Competitiveness assessment of Russian universities under the conditions of globalisation

Leonid Bragin, Galina Selyanskaya, Irina Stukalova

Plekhanov Russian University of Economics, Stremyanny per. 36, Moscow, 117997, Russian Federation

Abstract. The article is dedicated to the problems of competitiveness assessment of Russian universities under the conditions of globalisation. The authors have studied different methodical and methodological approaches to the ranking of universities. The authors have conducted the comparative analysis of the ratings of leading Russian universities using QS World University Rankings methodology; the analysis of the national monitoring of higher educational establishments effectiveness was also conducted.
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Introduction

In the XXI century the rivalry between sates spreads its influence on the education and science, which becomes strategically important for the economic growth and development of human potential. In this regard the problem of global competitive growth of the Russian education system in the whole and its separate subjects is acquiring of critical importance. This research was supported by grant № 2014/162 “Competitiveness of the Russian universities in the conditions of globalization of educational space” provided by the Ministry of Education and Science of Russian Federation.

As a *scientific hypothesis* the authors took the suggestion that within the framework of the global educational space the single-type principles and single-vector indices should be the bases for the methodology of national and global university ratings formation, which show the level of their competitiveness.

The *aim* of this article is the carrying out of the comparative analysis of the methodology and criteria for the global and national educational ratings which allow defining managing directions and tools of the Russian universities competitiveness for the purpose of their entering the global elite.

This article has the following *logical structure*: firstly, the article studies methodological approaches to the understanding of processes of globalisation i the sphere of education; secondly, the article reveals key problems of globalisation in the sphere of education; thirdly, the article defines the interconnection between the national competitiveness and the system of a certain state; fourthly, the authors have conducted the comparative analysis of methodology of global and national educational ratings; fifthly, final conclusions are drawn.

Methods of investigation used by the authors while preparing this article: deduction, comparative, structural-logical and correlation analysis.

Globalisation of national educational systems

On the modern stage of development we can observe deep changes of the whole system of international relationships. Globalisation becomes their peculiar feature. Globalisation is understood as a brand new process (and phenomenon) of internationalization of all the spheres of social-economic life under the conditions of the modern stage of international division of labour taking place on the basis of information-computer technologies [1, pp: 180]. Being under the pressure of transnational corporations the economic relationships have already rearranged themselves to the needs of globalisation. It should be noted that this process had irreversible character due to the strong orientation of the states to the creation of different conglomerate formations (unions, international organisations). [2, pp: 37-41]. It was the education that prepared the fundamental potential for globalisation development. Education is, on the one hand, the factor which structures the state's society depending on the goals set by the society, and, on the other hand, it is the factor which determines the quality and structure of the labour potential.

In the wide sense the educational globalisation is understood as the process of the creation of the unique global uniform system that eliminates differences between the educational systems which are included in it. In the narrow sense educational globalisation is the process of the greater adaptation of educational system to the needs of the global market economy. Growing dependence of the latter on the knowledge economy forms the idea of creation of a unique world educational system which is based on the unique educational standards.

Educational activity of all the groups of people becomes the main means for development and reproduction, i. e. a permanently studying society is being formed. A demand for education, especially for the higher one rises rapidly. It is mass proportions. The forms of education are fundamentally changing: open and remote education is being actively developed. Globalisation leads to the fact that the educational sphere itself is being considered as a sphere of business, funds investment and provision of fee-based services [3, pp; 1469-1472; 4, pp. 290-305; 5, pp. 1-40].

Key problems of globalisation in the sphere of education

Non-involvement of the education itself into the process of globalisation, its independence and privacy are phenomenal. The system of directions for national educational systems modernisation was formed only during the last decade, in that time there appeared a range of scientific articles dedicated to the problems of national educational systems competitiveness in the conditions of the globalisation. Generalising the diversity of investigators' opinions one can point out a range of problems, solving of which is the beneficial co-existence of the national educational system in Russia. Among these are the formation of the internationalization strategy by the subjects of educational system, development of the transnational education, providing of the international quality, development of the regional and interregional collaboration, implementation of innovative educational informative and communicative technologies and creating of virtual universities on their basis, as well as the problems of equality and affordability of education. [6, 7, 8, 9, 10].

