

“THE THREE UNIVERSITY MISSIONS” RANKING METHODOLOGY

The first draft of the Moscow International University Ranking methodology has been developed as a result of a wide public discussion with a total of over 100 collective contributors: universities, rector councils, expert associations, and rating agencies. The list of ranking criteria was submitted for consideration to the International Expert Council of Ranking comprised of 25 renowned tertiary education experts representing the USA, the UK, Brazil, China, India, South Africa, Iran, Italy, Belgium, Turkey, Poland, and Russia.

Expert discussions were continued after the pilot ranking had been released in December 2017. The ranking was widely discussed with the representatives of the academic community in Russia and abroad. Ranking presentations were held at more than 15 events in Belgium, Hungary, India, Japan etc.) As a result, we recognized the need to alter some of the ranking indicators and expand the list of the participating universities.

Shortlisted universities

The shortlist of the Moscow International University Ranking in 2018 aimed to provide the widest possible representation of the leading multi-profile universities all over the world so that the number of the universities representing a particular country correlated with the importance of the country in terms of global economy. Around 500 universities that achieved leading positions in global university rankings and/or national academic rankings listed in IREG Inventory of National Rankings were included in the evaluation list in 2018. In some cases the selection was carried out on the basis of number of the university's research publications from 2013 to 2016, as per the data from the analytics tool InCites built on the foundation of the scientific citation indexing service Web of Science. Furthermore, narrow-focused higher education institutions, i.e. those without educational programmes in at least two of 6 areas of knowledge according to the OECD classification, were excluded from consideration.

Changes in the system of criteria used

1. A new indicator was introduced: «University website reach.» The ratio of university website visitors to the total number of Internet users is evaluated. This evaluation is based on data collected from Alexa, one of the global leaders in web analytics.

2. The list of data sources for the criterion «University's followers in social media» has been expanded. The largest social networks (Facebook, VK, Sina Weibo) have been added to Twitter, which significantly expanded the communication coverage.

3. The weight coefficients for some indicators have been altered. The weight of the following criteria has been increased: «Wins in international student contests by students» (5% to 7%) and «Awards from the IREG List won by university academic staff and graduates» (5% to 6%). At the same time, the following criteria were found overestimated as per the feedback, and their weight has been reduced: «The number of university graduates who have a separate page dedicated to them on Wikipedia» (12% to 9%), «The number of views of the university's Wikipedia page» (2% to 1%), «Total pages of the university website» (4% to 3%), «Proportion of international students» (10% to 8%), «Field-weighted views impact (3% to 2%).

Information Sources

The ranking uses only objective criteria approved by the international experts. Reputation surveys are entirely excluded from consideration. The ranking is based on the open data available at the official websites of universities as well as data from independent global sources: Clarivate Analytics, data and metrics provider from InCites and Global Institutional Profiles Project (GIPP); Elsevier, owner of the bibliographic and abstract database Scopus; online platforms for mass education Coursera and edX; the universal multilingual Internet encyclopedia Wikipedia; search engines (Google, Yandex, Baidu); social networks (Facebook, Twitter, VK, Sina Weibo); the Alexa company; web portals of international student academic contests; websites of the academic awards from the IREG List of International Academic Awards.

Ranking Calculation

The overall weight of indicators per group is: 45% for Education, 25% for Research, and 30% for University and Society.

The university score reflecting its position relative to the competitors was calculated by each indicator. The calculation was conducted in two ways:

1. For the normalised indicators (citation impact and scientific publication views), the score of the participating universities was calculated according to the formula:

$$x_i = \frac{a_i - a_{min}}{(a_{max} - a_{min})},$$

where:

x_i – the score of the i -th indicator;

a_i – the value of the i -th indicator;

a_{max} – the maximum value of the i -th indicator;

a_{min} – the minimum value of the i -th indicator.

2. In cases where linear calculation was hardly applicable, indicator normalisation method was used instead. To be more specific, the Box-Cox transformation was used: one of the transformation methods was applied to the data having non-normal distribution to make the normal distribution law applicable.

