

Artículo de investigación

Structural changes in the professional training of higher education students in Russia

Структурные сдвиги профессиональной подготовки студентов высшего образования в России

Los cambios estructurales de la formación profesional de los estudiantes de educación superior en Rusia

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SPIN-ID <https://elibrary.ru: 7560-0426>**Abstract**

The article provides a statistical analysis of the dynamics and structure of professional training of higher education students. The main goal of the work is to identify the conformity of degrees of university graduates with the needs of the modern labor market. The empirical base of the study was compiled according to official statistics in Russia for 2013-2018. During the period under review, there was a 3.19% decrease in students studying under the Bachelor's degree program, while the number of long first degree students decreased by a factor of 3.39, and the number of students studying under Master's degree programs, in contrast, increased by a factor of 2.85. There is a tendency to reduce the share of accepted applications for university admission from the total number of applications submitted for all study programs, with the exception of Master's degree programs. The results obtained indicate that professions, which are popular with university students, are not in high demand in the modern labor market. Holders of a Bachelor's degree preferred mainly the humanitarian professions (related to Law, Economics, and Pedagogy). However, the related study programs are characterized by an overdemand and a high level of competition. Structural changes in the Bachelor's and Master's degree programs have occurred in terms of increasing the share of academic and engineering programs. The calculations made it possible to trace the progressive change in the structure of student

Аннотация

В статье проведен статистический анализ динамики и структуры профессиональной подготовки студентов высшего образования. Основной целью работы является выявление соответствия специальностей выпускников вузов потребностям современного рынка труда. Эмпирическая база исследования составлена по данным официальной статистики в России за 2013-2018 гг. За рассматриваемый период произошло сокращение обучающихся по программе бакалавриата на 3,19 %, при этом численность студентов специалитета снизилась в 3,39 раз, а численность студентов по программе магистратуры, напротив, выросла в 2,85 раза. Наблюдается тенденция сокращения доли принятых заявлений о поступлении вузы из общего числа поданных заявлений по всем программам обучения, за исключением магистратуры. Полученные результаты свидетельствуют о том, что профессии, которые популярны у студентов вузов, не достаточно востребованы на современном рынке труда. Выпускники бакалавриата предпочитали преимущественно гуманитарные профессии (юридические, экономические, педагогические), но именно по ним наблюдается перенасыщение и высокий уровень конкуренции. Структурные сдвиги в программе обучения бакалавриата и магистратуры произошли в части увеличения

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training under the long first degree programs towards the growth of the medical direction. A reduction in the primary link of the long first degree is due to its transformation to the basic form of Bachelor training.

Key Words: Higher education, Bachelor's degree, Master's degree, long first degree, labor market, structure of professional training.

доли педагогического и инженерно-технического образования. Проведенные расчеты позволили проследить поступательное изменение структуры подготовки студентов по программе обучения специалитета в сторону роста медицинского направления. сокращение по первичному звену специалитета объясняется его сменой на базовую форму подготовки в качестве бакалавриата..

Ключевые слова: высшее образование, бакалавриат, магистратура, специалитет, рынок труда, структура профессиональной подготовки.

Resumen

El artículo da un análisis estadístico de la dinámica y la estructura de la formación profesional de los estudiantes en la educación superior. El objetivo principal del trabajo es identificar las necesidades especiales de los graduados pertinentes del mercado de trabajo moderno. La base empírica de la investigación se realiza de acuerdo con las estadísticas oficiales en Rusia en 2013-2018. Durante el período bajo revisión se produjo una disminución de los estudiantes en un programa de pregrado en el 3.19%, mientras que el número de estudiantes especialidades disminuyó 3.39 veces, mientras que el número de estudiantes en el programa de maestría, en contraste, aumentó en 2.85 veces. Hay una tendencia a la reducción de la proporción de solicitudes aceptadas para la admisión universitaria del número total de solicitudes presentadas para todos los programas de estudio, con la excepción del programa de maestría. Los resultados indican que las ocupaciones que son populares entre los estudiantes universitarios no tienen una gran demanda en el mercado laboral moderno. Los graduados de pregrado preferían principalmente las profesiones humanitarias (legales, económicas, pedagógicas), pero es sobre ellas que hay un exceso y un alto nivel de competencia. Los cambios estructurales en el plan de estudios de los programas de pregrado y maestría han tenido lugar en términos de aumentar la participación de las pedagógicas y la educación en ingeniería. Los cálculos permitieron seguir el cambio progresivo en el programa de preparación de los estudiantes de acuerdo con el programa de formación profesional hacia el crecimiento del campo de la medicina. La reducción en las profesionales de atención primaria debido a su cambio en la forma básica de la formación como estudiante.

Palabras clave: Educación superior, pregrado, posgrado, maestría, mercado laboral, la estructura de la formación profesional.

Introduction

The state of the higher education system, the quality and structure of professional training are of great importance for the sustainable development of the economy of any country (Sam, 2018; Aleksejeva, 2016). Permanent cyclical fluctuations in the economy determine the needs of the labor market (Trofimov, 2017). In turn, the response of the system of higher professional education should correspond to the real demand for labor resources.