Meanwhile, we think that the key problem of globalisation is the understanding and ability of evaluating the degree of penetration into the national educational system within which globalisation is a creative process that allows increasing national competitiveness. It is important to point out that this principle is proclaimed in the Federal law "About education in the Russian federation" No. 273-ФЗ of December 29, 2012, which defines that one of the most important principles of state policy formation in the sphere of education is the creation of favourable conditions for integration of the Russian educational system into the educational systems of other states on the equal and mutually beneficial basis.

National competitiveness and national educational system

Annual assessment of the world competitiveness of the states was carried out by the World economic forum. In 2013 Russia took the 64 place [11] and improved its position due to the macro-economic factors (low level of the state debt and preserving budget surplus). Under the modern conditions the competitiveness of the national educational system is closely connected to the national competitiveness. This statement is fully complied with the Federal target-oriented programme of education development up to 2015 which says that the main condition for increasing of economic and political role of Russia and improving of well-being of its people is the providing of the state's competitiveness increase. The main advantage of the highly-developed state is connected with its human potential which is mostly determined by the education. The aim of the education modernisation policy in the medium term is to provide the competitiveness of Russia on the world level. In this regard the competitiveness of the Russian educational system in the whole and separate universities as the components of this system are of great interest.

Comparative analysis of the methodology of global and national educational ratings

During the last years one can observe the growing influence of universities' global ratings on the national educational systems development. Global competitiveness of the educational market participants can only be implemented by those universities which come across the independent quality assessment (ratings) and are ready to take part in them. Ratings become an instrument of the social and world quality assessment of scientific-educational activity of the Russian universities [12, pp. 15-34; 13, pp. 219-231]. In the USA, Europe and in the developing countries such ratings have already acquired the features of the global guidelines for improvement of universities' competitiveness. Since the Russian universities were set the task to become recognizable players on the international educational market, their participation in the global ratings becomes a comprehensive and necessary condition for participation in the competition of universities i the international education space.

The most respected international ranking systems are ARWU (Academic Ranking of World Universities, Shanghai Jiao Tong University Ranking); THE (The Times Higher Education World University Rankings) world universities ranking Times and QS World University Rankings, which is generated by the Quacquarelli Symonds company every year. QS World University Rankings was chosen by the Russian specialists of educational problems as the basic one for the positioning of national universities.

While composing international rating of world universities QS the universities are assessed

according to 6 criteria (in descending order of priority): 1) academic reputation – comprises 40% of the total value; 2) employer reputation – comprises 10% of the total value; 3) citations per faculty – 20%; 4) faculty student ratio – 20%; 5) proportion of international students – 5%; 6) proportion of international c– 5%.

In 2013 Quacquarelli Symonds Company represented the results of the annual ranking. However only one Russian higher educational establishment - Lomonosov Moscow State University - was in top-200 of this ranking. Altogether there were 18 Russian universities in the ranking. However, it should be noted that the Russian universities have quite competitive indices of faculty student ratio, and the weakest positions were citations per faculty and proportion of international faculty.

Different national ratings play an important role for the universities today: School of higher economy and RIA Novosti rating which is formed on the basis of the Unified state exam for school leavers of the first year of education; "Delovaya Rossia" company rating, which is based on the graduates' being-in-demand on the labour market and some others.

Besides starting from 2012 the effectiveness evaluation system of universities activity, developed by the Ministry of Education and Science of the Russian Federation, is in force. This system was statutory fixed in the Federal law of December 29, 2012, # 273-FZ "About education in the Russian federation", Government Executive Order of the Russian federation of December 30, 2012 # 2620-p "Amendments in the branches of social sphere aimed at improvement of education and science effectiveness" and in the Decree of the Government of the Russian Federation of August 5, 2013 # 662 "About the monitoring of the educational system". The main criteria for higher educational establishments assessment are the following: 1) educational activity - average grade of the Unified state exam for school leavers of the first year of education; 2) research activity - number of means for research and design and development activities per faculty; 3) international activity - number of foreign students in the whole number of the students of the higher educational establishment; 4) financial and economic activity - incomes per faculty; 5) infrastructure capacity - total area of the academic rooms and infrastructure per student; 6) employment- ratio of number of university graduates who do not address to the employment offices during the first year after graduation to the total number of graduates number. We consider it possible to use effectiveness monitoring indices for creating universities' rankings. The authors have conducted the comparative analysis of methodology and content of criteria of the global QS World University Rankings and national rating, which is based on the monitoring system of higher educational establishments' effectiveness.