The university scores for each ranking indicator were then multiplied by the corresponding weight coefficients. The weighted university scores in each of the indicators were then summarised:

$$f = \sum_{i=1}^{n_x} x_i v_i,$$

where:

f – the ranking score;

x_i – the score of the i -th indicator;

n_x – the number of ranking indicators;

v_i – the weight of the i -th indicator.

MOSCOW INTERNATIONAL UNIVERSITY RANKING "THE THREE UNIVERSITY MISSIONS" CRITERIA 2018

No.	Name	Parameters measured	Criterion weight, %	Criterion meaning and justification	Data source	Details
I. Criteria group: Education						
1.	Wins in International Student Contests by Students	Student competitiveness	7	Unlike common scientometric indicators, which measure achievements of university staff, the innovative criterion of the Moscow Ranking makes it possible to measure students' competitiveness. The criterion demonstrates the amount of knowledge, skills and competence students obtain, as well as their ability to use these resources to solve complex tasks. The number of winners of international student contests and other prestigious international contests cannot be high, nevertheless, the number of winners and receivers of prestigious contests can show in a focused way the effectiveness of education and university students' opportunities for breakthrough scientific research.	Websites of international contests	Personal and team wins in the 12 international student contests from 2013 to 2017 were calculated in a similar way as Olympic medal standings' (contest winners and awardees were considered). Each contest was given a weight depending on the number of countries covered (ACM ICPC, which brings together students from over 100 countries, has the maximum weight, 1.00; while NSUCRYPTO and Belgrade Business International Case Competition with participants from as few as 9 countries have a weight of 0.09). The weighted values were then summed.
2.	Proportion of international students in the total number of students	Attractiveness for international students	8	This indicator demonstrates the proportion of international students out of the total number of students and is widely used by existing academic rankings.	University and regulatory body websites	International intramural students of all programmes that lead to a degree of bachelor or master, who spent more than 3 months in the university in the particular year (the ratio is calculated to the total number of intramural students of all programmes that lead to a degree of bachelor, master, or equivalent ISCED-2011 Levels 6 & 7 degrees).
3.	University budget to student ratio	Financial resources	15	This criterion evaluates a university's financial wellbeing. The higher the indicator, the wider the range of the university's opportunities to implement the three main missions: education, scientific research, and contribution to society.	University and regulatory body websites	Due to the fact that the cost of products and services may vary significantly from country to country, the budget was converted into PPP defined by World Bank (or the OECD PPP in case the necessary value was not present). Intramural students of all programmes that lead to a degree of bachelor, master, and equivalent ISCED-2011 Levels 6 & 7 degrees were considered.
4.	Student to faculty ratio	Human resources	15	This indicator actually demonstrates the sufficiency of the university's human resources. The more faculty and research staff per student means that university staff can afford to pay more attention to each student, therefore resulting in better conditions in the university.	University and regulatory body websites	The academic staff value, which includes faculty staff and research staff, was calculated in full time equivalent. For the number of students, intramural students of all programmes that lead to a degree of bachelor, master, and equivalent ISCED-2011 Levels 6 & 7 degrees were considered.

Table (continued)