Since the 1990s, a rapid transformation of the economy began in Russia. It was accompanied

by the shutdown of production enterprises and the rapid development of the financial sector, trade and intermediary services. The market urgently needed professionals in law, management and economics, while specialists with a degree in engineering and technology turned out to be unwanted (Litau, 2018). The education system was hastily adjusted to the said conditions – many vocational schools and colleges were closed or reprofiled; the number of universities and institutes with the humanitarian profile of training increased sharply. As a result, the professional-qualification imbalance in the

labor market has now become apparent. There is a demand for highly qualified specialists, while the supply structure does not correspond thereto (Vishnevskaya, 2019; Ekhlakova, 2019). This has led to the fact that the development of vocational, primarily technical education is the subject of close attention of the government.

The current state of vocational education has substantially adjusted the development priorities of higher education institutions, putting first the satisfaction of participants with the conditions, content and quality of the academic process (Akmarov, & Knyazev, 2017; Aithal, & Kumar, 2016; Volchik, & Maslyukova, 2017; Dalati, & Al Hamwi, 2016). Higher education is now perceived as an imperative requirement of employers, as a necessary but insufficient condition for obtaining a job. The higher education certificate is required in Russia even in those companies where it was previously optional (Solovov, 2016).

An analysis of the labor market requirements for the professional competence of personnel shows that a sharp drop in demand for traditional mass professions created an almost uncontrollable process of restructuring the labor resources of society (Valeeva *et al.*, 2016). In addition, the deformation of the structure of labor resources in Russia is deteriorating as a result of a long recession in the economy and aggravation of crisis phenomena. All these factors lead to the obvious problem of matching the number of university graduates to the needs of the labor market. The first step to solving the problem is a comprehensive assessment of the structural changes in the professional training of higher education students. This is exactly what this study is aimed at.

Literature Review

Today, the provision of competitiveness and professional competence in graduates of higher education institutions of Russia faces a number of pressing problems (Schelkunov *et al.*, 2018; Boytsov *et al.*, 2016; Batkovskii *et al.*, 2016) that arise, firstly, at the stage of forming a demand for educational services; secondly, at the stage of educational training of specialists; and thirdly, at the stage of employment.

In the context of a growing personnel deficit, the importance of universities in the formation of labor force supply corresponding to the requirements of the economy in quantitative and qualitative parameters is increasing (Zabelina *et al.*, 2014). According to the Superjob survey,

over 80% of graduates from Russian universities had difficulties with employment after graduation, both due to a lack of experience and suitable vacancies (Survey: Only 17% of Russian University Graduates Do Not Face Difficulties with Finding Work, 2019). Estimates of the Higher School of Economics show that every fourth graduate in Russia performs work that does not require higher education, and about 30% do not work according to the obtained degree (Diplomas Are No Longer Needed, 2019). These and other reasons led to the widespread occurrence of low labor productivity.

Researchers note the uncoordinated actions of higher education institutions and industrial enterprises in the training of specialists, which leads to imbalance (Kekhyan, 2014). Gimpelson *et al.* (2007) name the causes of labor force shortages and oversupply according to the results of surveys. The main reason for the shortage of workers on the supply side is the lack of the necessary study programs in the local labor market. On the demand side, the reason lies in the lack of competitive salaries and the inability of motivational tools to retain the already employed workers. It is worth mentioning that this problem remains relevant for a long time. Alekseychuk and Strekalova (2019) identify a number of factors, due to which graduates do not work in their degree fields, including poor awareness of the labor market, lack of understanding of the purpose for obtaining a certain profession, immature personal goals, inapplicability of acquired knowledge to the new requirements, and low salaries.

According to Morozov and Morozova (2018), the formation of a digital service economy has a significant impact on the labor market leading to the emergence of new forms of labor organization. This idea is developed by Tretyakova and Tretyakov (2019), Batkovskii *et al.* (2019) in terms of assessing the demand for IT specialists. They express the opinion that the system of professional higher education is not ready to fill in the gaps between the rapidly developing technologies, employers' requests and updating study programs to meet these requirements.

The article by Varshavskaya and Kotyrlo (2019) analyzes the supply and demand of graduates with a degree in engineering, technology, and economics. It defines that the declared shortage of engineering specialists is not related to the lack of their proposal at the macro level. When studying the problems of employing university graduates in some regions of Russia, a number of

negative trends was revealed indicating an imbalance in the development of higher professional education and the labor market (Kovaleva, 2006): an increase in the period of employment of university graduates; low security of graduates in employment issues; lack of economic interest in solving existing problems on the part of universities, etc. It is important that the unjustified choice of a study program when entering a university guided by subjective criteria for future prospects reduces the competitiveness of young specialists and their interest in improving their own professional competencies.

A review of the literature indicates that insufficient attention is paid to the problem of matching the majors of university graduates with the needs of the economy. The situation is aggravated by the fact that the experience of foreign countries has not found its sufficient embodiment in the system of professional training at the universities in Russia. Moreover, a number of higher education programs do not correspond to modern realities. The problem can be corrected by updating the education system, improving regulation and forecasting the professional needs of the labor market.

Materials and Methods

The study was based on the materials of official statistics (Russian Federal State Statistics Service (Rosstat)) and the data of the Ministry of Science and Higher Education of Russia. The aggregate indicators for Russia as a whole for 2013-2018 were analyzed, including the data on the number of applications submitted and accepted at higher education institutions by study programs; the number of students in all years of study for the corresponding Bachelor's degree, long first degree, and Master's degree programs; the degree of conformity of the employed graduates' work and the acquired profession. The data from the HeadHunter Group (2019) and official statistics on employment were used to analyze the state of the labor market.