On the first stage of investigation we conducted the structural-logical analysis of ratings, which allowed us to draw a conclusion on the fact that some of the indices-criteria of the above mentioned rankings have direct analogies, their interconnections are indicated with solid lines on fig.1. Interconnections of other indices-criteria have mediate character; they are indicated with dashed line on the figure. Generally the analysis allowed us to draw a conclusion on the high degree of vector coincidence of the comparing ratings.

During the second stage of investigation the authors used instrumental methods of analysis, - correlation analysis in particular. The investigation was conducted through the example of the ten leading Russian universities. The following requirements were the criteria for choosing educational establishments. The chosen higher educational establishments must have the "university" legal status and train bachelors, masters and PhD students, as well as conduct scientific investigations in a wide range of qualification directions and professions. The universities must be included in the top-15 of the Russian leading educational establishments except Moscow and St. Petersburg State Universities, which have won governmental target investments for increasing their global competitiveness and solving the task of five Russian including

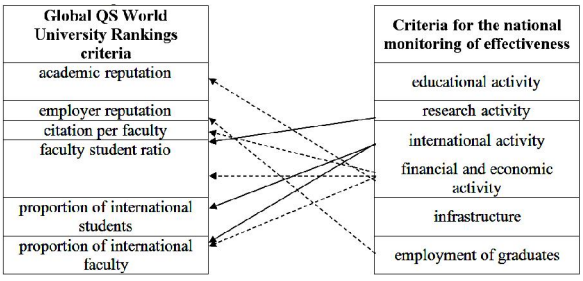

Figure 1. Interconnection of the criteria of the global QS World University Rankings and national monitoring of effectiveness

Source: authors' studies of universities in the first hundred of the world educational rankings by 2020. The funds in the amount of 35 milliard roubles will be sent during the period from 2014 to 2016 for increasing of competitiveness of the Russian educational establishments and creating conditions for their entering international top-100 of the universities

according to QS World University Rankings. The last third criterion: the chosen educational establishments must be participants of the QS ranking. The information about the universities chosen for the investigation is shown in Table 1.

Table 1. Indices of universities activity assessment

Nominal code of a university	Name of university
B1	Novosibirsk National Research University (State University)
B2	Moscow Institute for Physics and Technology (State University)
B3	St. Petersburg Polytechnical University
B4	Research University Higher School of Economics
B5	Ural Federal University named after the first President of Russia B.N. Yeltsin
B6	National Research Tomsk Polytechnic University
B7	National Research Tomsk State University
B8	Kazan (Volga region) Federal University
B9	Far Eastern Federal Uiversity
B10	Lobachevsky State University of Nizhni Novgorod

Nominal code of university and its serial number is selected on the basis of mentioning of 10 chosen universities in the QS ranking for 2013 (ranging from item 352 to item 701+).

Step 1. Conduct correlative analysis of the indices of effectiveness monitoring of the above mentioned universities. Fill in the matrix of the assessment indices of universities activity (Table 2) and rank them. Rank 1 is assigned to the university which has the biggest value of the index.

If the values of an index for several universities have similar quantitative assessment, their rank is to be equal to the arithmetic mean of the relative position numbers [14, pp: 320]. After the calculation of the connected ranks a normalized rank matrix is formed. Final rank of a university is determined on the basis of the sum of normalized ranks for all indices - rank 1 is assigned to the university which has the least sum of normalized ranks (Table 3).

Table 2. Matrix of assessment indices of universities activity

Indicators / Higher educational establishment	Full-scale values of indices for universities					
	Index No. 1	Index No. 2	Index No. 3	Index No. 4	Index No. 5	Index No. 6
B1	79.38	597.00	6.24	4223.26	10.56	99.767
B2	91.99	1124.63	9.78	3921.94	14.58	100.000
B3	73.82	742.16	10.08	2746.78	13.27	99.647
B4	88.10	902.13	3.62	5024.46	7.13	99.876
B5	68.11	200.36	2.42	1993.51	9.87	99.184
B6	74.76	864.51	18.24	3772.85	15.02	98.707
B7	67.39	836.37	10.85	3218.93	12.58	97.494
B8	71.05	205.79	3.45	3222.85	10.20	98.389
B9	62.88	209.79	2.26	3662.02	29.66	96.962
B10	68.47	441.64	1.89	2377.25	8.74	98.742

