An introduction to global university rankings
Globalization of science is becoming increasingly prominent, and the number of nodes and ties in the network has substantially increased over time. The traditional science powerhouses have occupied central positions in the network, while the new emergent scientific countries are rising, both driving the evolution of world order\(^1\).

In the past two decades, there have been dramatic changes in higher education and ideology defining standards and global competitiveness. Combined with the impact of globalization and the development of the global "knowledge economy," these competitive forces have resulted in the global competition phenomenon that is currently reshaping higher education\(^2\), including:

- The rise of global university rankings
- Declarations by nations to have a world-class university
- The development of regional units of control
- The development of cross-border quality assessment practices
- The internationalization of universities

In this report we discuss the rise in significance of global university rankings, the history of these rankings and provide some context to better understand some of the major ranking systems.

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\(^3\) Rust, Val & Kim, Stephanie. (2015). Globalization and global university rankings. https://doi.org/10.1007/978-94-017-4995-0_11
History and impact of international rankings

Research universities play a critical role in training the professionals, high-level specialists, scientists, and researchers needed by the economy and in generating new knowledge in support of the national innovation system. In this context, policymakers are keen to see their top universities operating at the cutting edge of intellectual and scientific development. The paradox of the world-class university, however, as Altbach has succinctly and accurately observed, is that “Everyone wants a world-class university. No country feels it can do without one. The problem is that no one knows what a world-class university is, and no one has figured out how to get one.”

University rankings emerged as a systematic way of identifying and classifying world-class universities. However, in the last century, international rankings were of interest only to education specialists. The arrival of global university rankings, generally seen to start in 2003, has changed the global landscape of higher education and is likely to continue to influence development nationally and internationally. In fact, ranking systems have become a standard feature in higher education systems. They are also increasingly accepted as an instrument to inform and guide evaluation and planning decisions at a global, national, institutional and individual level.

Rankings serve as a particularly useful lens for the study of power in higher education, as they are used to confer prestige, in the allocation of resources, as a form of agenda setting, as a means of stratifying national higher education systems, as a means of establishing hierarchical relations between nations, and as a lever to impose demands for accountability.

However, no ranking system can present the full picture of Higher Education Institutions (HEIs) in their entirety, but they are an important comparator. They impact stakeholders across the full university system: from students, faculty, researchers and research office to national governments and funding bodies.

1998
- Centre for Higher Education in Germany developed its own national ranking, CHE-Hochschul-Ranking (CHE University Ranking)

2003
- The arrival of global rankings with Academic Ranking of World Universities (ARWU), the first international ranking

2004
- Times Higher Education
- QS World University Rankings
- Webometrics (Spanish National Research Council), Spain

2006
- CWTS Leiden Ranking

2007
- National Taiwan University Ranking, Taiwan

2009
- SCImago Journal
- Country Rank (SJR), Spain and University Ranking by Academic Performance (URAP) (Informatics Institute of Middle East Technical University), Turkey

2010
- The Times Higher Education World University Rankings (THE), UK
- QS World University Rankings (Quacquarelli Symonds), UK

2014
- U-Multirank World University Rankings (European Commission), Belgium
- US News Best Global Universities Rankings

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Impact

Since the millennium, university rankings have become increasingly influential. Key stakeholders use rankings to influence important decisions, including:

- **Student and parents**
  Reputation derived from league tables is a critical determinant for student applicants, especially for international students.

- **Universities & leadership**
  University leadership can see the impact directly in the form of quality and number of students enrolled, which in turn affect their budget.

- **Governments & funding agencies**
  Governments and funding agencies are more favourably disposed to highly ranked universities.

- **Employers**
  Employers often seek out and prioritize candidates from the most highly respected universities.

- **Collaborators & partners**
  Organizations and institutions use rankings as a benchmark when seeking out collaboration partners.

Rankings are also used as a ‘policy instrument’ to underpin and quicken the pace of higher education reform.

"Whatever one’s own views, it is impossible to ignore them"

Ellen Hazelkorn, Director of Higher Education Policy Research Unit (HEPRU), Dublin Institute of Technology (Ireland)
### Understanding the rankings

University rankings are based on a range of different factors, and different ranking systems use different indicators and different weights.