A dynamic analysis consists in determining individual and generalizing indicators of structural changes constructed using linear and quadratic mean coefficients of absolute and relative structural shifts with a variable and constant comparison base (Sivelkin, & Kuznetsova, 2002).

The structural indicator was calculated according to the following formula:

$$d_i = \frac{x_i}{s} \times 100', \quad (1)$$

where d_i is the share of the i^{th} element of the structure, $i=N,1$; x_i is the absolute value by the i^{th} element; s is the final sum of the absolute values of the i^{th} elements of the structure.

An individual indicator of absolute structural changes with a variable comparison base is determined according to the following formula:

$$\Delta = d_j - d_{j-1}, \quad (2)$$

where d_j is the relative share of the given group in the j^{th} period; d_{j-1} is the relative share of the given group in the period.

An individual indicator of absolute structural changes with a constant comparison base is given below:

$$\Delta = d_j - d_0, \quad (3)$$

where d_0 is the relative share of the given group in the reference period.

An individual indicator of relative structural changes with a variable comparison base is calculated as follows:

$$J_d = \frac{d_j}{d_{j-1}}, \quad (4)$$

where d_j is the relative share of the given group in the j^{th} period; d_{j-1} is the relative share of the given group in the $j-1$ period.

Accordingly, an individual indicator of relative structural changes with a constant comparison base is determined according to the following formula:

$$J_d = \frac{d_j}{d_0}, \quad (5)$$

where d_j is the relative share of the given group in the j^{th} period; d_0 is the relative share of the given group (element) in the reference period.

The linear coefficient of absolute structural changes with a variable (chain) comparison base is calculated on a percentage basis:

$$L_z^{Ab} = \frac{\sum_{i=1}^n |d_j - d_{j-1}|}{n}, \quad (6)$$

where L_z^{Ab} is the linear coefficient of absolute structural changes (a chain coefficient, or with a variable comparison base); d are the relative shares of attributes; n is the number of gradations within structures; j are periods to be compared.

Results

An analysis of the situation in the higher education system of Russia shows that for the period of 2013-2018, there is a significant reduction in applications for admission to the Bachelor's degree programs (from 4.1 million applications to 2.5 million applications), a decrease in the number of applications for admission to the long first degree programs (from 825.5 thousand applications to 547.9 thousand applications), and a simultaneous growth of applications for admission to the Master's degree programs (from 186.9 thousand applications to 469.5 thousand applications). At the same time, in 2013, the share of applications submitted for the Bachelor's degree studies was 80.06%, while by 2018, it decreased to 71.47%. The share of applications submitted for the long first degree study programs changed over this period from 16.23% to 15.33% of the total quantity of applications. The share of applications submitted to the Master's degree programs increased from 3.68% to 13.14%.

If the reduction in the primary link of the long first degree programs is explained by its change to the basic form of the Bachelor's degree studies, where the decrease in the number of applications is caused, among other things, by demographic reasons and the partial transition of applicants to secondary professional education, then the sharp increase in the number of applications to the

Master's degree programs is explained by the demand for completion of the second stage of higher education after receiving Bachelor's degree.

In 2013, out of all applications for admission under the Bachelor's degree programs, 995.1 thousand applications were accepted, that is, the competition rate was 4 persons per 1 place. Five years later, in 2018, 741.1 thousand applications were accepted, and the competition rate was reduced to 3.44 persons per 1 place. In 2013, 104.1 thousand applications were accepted for admission to the Master's degree programs with the competition rate of 1.79 persons per 1 place.

In 2018, out of 469.5 thousand applications submitted for admission, 244.5 thousand applications were accepted, but the competition rate increased just by 7% to 1.92 persons per 1 place. More noticeable changes in the competition rate were observed in the long first degree programs. In 2013, 147.3 thousand applications were accepted for admission to the long first degree programs, that is, the competition rate decreased by more than 40% from 5.6 to 3.4 persons per 1 place. Thus, there is a clear tendency to reduce the share of accepted applications from the total number of applications submitted for all types of study programs, with the exception of the Master's degree programs.

The data on the applications submitted for admission to study programs are reflected in the statistics on the number of students in all years of study. The dynamics of changes in the number of students is presented in Figure 1. During the 2013-2018 period, there was a 3.19% decrease in students studying under the Bachelor's degree program, while the number of the long first degree students decreased by a factor of 3.39, and the number of students studying under Master's degree programs, in contrast, increased by a factor of 2.85.