Source: data by the Ministry of Education and Science of the Russian Federation

Table 3. Normalized matrix of the rank assessments of universities activity

University	Normalized rank assessment of indices for universities						Sum of ranks	Final rank
	Index No. 1	Index No. 2	Index No. 3	Index No. 4	Index No. 5	Index No. 6		
B1	3.0	6.0	5.0	2.0	6.0	3.0	25.0	4
B2	1.0	1.0	4.0	3.0	3.0	1.0	13.0	1
B3	5.0	5.0	3.0	8.0	4.0	4.0	29.0	5
B4	2.0	2.0	6.0	1.0	10.0	2.0	23.0	3
B5	8.0	10.0	8.0	10.0	8.0	5.0	49.0	10
B6	4.0	3.0	1.0	4.0	2.0	7.0	21.0	2
B7	9.0	4.0	2.0	7.0	5.0	9.0	36.0	6
B8	6.0	9.0	7.0	6.0	7.0	8.0	43.0	7
B9	10.0	8.0	9.0	5.0	1.0	10.0	43.0	7
B10	7.0	7.0	10.0	9.0	9.0	6.0	48.0	9

Source: authors' calculations

Using the acquired result of the rank assessments of the universities one can evaluate mutual influence of indices, included in the assessment system, through the determination of closeness of indices connection. In order to do it we shall define the rank multiple correlation coefficient W (concordance coefficient) [14, pp: 326]. In this case concordance coefficient is W=0.4761. According to the Cheddock scale the connection of the assessed indices can be characterised as moderate. According to E.P. Golubkov scale for correlation assessment this connection can be considered as weak one [15]. In order to evaluate the significance of the concordance coefficient W, we shall calculate χ^2 Pirson criterion. Rated value of the Pirson criterion is χ_p^2=25.71. Table value of χ^2 Pirson criterion for the number of degrees of freedom k=9 with the set level of significance (tolerance probability of a mistake) α=0.05 is χ_T^2=16.919. Since the rated value of the coefficient χ_p^2 is bigger than the table one χ_T^2, the acquired concordance coefficient W - is not a random value. This fact proves that the index system of assessments of universities activity is characterized by the sufficient independence of the indices, included in it, and the acquired results can be used for the further investigations. Let us calculate the significance coefficient and relative sufficiency of the acquired rank assessments of the universities (Table 4).

Table 4. Distribution of universities according to the degree of significance

Place of a university	Number of a university	Sum of ranking assessments of universities	Significance coefficient	Relstive significance coefficient	Relative weight
1	2	13.0	0.1741	0.2487	1.5161
2	6	21.0	0.1444	0.2063	1.2581
3	4	23.0	0.1370	0.1958	1.1935
4	1	25.0	0.1296	0.1852	1.1290
5	3	29.0	0.1148	0.1640	1.0000
6	7	36.0	0.0889		
7	8	43.0	0.0630		
7	9	43.0	0.0630		
9	10	48.0	0.0444		
10	5	49.0	0.0407		
Average rank-factor Tcp		33.0			

Source: authors' calculations

Average rank-factor Tcp equals to 33.0. Using the values of sums of universities rank assessments and the average rank-factor we can build a ranking diagram, which allows us graphically depict the weight of every rank (Fig. 2).

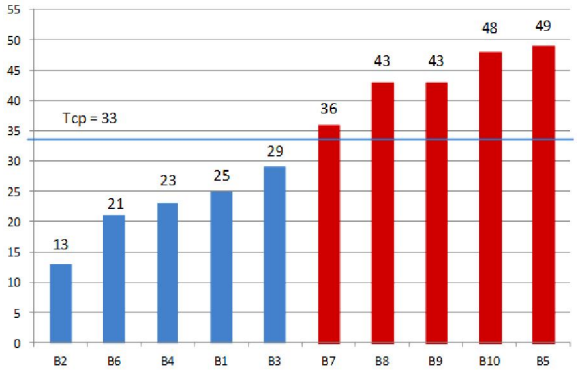

Fig. 2. Universities ranking diagram

Thus, the most effective are those universities which rank sum is less or equal to Tcp; these are B1, B2, B3, B4 and B6. The weakest ones are B5, B8, B9 and B10 universities.