<table>
<thead>
<tr>
<th>Research related indicators</th>
<th>Patent related indicators</th>
<th>Other indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of publications in indexed journals</td>
<td>Staff-to-student ratio</td>
<td>Citations per faculty</td>
</tr>
<tr>
<td>Industry article citation impact</td>
<td>Number of conference proceedings</td>
<td>Avg. number of times a journal has been cited by patents</td>
</tr>
<tr>
<td>Doctorate to Bachelor students ratio</td>
<td>Number of Highly Cited Researchers™</td>
<td>Number of publications cited in Science / Nature</td>
</tr>
<tr>
<td>Number / ratio of 1% most cited publications</td>
<td>Number of basic patents filed by the organization</td>
<td>Proportion of international students</td>
</tr>
<tr>
<td>Percentage of articles that contain one or more industrial co-authors</td>
<td>Citations per faculty</td>
<td>Number / percentage of 10% most cited publications</td>
</tr>
<tr>
<td>Percentage of patents cited</td>
<td>Proportion of international staff</td>
<td>Reputation among colleagues / students</td>
</tr>
<tr>
<td>Reputation among research peers (regional / international)</td>
<td>Quantity and quality of research grants</td>
<td>Research income from industry</td>
</tr>
<tr>
<td>Staff / alumni with Nobel prizes or the Fields medal</td>
<td>Ratio of patent applications to grants over the assessed timeframe</td>
<td>Percentage of patents sought with the U.S., European and Japanese patent offices</td>
</tr>
</tbody>
</table>

### The major players

Several organizations produce worldwide university rankings, including:

<table>
<thead>
<tr>
<th>Academic Ranking of World Universities</th>
<th>CWTS Leiden Ranking</th>
<th>QS World University Rankings</th>
<th>THE World University Rankings</th>
<th>U.S. News Best Global University Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publisher: Shanghai Ranking Consultancy</td>
<td>Publisher: Centre for Science and Technology Studies Leiden University</td>
<td>Publisher: QS Quacquarelli Symonds</td>
<td>Publisher: Times Higher Education</td>
<td>Publisher: U.S. News &amp; World</td>
</tr>
</tbody>
</table>

The following pages provide some key information on each of these ranking systems, including key indicators and weightings, criteria for inclusion and data sources.
ARWU considers every university that has any Nobel Laureates, Fields Medalists, Highly Cited Researchers, or papers published in Nature or Science.

Universities with a significant amount of papers indexed by Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI) are also included.

In total, more than 1800 universities are ranked and the best 1000 are published.

**Criteria for inclusion**

**01**
ARWU considers every university that has any Nobel Laureates, Fields Medalists, Highly Cited Researchers, or papers published in Nature or Science.

**02**
Universities with a significant amount of papers indexed by Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI) are also included.

**03**
In total, more than 1800 universities are ranked and the best 1000 are published.

**Data sources**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nobel prize</td>
<td><a href="http://www.nobelprize.org">www.nobelprize.org</a></td>
</tr>
<tr>
<td>Fields medals</td>
<td><a href="http://www.mathunion.org/imu-awards/fields-medal">www.mathunion.org/imu-awards/fields-medal</a></td>
</tr>
<tr>
<td>Cited researchers</td>
<td><a href="http://www.clarivate.com/webofsciencegroup/solutions/web-of-science">www.clarivate.com/webofsciencegroup/solutions/web-of-science</a></td>
</tr>
<tr>
<td>Nature &amp; Science papers</td>
<td><a href="http://www.clarivate.com/webofsciencegroup/solutions/web-of-science">www.clarivate.com/webofsciencegroup/solutions/web-of-science</a></td>
</tr>
<tr>
<td>Published indexed papers</td>
<td><a href="http://www.clarivate.com/webofsciencegroup/solutions/web-of-science">www.clarivate.com/webofsciencegroup/solutions/web-of-science</a></td>
</tr>
</tbody>
</table>

**Others**

Number of academic staff data is obtained from national agencies such as National Ministry of Education, National Bureau of Statistics, National Association of Universities and Colleges, National Rector’s Conference.