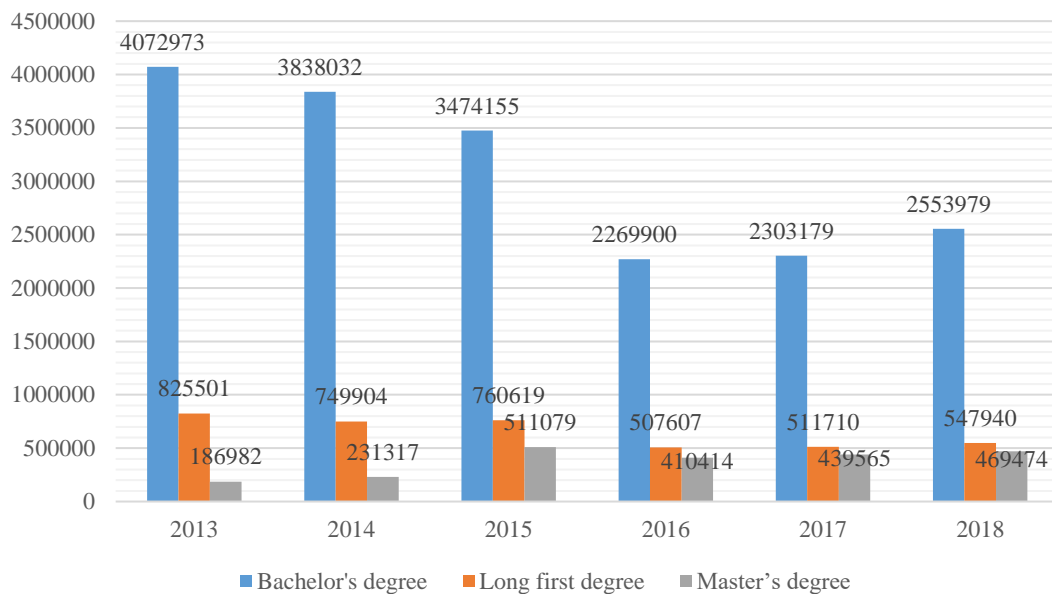


Figure 1. The distribution of the number of students in all years of study according to study programs in 2013-2018, persons
Source: (Ministry of Science and Higher Education of the Russian Federation, 2019)

The most popular Bachelor's degree study programs were Economics, Law, Management, Teacher Training, Civil Engineering, Government and Municipal Administration, Power and Electrical Engineering, and Psychology and Teacher Training. In total, in

2013, the share of Bachelor's degree students accounted for 37.49% of all students, and in 2018 – 48.21%. The distribution of Bachelor's degree students according to the most popular majors is presented in Table 1.

Table 1. The distribution of Bachelor's degree students according to the most popular majors in 2013-2018, %

Major	2013	2014	2015	2016	2017	2018
Economics .1	11.32	13.07	9.55	13.00	11.65	10.45
Law .2	8.86	6.38	8.76	12.47	12.00	11.08
Management .3	6.38	4.46	5.78	7.60	6.63	6.05
Teacher Training .4	4.06	3.09	3.16	4.91	4.93	9.4
Civil Engineering .5	2.46	1.75	2.62	3.98	4.01	3.96
Government and Municipal Administration .6	2.08	1.55	2.25	3.29	3.16	3.01
Power and Electrical Engineering .7	1.32	0.94	1.46	2.28	2.38	2.47
Psychology and Teacher Training .8	1.01	0.78	1.16	1.73	1.67	1.69
Miscellaneous	62.51	67.98	65.26	50.74	53.57	51.89
Total	100	100	100	100	100	100

Source: (Ministry of Science and Higher Education of the Russian Federation, 2019)

Based on the data in Table 1, let us determine the linear coefficient of absolute structural changes for the reviewed period: $L_{2014/2013} = 1.60$, $L_{2015/2014} = 1.92$, $L_{2016/2015} = 3.23$, $L_{2017/2016} = 0.66$, $L_{2018/2017} = 1.02$. The highest value of structural changes according to

majors was noted in 2016. From 2016 to 2018, small structural changes were observed.

The absolute chain and base structural changes in the distribution of the Bachelor's degree students are presented in Table 2.

Table 2. The absolute chain and base indices of structural changes in the distribution of Bachelor's degree students according to the most popular majors

Major	Chain Index / (Base Index)				
	2014	2015	2016	2017	2018
Economics .1	1.75 (1.75)	-3.52 (-1.77)	3.45 (1.68)	-1.35 (0.33)	-1.20 (-0.87)
Law .2	-2.48 (-2.48)	2.38 (-0.10)	3.71 (3.61)	-0.47 (3.14)	-0.92 (2.22)
Management .3	-1.92 (-1.92)	1.32 (-0.60)	1.82 (1.22)	-0.97 (0.25)	-0.58 (-0.33)
Teacher Training .4	-0.97 (-0.97)	0.07 (-0.90)	1.75 (0.85)	0.02 (0.87)	4.47 (5.34)
Civil Engineering .5	-0.71 (-0.71)	0.87 (0.16)	1.36 (1.52)	0.03 (1.55)	-0.05 (1.50)
Government and Municipal Administration .6	-0.53 (-0.53)	0.70 (0.17)	1.04 (1.21)	-0.13 (1.08)	-0.15 (0.93)
Power and Electrical Engineering .7	-0.38 (-0.38)	0.52 (0.14)	0.82 (0.96)	0.10 (1.06)	0.09 (1.15)
Psychology and Teacher Training .8	-0.23 (-0.23)	0.38 (0.15)	0.57 (0.72)	-0.06 (0.66)	0.02 (0.68)
Miscellaneous	5.47 (5.47)	-2.72 (2.75)	-14.52 (-11.77)	2.83 (-8.94)	-1.68 (10.62)

Let us conduct an extensive analysis of the absolute indicators of structural changes when training students under the Bachelor's degree programs. The results show that in 2014, as compared to the previous year, there was an increase by 1.75% in the number of Bachelor's degree students with the major in Economics. For other majors, the growth was 5.47%, while the share of students under other study programs decreased. In 2015, as compared to 2014, on the contrary, the share of students studying Economics (-3.52%) and Miscellaneous majors (-2.72%) decreased, while other study programs experienced an increase. In general, a decrease in the share of Bachelor's degree students with a major in Economics was noted in 2017 (-1.35%) and in 2018 (-1.2%). The share of students

studying Law, Management, Government and Municipal Administration also decreased. In 2017-2018, a growth in the share of Bachelors was recorded in Teacher Training (+0.02% and +4.47%, respectively) and in Power and Electrical Engineering (+0.1% and +0.09%, respectively). In 2018, as compared to 2013, the largest decrease in Bachelor's degree students can be noted in Economics (-0.87%), Management (-0.33%), and Miscellaneous (-10.62%). For other study programs, the share of Bachelor's degree students increased.