No.	Name	Parameters measured	Criterion weight, %	Criterion meaning and justification	Data source	Details
II. Criteria group: Research						
5.	Awards from the IREG list won by university academic staff and graduates	Outstanding scientific achievements	6	This metric is the developed approach proposed by the Shanghai ranking. Calculating the number of laureates of prestigious prizes to evaluate the scientific potential of the university is fundamentally correct. However, considering the Nobel Prizes and the Fields Medal significantly limits university evaluation opportunities. Therefore we used the IREG List of International Academic Awards, which includes world's 99 most prestigious scientific awards (providing the opportunity to prolong the prize list later).	Websites of international awards	Awards from the IREG List of International Academic Awards a university's staff and alumni won during the period from 1998 to 2017. Only permanent university staff members as of the date of prize giving were considered. Alumni included those who successfully completed a programme that leads to a degree of Bachelor, Master, PhD, and equivalent degrees.
6.	Normalised Citation Impact [global level], according to Scopus	Quality of scientific publications [international level]	5	The normalised citation impact quantitatively shows how much better or worse than world average a particular publication is cited compared with publications of the same type, area of knowledge, and year. The indicator demonstrates global relevance of the university's research activities within the academia, reflecting its acuteness and quality. Normalised citation indicators are widely used by academic rankings.	Scopus	The publications in the time period from 2013 to 2016 and scientific citation data at the time of data compilation (May 2018) were considered. The normalised citation impact is calculated separately for 6 broad areas of knowledge according to OECD classification: Natural Sciences, Engineering and Technology, Medical Sciences, Agricultural Sciences, Social Sciences, and Humanities. The scores gained in each area of knowledge were then summed.
7.	Normalised Citation Impact [global level], according to Web of Science	Quality of scientific publications [international level]	5	The normalised citation impact quantitatively shows how much better or worse than world average a particular publication is cited compared with publications of the same type, area of knowledge, and year. The indicator demonstrates global relevance of the university's research activities within the academia, reflecting its acuteness and quality. Normalised citation indicators are widely used by academic rankings.	Web of Science	The publications in the time period from 2013 to 2016 and scientific citation data at the time of data compilation (June 2018) were considered. The normalised citation impact is calculated separately for 6 broad areas of knowledge according to OECD classification: Natural Sciences, Engineering and Technology, Medical Sciences, Agricultural Sciences, Social Sciences, and Humanities. The scores gained in each area of knowledge were then summed.

Table (continued)

No.	Name	Parameters measured	Criterion weight, %	Criterion meaning and justification	Data source	Details
8.	Normalised Citation Impact [national level], according to Scopus	Quality of scientific publications (national level)	1	This indicator demonstrates global relevance of the university's research activities within the academia of the country where the university is situated. Introducing this criterion contributes to better consideration of achievements of national science schools and more accurate measurements in humanities.	Scopus	The publications in the time period from 2013 to 2016 were considered. This indicator is different from indicator 6 in the fact that for each of the 6 areas of knowledge a ratio of a university's normalised citation impact to its country's respective value is calculated. The relation of the university's result to the best result among the universities located in this particular country was used as the final value.
9.	Normalised Citation Impact [national level], according to Web of Science	Quality of scientific publications (national level)	1	This indicator demonstrates global relevance of the university's research activities within the academia of the country where the university is situated. Introducing this criterion contributes to better consideration of achievements of national science schools and more accurate measurements in humanities.	Web of Science	The publications in the time period from 2013 to 2016 were considered. This indicator is different from indicator 6 in the fact that for each of the 7 areas of knowledge a ratio of a university's normalised citation impact to its country's respective value is calculated. The relation of the university's result to the best result among the universities located in this particular country was used as the final value.
10.	Research income per academic staff member	Staff involvement in research and development	5	This indicator actually shows the amount of R&D finance per staff member. The higher the amount of finance per staff member is, the more relevant the university's research. For those universities which collect the expenses data instead of income, the indicator is calculated as expenses (budget) per academic staff member.	University and regulatory body websites	The funds a university attracted for academic research and development were considered. This sum does not include other components, such as income from education activities, investment, commercialisation, etc. In case country-specific features or other peculiarities do not allow to calculate the research income, research budget as fund spent on research are used. The indicator was calculated using PPP defined by World Bank (or the OECD PPP in case the necessary value was not present). The academic staff value, which includes faculty staff and research staff, was calculated in full time equivalent.
11.	Field-weighted views impact (according to Scopus)	Relevance of scientific publications	2	The indicator evaluates how relevant a university's scientific publications are for wide audience of Scopus users. The necessity for this indicator is that it shows the popularity of a paper amongst users, including those whose work output cannot be evaluated through citation impact values: students, journalists, analysts, science communicators and writers, researchers, whose papers are not included in Scopus, and others interested in modern science.	Scopus	The indicator was calculated as an average field-weighted views impact (FWI) of all of the considered papers of a university published during the period from 2013 to 2016. Like normalised citation impact, this indicator is calculated by comparing each publication with those of the same type, area of knowledge, and year.

