqrt{2\pi}} \cdot e^{\frac{-(x_3 - 8.06)^2}{2 \times 3.95 \times 3.95}} ;$$

(3)

– Transportation

$$y_4(x_4) = \frac{72,00}{2.11 \times \sqrt{2\pi}} \cdot e^{\frac{-(x_4 - 3.22)^2}{2 \times 2.11 \times 2.11}} ;$$

(4)

– Wholesale and retail

$$y_5(x_5) = \frac{390,00}{15.,29 \times \sqrt{2\pi}} \cdot e^{-\frac{(x_5 - 43.45)^2}{2 \times 15.29 \times 15.29}} ;$$

(5)

– Administrative, professional, financial services

$$y_6(x_6) = \frac{216,00}{8.44 \times \sqrt{2\pi}} \cdot e^{-\frac{(x_6 - 13.72)^2}{2 \times 8.44 \times 8.44}} ;$$

(6)

– Health, education and social services

$$y_7(x_7) = \frac{192.00}{5.53 \times \sqrt{2\pi}} \cdot e^{-\frac{(x_7 - 14.53)^2}{2 \times 5.53 \times 5.53}} ;$$

(7)

– Information service

$$y_8(x_8) = \frac{116,57}{3.44 \times \sqrt{2\pi}} \cdot e^{-\frac{(x_8 - 4.17)^2}{2 \times 3.44 \times 3.44}} ;$$

(8)

– Personal service

$$y_9(x_9) = \frac{48,00}{1.70 \times \sqrt{2\pi}} \cdot e^{-\frac{(x_9 - 2.51)^2}{2 \times 1.70 \times 1.70}}$$

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(9)

The quality of the developed models was evaluated using three tests. The computational experiment showed that the calculated values of the Kolmogorov-Smirnov test statistics are located in the range from 0.020 to 0.134. These values are substantially less than the tabular value of 0.152 component (a significance level of 0.05). Estimated values for the Pearson test range from 0.144 to 4.780 less than the table value (9.49). The calculated values of the statistics on the Shapiro-Vilka test exceed the table value of 0.93 (significance level 0.01). Econometric analysis of these 3 tests showed high quality each of the functions (1)-(9).

Discussion of the modeling results

The density functions of normal distribution allow us to determine the average values of the prevailing specific weight of the early entrepreneurial activity of depending on the sector specialization. The corresponding indicators are shown in Table 1. The same table presents the intervals change of the indicators under consideration (column 3) which are characteristic of most countries (68%). The intervals are calculated on the basis of the average values of the indicators and the values of standard deviations. It being known that for calculating the boundaries of the interval specified deviation is added and subtracted to the average importance of the index respectively. The mean importance and intervals of index in the specified table match to the functions (1) - (9).

Table 1
Indicators of sector specialization of early-stage entrepreneurs

Sectors	Value	Interval of Change
1	2	3
Agriculture	4.28	0.87-7.69
Mining	5.29	1.46-9.06
Manufacturing	8.06	4.11-12.01
Transportation	3.22	1.11-5.33
Wholesale and retail	43.45	28.16-58.74
Administrative, professional, financial services	13.72	5.28-22.16
Health, education and social services	14.53	9.00-20.06
Information service	4.17	0.73-7.61
Personal service	2.51	0.81-4.21

The information referred to column 2, allows to conclude that in 2018 the average of the countries value of the share of entrepreneurs who specialized in agricultural production amounted to 4.28%. The level of this indicator is higher (from 21.3% to 7.8%) than the upper limit of the interval given in column 3 of the table, noted in countries such as Madagascar, Thailand, Bulgaria, Sudan, Italy, Russia, Slovenia, Croatia, Egypt, Sweden, Greece, Turkey. Values of less than one per cent occurred in Angola, Switzerland, Brazil, Luxembourg, Cyprus, the Republic of Korea, Saudi Arabia and the UAE.

The average share of entrepreneurs associated with the extraction of minerals in the countries under consideration was about 5.3%. The level of this indicator is higher than the upper limit of the interval given in column 3 of table 1, took place in 2018 in countries such as. Low values (1.1%) were observed in Lebanon, Indonesia, Cyprus and India.

The average for 48 countries the proportion of early-stage entrepreneurs associated with the manufacturing industries made up about 8%. The proportion above the upper limit of this range

was observed in countries such as Turkey, Sudan, Colombia, Republic of Korea, Taiwan, Uruguay, Chile, Egypt. Values lower than the lower limit of the range (namely from 1.2% to 3.2%) were observed in the following countries: Angola, Ireland, Cyprus, France, Brazil, Japan, UAE.