The above analysis of the intensity of structural changes according to the absolute indices is mainly confirmed by estimates of individual relative indices (Table 3).

Table 3. Individual relative indices of structural changes in the distribution of Bachelor's degree students according to the most popular majors

Major	Chain Index / (Base Index)				
	2014	2015	2016	2017	2018
Economics .1	1.15 (1.15)	0.73 (0.84)	1.36 (1.15)	0.90 (1.03)	0.90 (0.92)
Law .2	0.72 (0.72)	1.37 (0.99)	1.42 (1.41)	0.96 (1.35)	0.92 (1.25)
Management .3	0.70 (0.70)	1.30 (0.91)	1.31 (1.19)	0.87 (1.04)	0.91 (0.95)
Teacher Training .4	0.76 (0.76)	1.02 (0.78)	1.55 (1.21)	1.00 (1.21)	1.91 (2.32)
Civil Engineering .5	0.71 (0.71)	1.50 (1.07)	1.52 (1.62)	1.01 (1.63)	0.99 (1.61)
Government and Municipal Administration .6	0.75 (0.75)	1.45 (1.08)	1.46 (1.58)	0.96 (1.52)	0.95 (1.45)
Power and Electrical Engineering .7	0.71 (0.71)	1.55 (1.11)	1.56 (1.73)	1.04 (1.80)	1.04 (1.87)
Psychology and Teacher Training .8	0.77 (0.77)	1.49 (1.15)	1.49 (1.71)	0.97 (1.65)	1.01 (1.67)
Miscellaneous	1.09 (1.09)	0.96 (1.04)	0.78 (0.81)	1.06 (0.86)	0.97 (0.83)

The largest increase in the share of Bachelor's degree students in 2018 was determined in Teacher Training (by a factor of 2.32), Power and Electrical Engineering (by a factor of 1.87), Psychology and Teacher Training (by a factor of 1.67), and Civil Engineering (by a factor of 1.61). Thus, it can be concluded that with regard to the

Bachelor's degree study programs, a structural shift towards the growth of pedagogical and engineering education occurred.

Table 4 shows the distribution of students according to the most popular majors within the long first degree programs.

Table 4. The structure of student distribution according to the most popular majors within the long first degree study programs in 2013-2018, %

Major	2013	2014	2015	2016	2017	2018
Law .1	9.03	5.86	3.16	0.20	0.02	0.00
Finance and Credit .2	4.82	3.75	1.90	0.08	0.00	0.00
Corporate Management .3	4.57	3.69	2.05	0.14	0.01	0.00
Economics and Management .4	4.39	3.81	1.98	0.07	0.00	0.00
Accounting, Analysis and Audit .5	3.20	2.28	1.19	0.08	0.00	0.00
Medical Business .6	3.98	7.94	11.44	20.58	21.40	21.75
Government and Municipal Administration .7	2.36	2.02	1.10	0.09	0.00	0.00
Industrial and Civil Engineering .8	1.25	1.15	0.66	0.03	0.00	0.00
Economic Security .9	0.52	1.62	3.63	6.38	6.95	7.02
Dentistry .10	0.74	0.51	3.58	5.64	0.0	5.77
Miscellaneous	65.14	67.37	69.31	66.71	71.62	65.46
Total	100	100	100	100	100	100

Source: (Ministry of Science and Higher Education of the Russian Federation, 2019)

Using the data from Table 4, let us calculate the linear coefficients of absolute structural changes: $L_{2014/2013} = 1.32$, $L_{2015/2014} = 1.91$, $L_{2016/2015} = 2.54$, $L_{2017/2016} = 1.15$, $L_{2018/2017} = 1.12$. Since 2015, the dynamics of coefficient values show a tendency towards a decrease in the scale of structural changes in the distribution of students among the long first degree programs. The most significant structural changes were recorded in 2016 as compared to 2015. Thus, in 2016, the share of Humanities degree students (Law; Economics and Management; Finance and Credit; Corporate Management; Accounting, Analysis and Audit; Government and Municipal Administration) significantly decreased. At the same time, the share of students enrolled in the Medical Business program increased from 7.94% in 2014 to 11.44% in 2015 and 20.58% in 2016. The emphasis in Teacher Training also changed –

students began choosing such majors as Economic Security (3.63%), Dentistry (3.58%), etc. In 2016, the share of students enrolled in the Pediatrics (6.13%), Customs (5.68%), Dentistry (5.64%), Pharmacy (4.13%), Veterinary Medicine (3.86%), Mining Engineering (3.56%), Railway Operation (2.59%), Railway Rolling Stock (2.54%) study programs increased. In previous years (2013-2015), the share of students studying these majors did not exceed 1%. By 2018, humanitarian and economic programs (Law, Finance and Credit, Corporate Management), which had been popular in 2013, dropped practically to zero.