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4 The weighted scores of the above five indicators divided by the number of full-time equivalent academic staff. If the number of academic staff for institutions of a country cannot be obtained, the weighted scores of the above five indicators are used. For ARWU 2019, the numbers of full-time equivalent academic staff were obtained for institutions in USA, UK, France, Canada, Japan, Italy, China, Australia, Netherlands, Sweden, Switzerland, Belgium, South Korea, Czech, Slovenia, New Zealand etc.
## CWTS Leiden Rankings

### Indicators and corresponding weights

<table>
<thead>
<tr>
<th>Scientific impact indicators</th>
<th>Open access indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>◼ Total number of publications of a university.</td>
<td>◼ Total number of publications of a university</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications that, compared with other publications in the same field and in the same year, belong to the top 1% most frequently cited.</td>
<td>◼ The number and the proportion of open access publications of a university.</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications that, compared with other publications in the same field and in the same year, belong to the top 5% most frequently cited.</td>
<td>◼ The number and the proportion of gold open access publications of a university.</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications that, compared with other publications in the same field and in the same year, belong to the top 10% most frequently cited.</td>
<td>◼ The number and the proportion of hybrid open access publications of a university.</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications that, compared with other publications in the same field and in the same year, belong to the top 50% most frequently cited.</td>
<td>◼ The number and the proportion of bronze open access publications of a university.</td>
</tr>
<tr>
<td>◼ The total and the average number of citations of the publications of a university.</td>
<td>◼ The number and the proportion of green open access publications of a university.</td>
</tr>
<tr>
<td>◼ The total and the average number of citations of the publications of a university, normalized for field and publication year.</td>
<td>◼ The number and the proportion of publications for which the open access status is unknown.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collaboration indicators</th>
<th>Gender indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>◼ Total number of publications of a university.</td>
<td>◼ The total number of authorships of a university</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications that have been co-authored with one or more other organizations.</td>
<td>◼ The number of male and female authorships of a university, that is, a university’s number of authorships for which the gender is known</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications that have been co-authored by two or more countries.</td>
<td>◼ The number of authorships of a university for which the gender is unknown and the number of authorships for which the gender is unknown as a proportion of a university’s total number of authorships</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications that have been co-authored with one or more industrial organizations.</td>
<td>◼ The number of male authorships of a university, the number of male authorships as a proportion of a university’s total number of authorships, and the number of male authorships as a proportion of a university’s number of male and female authorships</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications with a geographical collaboration distance of less than 100 km.</td>
<td>◼ The number of female authorships of a university, the number of female authorships as a proportion of a university’s total number of authorships, and the number of female authorships as a proportion of a university’s number of male and female authorships</td>
</tr>
<tr>
<td>◼ The number and the proportion of a university’s publications with a geographical collaboration distance of more than 5000 km.</td>
<td></td>
</tr>
</tbody>
</table>

### Criteria for inclusion

1. **At least 800 publications indexed in the Web of Science in the period 2015–2018**
2. **CWTS identifies a ‘core’ journal list of international scientific journals**
3. **Only research articles and review articles are taken into account.**

### Data sources

- Scientific impact indicators
- Collaboration indicators
- Open access indicators
- Gender indicators

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7 Clarivate’s Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index™. For each author, gender statistics are collected from three sources: Gender API, Genderize.io, and Gender Guesser.
QS World University Rankings

**Indicators and corresponding weights**

- **Academic reputation**: 40%
- **Employer reputation**: 10%
- **Faculty/student Ratio**: 20%
- **Citations per faculty**: 20%
- **International faculty ratio**: 5%
- **International student ratio**: 5%

**Criteria for inclusion**

01
A university must teach at multiple study levels (i.e. both undergraduate and postgraduate)

02
Conduct work in at least two of five possible faculty areas (Arts and Humanities; Engineering and Technology; Social Sciences and management; Natural Sciences; Life Sciences and Medicine)

**Data sources**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic reputation</td>
<td>QS Academic Survey</td>
</tr>
<tr>
<td>Employer reputation</td>
<td>QS Employer Survey</td>
</tr>
<tr>
<td>Faculty/student ratio</td>
<td>University</td>
</tr>
<tr>
<td>Citations per faculty</td>
<td>Elsevier’s Scopus database</td>
</tr>
<tr>
<td>International faculty ratio</td>
<td>University</td>
</tr>
<tr>
<td>International student ratio</td>
<td>University</td>
</tr>
</tbody>
</table>
THE World University Rankings

