CWTS profile and the Leiden Ranking

Mark Neijssel
+31 6 10563408
m.neijssel@cwts.leidenuniv.nl
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• Dealing with differences
Institute Profile

- Scientific institute AND Innovative Contract Research Organization
- Research Performance- and Benchmark studies, Societal impact and Economic impact
- Based in Leiden, the Netherlands
Institute Profile
- >25 years CWTS history in short (1985-2010) -

• Started around 1985 by Anthony van Raan and Henk Moed; One and a half person funded by university
• Context is science policy, research management
• Mainly contract research and services (research evaluation)
• Staff stable around 15 people (10 researchers)
• Main focus on publication and citation data (in particular Web of Science)
Institute Profile
- >25 years CWTS history in short (2010-.....) -

- Block funding since 2008;
- Since 2010
  - New director Paul Wouters
  - Moving from *services* mainly with some research to:
    - *Research institute* with services;
- New recruitments: now ~35 people.
Institute Profile

- **Chairs**
  - Scientometrics
  - Science policy
  - Science technology & innovation

- **Working groups**
  - Advanced bibliometric methods
  - Evaluation Practices In Context (EPIC)
  - Social sciences & humanities
  - Society Using Research (SURe)
  - Career studies
Leiden Ranking introduction

- Transparency
- Not multiple dimensions of university performance in a single aggregate indicator
- No attempt to measure all relevant dimensions of university performance
- Based exclusively on bibliometric data
- Research performance based on international journals
- Leiden Ranking 2014: 750 universities
Data Infrastructure

- Core: enhanced version of Thomson Reuters’ Web of Science database
- Expanding: Scopus, PATSTAT
- Robustness: built upon SQL
- 25 years of research and cleaning/data handling
Data Infrastructure
- Cleaning & Unification -

• Corrections for citing-cited publication (coupling of documents)
• Unification of names and addresses: organisational data of university
• Error corrections
• Removal of retracted publications/fraud
Data Infrastructure
- Cleaning & Unification -

Web of Science®

Cited Reference Search (Find the articles that cite a person’s work)

Step 2: Select cited references and click "Finish Search."

Hint: Look for cited reference variants (sometimes different pages of the same article are cited or paper)

CITED REFERENCE INDEX
References: 1 - 2 of 2

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<th>Select</th>
<th>Cited Author</th>
<th>Cited Work</th>
<th>Year</th>
<th>Volume</th>
<th>Issue</th>
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<td>Physics Reports</td>
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Identifier | Citing Articles ** | View Record
10.1016/0370-1573(94)00030-M | 1104 | View Record in Web of Science

77 View Record

Restrict results by any or all of the options below:

All languages | All document types
English | Article
Afrikaans | Abstract of Published Item
Arabic | Art Exhibit Review

* "Select All" adds the first 500 matches to your cited reference search, not all matches.
** Citing Article counts are for all databases and all years, not just for your current database and year limits.
Data Infrastructure
- Cleaning & Unification -

- Lomonosov Moscow State University
- **415** different name/address variations
- Approx. 20% of these name variations appear >10 times

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Data Infrastructure
- Cleaning & Unification -

• Identification of universities
  • combination of education and research tasks
  • doctorate-granting authority
  • No homogeneous entities in the Leiden Ranking

• Academic systems/role of universities differ substantially reflected in the outcomes of the Leiden Ranking
Data Infrastructure
- Cleaning & Unification -

• Affiliated institutions
  – Component: Munich Center for Technology in Society (MCTS) is part of TUM
  – Joint research facility or organization: Charité, the medical school for both the Humboldt University and Freie Universität Berlin or ACTA, the Faculty of Dentistry of UvA and VU Amsterdam
  – Associated organization: Trafford Hospital -> Central Manchester University Hospitals (CMFT) or Massachusetts General Hospital, one of the teaching hospitals of Harvard Medical
The 750 universities: selection and counting method

- Articles & reviews in *international scientific core journals*
- Period 2009-2012/13
- Fractional
- >1000 publications
Fields of science
- CWTS publication classification system -

- Proper and robust classification because of true citation relations of all WoS publications 2000-2013
- No issues with multidisciplinary journals (e.g. Nature, Science, PLOS ONE etc.)
- No human involvement
- Better/finer grain than all other classification systems
  - 7 broad fields (Leiden Ranking)
  - 24 disciplines
  - ~800 areas
  - >40,000 topics
Fields of science
- CWTS publication classification system -