The absolute chain and base structural changes in the distribution of the long first degree students are presented in Table 5.

Table 5. The absolute chain and base indices of structural changes in the distribution of long first degree students

Major	Chain Index / (Base Index)				
	2014	2015	2016	2017	2018
Law .1	-3.17 (-3.17)	-2.7 (-5.87)	-2.96 (-8.83)	-0.18 (-9.01)	-0.02 (-9.03)
Finance and Credit .2	-1.07 (-1.07)	-1.85 (-2.92)	-1.82 (-4.74)	-0.08 (-4.82)	0.00 (-4.82)
Corporate Management .3	-0.88 (-0.88)	-1.64 (-2.52)	-1.91 (-4.43)	-0.13 (-4.56)	-0.01 (-4.57)
Economics and Management .4	-0.58 (-0.58)	-1.83 (-2.41)	-1.91 (-4.32)	-0.07 (-4.39)	0.00 (-4.39)
Accounting, Analysis and Audit .5	-0.92 (-0.92)	-1.09 (-2.01)	-1.11 (-3.12)	-0.08 (-3.20)	0.00 (-3.2)
Medical Business .6	3.96 (3.96)	3.50 (7.46)	9.14 (16.6)	0.82 (17.42)	0.35 (17.77)
Government and Municipal Administration .7	-0.34 (-0.34)	-0.92 (-1.26)	-1.01 (-2.27)	-0.09 (-2.36)	0.00 (-2.36)
Industrial and Civil Engineering .8	-0.1 (-0.1)	-0.49 (-0.59)	-0.63 (-1.22)	-0.03 (-1.25)	0.00 (-1.25)
Economic Security .9	1.1 (1.1)	2.01 (3.11)	2.75 (5.86)	0.57 (6.43)	0.07 (6.50)
Dentistry .10	-0.23 (-0.23)	3.07 (2.84)	2.06 (4.9)	-5.64 (-0.74)	5.77 (5.03)
Miscellaneous	2.23 (2.23)	1.94 (4.17)	-2.60 (1.57)	4.91 (6.48)	-6.16 (0.32)

In 2018, as compared to 2017, there was a decrease in the share of long first degree students studying Law (by 0.02%), Corporate Management (by 0.01%), and Miscellaneous (by 6.16%). An increase in the share of long first degree students was noted for all other majors. In 2018, as compared to 2013, the most intensive decrease in the share of long first degree students was noted in Law (by 9.03%), Finance and Credit

(by 4.82%), Corporate Management (by 4.57%), Accounting, Analysis and Audit (by 3.2%). The greatest growth was recorded for such study programs as Medical Business (by 17.7%), Economic Security (6.5%), and Dentistry (5.03%). The intensity of structural changes is confirmed by individual relative indices (Table 6).

Table 6. The individual relative chain and base structural changes in the distribution of students studying under the long first degree programs

Major	Chain Index / (Base Index)				
	2014	2015	2016	2017	2018
Law .1	0.65 (0.65)	0.35 (0.35)	0.06 (0.02)	0.10 (0.00)	0.00 (0.00)
Finance and Credit .2	0.78 (0.78)	0.39 (0.39)	0.04 (0.02)	0.00 (0.00)	- (0.00)
Corporate Management .3	0.81 (0.81)	0.45 (0.45)	0.07 (0.03)	0.07 (0.00)	0.00 (0.00)
Economics and Management .4	0.87 (0.87)	0.45 (0.45)	0.04 (0.02)	0.00 (0.00)	- (0.00)
Accounting, Analysis and Audit .5	0.71 (0.71)	0.37 (0.37)	0.07 (0.03)	0.00 (0.00)	- (0.00)
Medical Business .6	1.99 (1.99)	2.87 (2.87)	1.80 (5.17)	1.040 (5.38)	1.016 (5.46)
Government and Municipal Administration .7	0.86 (0.86)	0.47 (0.47)	0.08 (0.04)	0.00 (0.00)	- (0.00)
Industrial and Civil Engineering .8	0.92 (0.92)	0.53 (0.53)	0.05 (0.02)	0.00 (0.00)	- (0.00)
Economic Security .9	3.12 (3.12)	6.98 (6.98)	1.76 (12.27)	1.09 (13.37)	1.01 (13.5)
Dentistry .10	0.69 (0.69)	4.84 (4.84)	1.58 (7.62)	0 (0.00)	- (7.80)
Miscellaneous	1.03 (1.03)	1.06 (1.06)	0.96 (1.02)	1.074 (1.10)	0.914 (1.00)

In 2018, the largest increase in the share of long first degree students as compared to 2017 was observed for the study programs in Medical Business and Economic Security. For 5 years, the structure of long first degree students changed significantly: Economic Security (by a factor of 13.5), Dentistry (by a factor of 7.8), and Medical Business (by a factor of 5.46). This is due to the fact that these majors remain in the profile of

long first degree training while other majors are being gradually canceled and transferred to the format of Bachelor's and Master's degree programs.

Next, let us consider the structure of training students under Master's degree programs (Table 7).