Step 2. On this stage of investigation we tried to define the relationship between the acquired final rank assessment of universities and the ranks, acquired by these universities according to the data of QS ranking. Let us fill in the table of normalized ranking assessments for the mentioned indices (Table 5).

Concordance coefficient of the mentioned factors equals to W=0.8161, which, according to the Cheddoch and E. P. Golubkov scale, can be characterised as the high connection of the assessing parameters. Rated value of Pirson criterion χ_p^2=14.69 is equal to the table value χ_T^2=14.684 for the number of degrees of freedom k=9 at the tolerance probability of mistake α=0.1, which proves the significance of the concordance coefficient and speaks for the unique dependence of the factors under consideration - a place which is acquired by a university in the QS rating and a place, acquired in the process of universities ranking using the national methodology of monitoring of effectiveness of higher educational establishments activity. This conclusion allowed us to prove the rightfulness of the scientific hypothesis, developed by the authors, by means of experiment.

Table 5. Normalized matrix of universities rank assessment for two indices (QS ranking and final rank according to Table 3)

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Final rank (Table 2)	4.0	1.0	5.0	3.0	10.0	2.0	6.0	7.5	7.5	9.0
Rank according to the QS rating	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
Sum of ranks	5.0	3.0	8.0	7.0	15.0	8.0	13.0	15.5	16.5	19.0
Final rank	2	1	4	3	7	4	6	8	9	10

Source: authors' calculations

Table 6. Distribution of universities according to the degree of significance for two factors (QS ranking and final rank according to Table 3)

Place of university	Number of a university	Sum of ranking assessments of universities	Significance coefficient	Relative significance coefficient	Relative weight
1	2	3.0	0.1889	0.2464	1.4167
2	1	5.0	0.1667	0.2174	1.2500
3	4	7.0	0.1444	0.1884	1.0833
4	3	8.0	0.1333	0.1739	1.0000
4	6	8.0	0.1333	0.1739	1.0000
6	7	13.0	0.0778		
7	5	15.0	0.0556		
8	8	15.5	0.0500		
9	9	16.5	0.0389		
10	10	19.0	0.0111		
Average rank-factor Tcp		11.0			

Source: authors' calculations

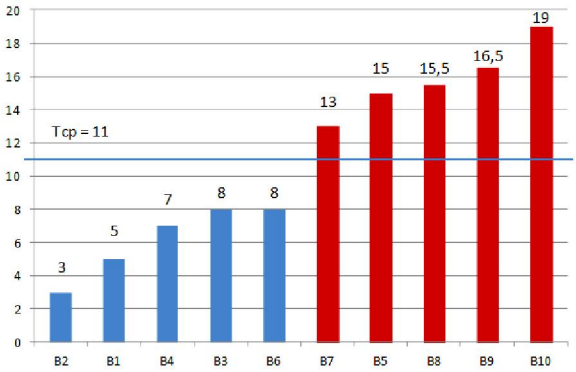

Fig. 3 - Universities ranking diagram for two factors (QS ranking and final rank according to Table 3)

Average rank-factor Tcp equals to 11.0. Using the values of sums of universities ranking assessments and the average rank-factor, we can build a ranking diagram for two indices (QS ranking and final rank according to Table 3). Using the acquired assessments, let us build a ranking diagram (Fig. 3).

Similar to the first case, we see that the most effective universities are B1, B2, B3, B4 and B6 and the weakest are - B5, B7, B8, B9 and B10.

Conclusions

It should be pointed out that the transformation of national educational systems is taking place under the modern conditions and in the context of imperatives of globalization and transfer to the knowledge economy.

Globalisation is an important problem for the higher education, since the model of the future educational system depends on the adequate implementation of globalisation and internationalisation elements in the process of education. Under the conditions of knowledge economy this fact can be placed on the same footing as the most important influencing factor of national competitiveness.

Within the framework of the global educational space the single-type principles and single-vector indices should be the bases for the methodology of national and global university ratings formation, which show the level of their competitiveness.

Corresponding Author:
Dr.Bragin Leonid
Plekhanov Russian University of Economics
Stremyanny per. 36, Moscow, 117997, Russian Federation

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