Average value in the transport sector in 2018 was not much more than 3%. The relatively high level of the indicator (from 9.2% to 5.3%) was observed in Brazil, the Republic of Korea, Russia, Chile, India, Luxembourg. Less than one per cent of entrepreneurs in this area were in Indonesia, Saudi Arabia, Puerto Rico, Morocco and Switzerland.

The highest level of early entrepreneurs was observed in wholesale and retail trade, where their average share in the total number of such entrepreneurs reached 43.45%. This specialization was characteristic of almost half of the early entrepreneurs. The most widespread (from 74% to 60%) trade was among early entrepreneurs in such countries as Angola, Indonesia, Saudi Arabia, Morocco, Peru, Guatemala, China, Egypt, Panama, India, Thailand. The lowest level of this indicator (from 27% to 21%) was in Switzerland, Sweden, Croatia, Slovakia, France, Germany, Slovenia, USA, Luxembourg, Netherlands, Great Britain. In our opinion, the relatively low level of the indicator in these countries is due to the predominance of large retail chains.

Significant development in recent years have received a variety of services provided by entrepreneurs. Thus, the average level of administrative, professional, financial services in the 48 countries in question reached almost 14% in the activities of early entrepreneurs. The highest values (from 30% to 22%) of the share of such entrepreneurs are noted in the countries that are characterized by high incomes, namely in Switzerland, Luxembourg, Slovenia, USA, UAE, Spain, Great Britain, Italy, the Netherlands. These services have not been significantly developed in the following countries: Saudi Arabia, Panama, Lebanon, Morocco, Thailand, India, Peru, Egypt, Angola, Indonesia, Madagascar. In them, the share of relevant entrepreneurs does not exceed 5% of the total number of early entrepreneurs.

Similarly, a significant (14.5%) number of entrepreneurs were associated with the provision of services in the areas of health, education and social work. High level of services in this industry (from 27% to 21%) took place in such countries as Germany, France, Netherlands, Austria, Slovakia, Puerto Rico, Ireland, Great Britain. The low level of relevant services (less than 8.4%) was observed in Peru, Thailand, Angola, Egypt, Guatemala, Madagascar.

The average for 48 countries proportion of early-stage entrepreneurs related to information services accounted for about 4%. High values (13.2% to 8.3%) were observed in economically developed countries: Iceland, Japan, Croatia, Luxembourg, Austria, Sweden, Switzerland. Information services provided by early entrepreneurs in Lebanon, Madagascar, Panama, Egypt, Thailand, Bulgaria, Morocco, Sudan were not developed (less than 0.7 percent).

The average level of personal services was about 2.5%. At the same time, a relatively high share (from 9% to 4%) of such entrepreneurs received such services in Austria, Cyprus, Ireland, Great Britain, Switzerland, USA, Canada, Iran, Japan, Madagascar. Such services were not popular with early entrepreneurs in countries such as Thailand, Sudan, Brazil, Poland, Indonesia, Qatar. They were carried out by less than 0.8% of entrepreneurs in 2018.

Analysis of data presented in the table showed that for early entrepreneurs it is preferable to provide a variety of services. The share of entrepreneurs who specialize in providing services reached 81% in 2018. Production activity in the sectors structure of early entrepreneurship was, respectively, less than 20%. That is, every 4 out of 5 early entrepreneurs preferred the service sector.

In general, the above analysis confirmed the correctness of the hypotheses. The study found that indicators of the proportion of early entrepreneurs specialized in certain activities differ significantly across countries, and that in most countries, activities such as trade and a variety of services predominate at an early stage of entrepreneurial activity.

Conclusion

The results of the research, which have scientific novelty, are as follows:

- Analyze of the existing levels of sector specialization of early entrepreneurs using the functions of the density of normal distribution;
- High quality of approximation of the initial data by the dependences (1)-(9) given in the article is proved);

- Average weights of industry preferences of early stage entrepreneurs in most of the 48 countries included in the global monitoring project are given;
- Proved the predominance in most countries of early entrepreneurs, specialized in wholesale and retail trade;
- Significant differentiation of indicators by country is proved;
- Countries with high and low levels of the considered indicators are given.

The novelty of the researches is caused with the analysis of specific weight entrepreneurs specialized in 9 types of economic activities in the total population of previous. The outcome of this work can be applied in studies to justify degree to improve and develop the business sector. The models developed in the course of the research can be used by public authorities in the justification of strategic documents for the development and improvement of entrepreneurship.

The prospects for further research are to assess the gender characteristics and motivation of early entrepreneurs in different countries.

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