Table 7. The structure of student distribution according to the most popular majors within the Master's degree study programs in 2013-2018, %

Major	2013	2014	2015	2016	2017	2018
Law .1	10.40	10.30	11.55	13.53	14.01	13.71
Management .2	9.24	7.74	6.82	6.66	5.91	5.54
Economics .3	8.97	8.22	8.69	9.39	8.96	7.94
Teacher Training .4	7.04	7.74	6.87	7.53	7.83	8.33
Government and Municipal Administration .5	3.07	2.92	3.14	3.35	3.49	3.42
Civil Engineering .6	2.19	1.30	3.04	3.76	3.88	4.05
Informatics and Computing .7	2.17	0.96	1.65	1.75	1.72	1.69
Psychology .8	2.11	2.18	1.92	1.95	1.92	2.21
Psychology and Teacher Training .9	1.91	1.03	2.08	2.11	2.04	2.07
Power and Electrical Engineering .10	1.84	0.89	1.67	1.90	1.97	2.06
Finance and Credit .11	1.78	1.06	2.26	2.36	2.28	1.99
Miscellaneous	49.28	55.66	50.31	45.71	45.99	46.99
Total	100	100	100	100	100	100

Table 7 shows that in 2013-2018, humanitarian study programs were mainly the most popular majors among Master's degree students. The following changes occurred in the structure for the 2013-2018 period: the share of students in Management (-3.7%), Economics (-1.03%), Informatics and Computing (-0.48%) decreased; while the share of students studying Law (+3.31%), Teacher Training (+1.29%), Government and Municipal Administration (+0.35%), Civil Engineering (+1.86%), Psychology (+0.1%), Psychology and Teacher Training (+0.16%), Power and Electrical Engineering (+0.22%), and Finance and Credit (+0.21%) increased.

According to Table 7, let us determine the linear coefficient of absolute structural changes: $L_{2014/2013} = 1.19$, $L_{2015/2014} = 1.23$, $L_{2016/2015} = 0.79$, $L_{2017/2016} = 0.23$, $L_{2018/2017} = 0.35$. The maximum value of structural changes was observed in 2015 as compared to 2014. There is a steady tendency towards a decrease in structural changes in the distribution of students according to study programs.

The absolute chain and base coefficients of structural changes in the distribution of Master's degree students are presented in Table 8.

Table 8. The absolute chain and base indices of structural changes in the distribution of Master's degree students

Major	Chain Index / (Base Index)				
	2014	2015	2016	2017	2018
Law .1	-0.10 (-0.10)	1.25 (1.15)	1.98 (3.13)	0.48 (3.61)	-0.30 (3.31)
Management .2	-1.50 (-1.50)	-0.92 (-2.42)	-0.16 (-2.58)	-0.75 (-3.33)	-0.37 (-3.7)
Economics .3	-0.75 (-0.75)	0.47 (-0.28)	0.70 (0.42)	-0.43 (-0.01)	-1.02 (-1.03)
Teacher Training .4	0.70 (0.70)	-0.87 (-0.17)	0.66 (0.49)	0.30 (0.79)	0.50 (1.29)
Government and Municipal Administration .5	-0.15 (-0.15)	0.22 (0.07)	0.21 (0.28)	0.14 (0.42)	-0.07 (0.35)
Civil Engineering .6	-0.89 (-0.89)	1.74 (0.85)	0.72 (1.57)	0.12 (1.69)	0.17 (1.86)
Informatics and Computing .7	-1.21 (-1.21)	0.69 (-0.52)	0.10 (-0.42)	-0.03 (-0.45)	-0.03 (-0.48)
Psychology .8	0.07 (0.07)	-0.26 (-0.19)	0.03 (-0.16)	-0.03 (-0.19)	0.29 (0.1)
Psychology and Teacher Training .9	-0.88 (-0.88)	1.05 (0.17)	0.03 (0.20)	-0.07 (0.13)	0.03 (0.16)
Power and Electrical Engineering .10	-0.95 (-0.95)	0.78 (-0.17)	0.23 (0.06)	0.07 (0.13)	0.09 (0.22)
Finance and Credit .11	-0.72 (-0.72)	1.20 (0.48)	0.10 (0.58)	-0.08 (0.50)	-0.29 (0.21)
Miscellaneous	6.38 (6.38)	-5.35 (1.03)	-4.6 (-3.57)	0.28 (-3.29)	1.00 (-2.29)

In 2018, there was a decrease in the share of Master's degree students studying Economics (-1.02%), Management (-0.37%), Law (-0.30%), Finance and Credit (-0.29%), Government and Municipal Administration (-0.07%), Informatics and Computing (-0.03%). For the period under review, a decrease in the share of students

studying Management (-3.7%), Economics (-1.03%), Informatics and Computing (-0.48%), and Miscellaneous (-2.29%) was observed. Table 9 presents the calculation of individual relative chain and base indices of structural changes in the distribution of students studying under the Master's degree programs.