**Criteria for inclusion**

**01**
Universities that teach undergraduates

**02**
Universities with research output amounting to more than 1,000 relevant publications between 2014 and 2018 (with a minimum of 150 a year)

**03**
80 percent or more of their research output is not exclusively in one of THE 11 subject areas

**Data sources**

**Teaching**
- THE Academic Reputation Survey Provided by university

**Research**
- THE Academic Reputation Survey Provided by university
- Scopus, Elsevier

**Citations**
- Scopus, Elsevier

**International Outlook**
- Provided by university
- Scopus, Elsevier

**Industry Income**
- THE Academic Reputation Survey

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Indicators and corresponding weights

- **Teaching**
  - Reputation (15%)
  - Staff-to-student ratio (4.5%)
  - Doctorate to Bachelor ratio (2.25%)
  - Doctorates awarded to academic Staff (6%)
  - Institutional income (2.25%)

- **Research**
  - Reputation (18%)
  - Research income (6%)
  - Research productivity (6%)

- **Citations**
  - Average number of times a university’s published work is cited (30%)

- **International outlook**
  - Proportion of international students (2.5%)
  - Proportion of international staff (2.5%)
  - International collaboration (2.5%)

- **Industry Income**
  - Research income an institution earns from industry scaled to the number of academic staff (2.5%)
U.S. News & World Report
Best Global Universities Rankings

Criteria for Inclusion

01
Top 250 universities in the results of the Clarivate global reputation survey

02
OR at least 1,500 papers published in 2014 to 2018

03
Only include universities/institutions that teach

Data Sources

<table>
<thead>
<tr>
<th>Criteria</th>
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</thead>
<tbody>
<tr>
<td><strong>Reputation</strong></td>
<td><a href="http://www.clarivate.com/webofsciencegroup/globalprofilesproject">www.clarivate.com/webofsciencegroup/globalprofilesproject</a></td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td>Web of Science platform, Clarivate</td>
</tr>
<tr>
<td><strong>Impact</strong></td>
<td>Web of Science platform, Clarivate</td>
</tr>
<tr>
<td><strong>International outlook</strong></td>
<td>Web of Science platform, Clarivate</td>
</tr>
</tbody>
</table>

Indicators and corresponding weights

- Reputation: 10%
- Productivity: 25%
- Impact: 50%
- International outlook: 15%

- Global research reputation (12.5%)
- Regional research reputation (12.5%)
- Publications (10%)
- Books (2.5%)
- Conference proceedings (2.5%)
- Normalized citation impact (10%)
- Total citations (7.5%)
- Number of publications that are among the 10% most cited (12.5%)
- Percentage of total publications that are among the 10% most cited (10%)
- Number of highly cited papers that are among the top 1% most cited in their respective field (5%)
- Percentage of total publications that are among the top 1% most highly cited papers (5%)
- International collaboration – relative to country (5%)
- International collaboration (5%)
Achieving university excellence

How can I influence my university’s excellence?

If you are a researcher

• Conduct excellent research
• Publish research results in impactful journals
• Participate in academic conferences
• Membership of international journal editorial board and academic organizations
• Win international awards
• Emphasize real-world impact of research output

If you are a university leader

• Understand the current research performance and diagnose the underlying issues
• Employ a strategic design of the research system, allocation of resources and appropriate policies
• Continuously measure performance and ensure policies and processes are followed
• Encourage cutting-edge research
• Identify, recruit and nurture the most talented global researchers
• Improve your global reputation and standing
• Develop international collaborations and partnerships
• Focus university’s socio-economic impact

“The establishment of a world-class university requires, above all, a strong leadership, a bold vision of the institution’s mission and goals, and a clearly articulated strategic plan to translate the vision into concrete programs and targets…A crucial element of the vision is the discovery of a niche market toward which the institutions will seek to build and maximize its comparative advantage.”

Jamil Salmi
The Challenge of Establishing World-Class Universities
About Clarivate

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How can we help you with your ranking strategy?

Clarivate helps HEIs drive research performance improvements that make a real impact on university rankings. Combining deep understanding of the different ranking systems with our world-class tools and data sets, we work with universities to benchmark existing performance, review research goals and develop a strategic plan to improve research performance and academic rankings.

Contact our experts today:

clarivate.com

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