Table (continued)

No.	Name	Parameters measured	Criterion weight, %	Criterion meaning and justification	Data source	Details
III. Criteria group: University & Society						
12.	The number of online university courses published on the biggest online global platforms	University's contribution to affordable online education	6	This innovative indicator has never been used in global academic rankings before. It measures the university's activity in the area of large-scale open online courses. Open online courses have formed a clearly expressed public demand, therefore the dynamic development of this type of educational activity is beyond doubt. The more courses that are published on global online platforms, the wider the knowledge is transferred by the university via the internet, and the more significant a university's contribution is to education affordability worldwide.	Online platforms: Coursera & edX	Total number of online courses published on the global online platforms Coursera and edX and available for users as of the data compilation moment (August 2018).
13.	University's share in its country's total university publications	University's contribution to the country's scientific research	4	This innovative ranking criterion measures the national significance of universities for scientific development in their respective countries. The higher the university's proportion in the country's total university publications is, the bigger its contribution to research in the country, and consequently, the more important and valuable such a university is for society.	Scopus	The ratio a university's scholarly output during the period from 2013 to 2016, indexed by Scopus, to its home country's university scholarly output.
14.	Total pages of a university's website indexed by the leading search engines	Web presence	3	This indicator reflects a number of important aspects of a university's communication with society: openness, transparency, information accessibility, university's commitment to information exchange.	Search engines: Google, Baidu, Yandex	The number of web pages of a university's official domain indexed by search engines was measured by standard domain search syntactical operators of the following search engines: Google, Baidu, Yandex. The minimum index value according to each engine was determined after data compilation (August–September 2018). The highest result of the three search engines was used as the final value.
15.	University's Wikipedia views	Web popularity	1	Along with the official website, a university's page on Wikipedia is an important source of information. A high number of views of the university's page shows the university's societal impact. The criterion will cover the number of views during the year preceding the ranking compilation year.	Wikipedia	Total views of a university's Wikipedia pages in English and (if applicable) in the official national language (languages) in 2016.

Table (end)

No.	Name	Parameters measured	Criterion weight, %	Criterion meaning and justification	Data source	Details
16.	University's followers in social media	Social network communication	4	Social media is one of the most practical communication tools for the university and those interested in its activity. A significant number of universities creates awareness of their activity through social media. Different social networks are popular in different countries and for different universities. Therefore, data of subscribers in 4 social networks was compiled for each university.	Facebook, Twitter, Sina Weibo	The number of the university page subscribers was analyzed in 4 social networks: Facebook, VK, Twitter, Sina Weibo. The pages available in English and the national language (if applicable) were considered. The total number of subscribers in the two social networks in which the university's audience is the largest, i.e. in the social networks which have the highest priority for the university communication-wise, was used as the final value.
17.	Number of the university's graduates with an individual article on Wikipedia	University's impact on society	9	High-quality education consists to a large extent of incommensurate phenomena, among other things it can be measured by the university's impact on society. One of the most effective ways to measure it is to count the number of alumni successful in various areas (politics, science, art, business, charity) with an individual article on Wikipedia about them. The indicator quantitatively evaluates the university's impact on society.	Wikipedia	Total number of university alumni with an individual page on Wikipedia meeting the threshold values: alumnus date of birth: not earlier than 1948; page views: at least 1000 in 12 months before the time of data compilation (June 2018). Thus, the pages which are not often visited by the users are excluded from calculation.
18.	University website reach	Societal relevance	3	This indicator reflects the relevance of the official university website for users throughout the world. The higher the ratio of the Internet users visiting the university website, the more popular the university is. If the university website is visited by a large number of Internet users, the university is considered relevant and valuable for society.	Alexa	This criterion evaluates the university website audience percentage among all Internet users. This evaluation is based on data collected from Alexa (alexa.com), one of the global leaders in web analytics. The data was compiled in September 2018.