Table 9. The individual relative chain and base indices of structural changes in the distribution of Master's degree students

Major	Chain Index / (Base Index)				
	2014	2015	2016	2017	2018
Law .1	0.99 (0.99)	1.25 (1.11)	1.17 (1.30)	1.04 (1.35)	0.98 (1.32)
Management .2	0.84 (0.84)	-0.92 (0.74)	0.98 (0.72)	0.89 (0.64)	0.94 (0.60)
Economics .3	0.92 (0.92)	0.47 (0.97)	1.08 (1.05)	0.95 (1.00)	0.89 (0.89)
Teacher Training .4	1.10 (1.10)	-0.87 (0.98)	1.10 (1.07)	1.04 (1.11)	1.06 (1.18)
Government and Municipal Administration .5	0.95 (0.95)	0.22 (1.02)	1.07 (1.09)	1.04 (1.14)	0.98 (1.11)
Civil Engineering .6	0.59 (0.59)	1.74 (1.39)	1.24 (1.72)	1.03 (1.77)	1.04 (1.85)
Informatics and Computing .7	0.44 (0.44)	0.69 (0.76)	1.06 (0.81)	0.98 (0.79)	0.98 (0.78)
Psychology .8	1.03 (1.03)	-0.26 (0.91)	1.02 (0.92)	0.98 (0.91)	1.15 (1.05)
Psychology and Teacher Training .9	0.54 (0.54)	1.05 (1.09)	1.01 (1.10)	0.97 (1.07)	1.01 (1.08)
Power and Electrical Engineering .10	0.48 (0.48)	0.78 (0.91)	1.14 (1.03)	1.04 (1.07)	1.05 (1.12)
Finance and Credit .11	0.60 (0.60)	1.2 (1.27)	1.04 (1.33)	0.97 (1.28)	0.87 (1.12)
Miscellaneous	1.13 (1.13)	-5.35 (1.02)	0.91 (0.93)	1.01 (0.93)	1.02 (0.95)

As seen from Table 9, in 2018, as compared to 2017, there was an increase in the share of Master's degree students studying Psychology (by a factor of 1.15), Teacher Training (by a factor of 1.06), Civil Engineering (by a factor of 1.04), Psychology and Teacher Training (by a factor of 1.01), and Miscellaneous (by a factor of 1.02). In 2018, as compared to 2013, an increase in the share of Master's degree students can be noted for the majors in Civil Engineering (by a factor of 1.82), Law (by a factor of 1.32), Teacher Training (by a factor of 1.18), Finance and Credit (by a factor of 1.12), Power and Electrical Engineering (by a factor of 1.12), Government and Municipal Administration (by a factor of 1.11), and Psychology (by a factor of 1.05). Thus, in 2018, an increase in the share of Master's degree students was observed in study programs related to Teacher Training and Engineering.

Discussion

According to the latest data from the HeadHunter Group in Russia, more than 4 million resumes and about 670 thousand vacancies were posted. As can be seen, the supply in the labor market is many times higher than the demand (HeadHunter Group, 2019). The digitalization of various fields

of activity is one of the modern priorities. As a result, employers no longer need new employees. This situation is illustrated by a decrease in the number of vacancies in such areas as Banking (-13.9%), Insurance (-7.7%) and Accounting (-5.5%) (Perekrest, 2019). The number of unemployed in these areas prevails over the number of vacancies declared by employers with employment services. At the same time, a significant shortage of representatives of technical professions is recorded in the labor market (The Ministry of Labor Names the Deficit and Oversupplied Professions, 2019).

According to the Federal State Statistics Service, in 2015-2017, out of 2627.5 thousand graduates of higher education institutions, 2447 thousand persons were employed and 180.6 thousand persons were unemployed. The employment rate of university graduates is about 84% (Federal State Statistics Service, 2019).

The highest degree of compliance (>70%) of the work of employed graduates with an academic degree, who graduated from a university in the period of 2015 to 2017, is observed for such majors as Mathematics and Mechanics, Computer and Information Sciences, Chemistry,

Informatics and Computing, Information Security, Photonics, Tool Engineering, Optical and Biotechnical Systems and Technologies, Electrical and Thermal Energy, Nuclear Energy and Technology, Aviation and Rocket and Space Equipment, Processes and Technology of Shipbuilding and Water Transportation, Clinical Medicine, Health Sciences and Preventive Medicine, Pharmacy, Veterinary Medicine, Law, Mass Media and Information and Librarianship, Education and Pedagogical Sciences, Fine and Applied Arts, Military Management, etc.

The least degree of conformity (<50%) between the work and academic degree is characteristic of Light Industry, Agriculture, Forestry and Fishery, Sociology and Social Work, and Political Sciences. Graduates of these study programs cannot or do not want to work in the related areas due to a lack of attractive vacancies or due to the high level of labor competition.

Conclusions

The study has revealed that both Bachelor's and Master's degree students choose humanitarian majors as the most popular study programs. The said area includes such academic programs as Law, Management, Economics, Teacher Training, Government and Municipal Administration, Civil Engineering, Informatics and Computing, and Psychology. Due to the characteristics of the higher education system in Russia, the most in-demand long first degree programs in 2018 were Medical Business, Economic Security, Pediatrics, Dentistry, Pharmacy, Veterinary Medicine, Mining Engineering, and Railway Operation. The data obtained made it possible to trace the progressive change in the structure of training under the long first degree programs towards the growth in the Medicine major. Structural changes in the Bachelor's and Master's degree programs have occurred in terms of increasing the share of academic and engineering programs. For the period from 2013 to 2018, the structure of long first degree students changed significantly: Economic Security (by a factor of 13.5), Dentistry (by a factor of 7.8), and Medical Business (by a factor of 5.46). An intensive decrease in the share of long first degree students was noted in Law; Finance and Credit; Corporate Management; and Accounting, Analysis and Audit.

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