• 7 broad fields
  – Cognitive and health sciences
  – Earth and environmental sciences
  – Life sciences
  – Mathematics, computer science, and engineering
  – Medical sciences
  – Natural sciences
  – Social sciences

• VOSviewer maps to explore fields
Fields of science
- CWTS publication classification system -

• Advantage: cognitive and health sciences includes both science as well as social sciences
Methodology
- Size independent indicators -

• Impact Indicators:
  • Number of publications (P)
  • Mean citation score (MCS)
  • Mean normalized citation score (MNCS)
  • Proportion publications in top 10% (PPTop 10%)

• Calculation:
  • Only articles and reviews
  • Self-citations are ignored
  • Citation window length must be at least 1 full year
Methodology
- Size dependent indicators -

• Impact Indicators:
  • Number of publications (P)
  • Total citation score (TCS)
  • Total normalized citation score (TNCS)
  • # highly cited papers (Ptop 10%)

• Calculation:
  • Only articles and reviews
  • Self-citations are ignored
  • Citation window length must be at least 1 full year
Methodology

- Collaboration indicators:
  - Proportion of inter-institutional collaborative publications PP(collab)
  - Proportion of international collaborative publications PP(int collab)
  - Proportion of collaborative publications with industry PP(UI collab)
  - Proportion of short distance collaborative publications PP(<100 km)
  - Proportion of long distance collaborative publications PP(>1000 km)
Methodology

- Focus on core journals:
  - Statistics are more accurate because focus on international journals
  - The journal publishes in English and has an international scope
  - The journal has a sufficiently large number of references to other core journals in the Web of Science database; the journal is well-connected
  - 16% of the publications in the Web of Science database are excluded
Methodology
- Advanced parameters -

• Full- or Fractional counting:
  • Less weight to collaborative publications than to non-collaborative ones
  • Fractional counting method leads to a more proper field normalization of impact indicators
  • Fairer comparisons between universities active in different fields

• Stability intervals:
  • How robust is the calculated value?
  • 95% stability interval
  • Bootstrapping
The Leiden Ranking 2014 top 3

- www.leidenranking.com

PPtop10%: Normalized impact

Stability: Intervals to enhance certainty
The Leiden Ranking 2014
- LMSU impact -

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<th>Country</th>
<th>P</th>
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### The Leiden Ranking 2014 - LMSU output -

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The Leiden Ranking 2014
- LMSU collaboration -

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Dealing with differences
Map of all sciences
- 769 fields of science -

Each circle represents a cluster of pubs

Colors indicate clusters of fields, disciplines

Distance represents relatedness (citation traffic)

Surface represents volume

Physical sciences
Maths, computer sciences
Social and health sciences
Cognitive sciences
Biomed sciences
Earth, Environ, agriculture sciences

VOSviewer
Positioning of an actor in the map
- LMSU -

• Activity overall (world and e.g. LMSU)
  • Proportion LMSU relative to world

• Activity per ‘field’ (world and LMSU)
  • Proportion LMSU in field

• Relative activity LMSU per ‘field’

• Scores between 0 (Blue) and 2 (Red)

• ‘1’ if proportion same as overall (Green)
Positioning of an actor in the map
- LMSU -
Using the map: benchmarks

• Benchmarking on the basis of research profile
  – Distribution of output over 769 fields

• Profile of each university in Leiden Ranking
  – Distribution of output over 769 fields

• Compare to LMSU profile

• Identify most similar
Positioning of an actor in the map
- Nagoya University -
Positioning of an actor in the map
- Saint Petersburg State University -
Most similar to LMSU Leiden Ranking universities

- FR - University of Paris-Sud 11
- RU - Saint Petersburg State University
- JP - Nagoya University
- FR - Joseph Fourier University
- CN - Peking University
- JP - University of Tokyo
Dedicated rankings
- CWTS’ Brazilian Ranking -

- [http://brr.cwts.nl/](http://brr.cwts.nl/)
More information on CWTS and methods

- [www.cwts.nl](http://www.cwts.nl)
- [www.leidenranking.nl](http://www.leidenranking.nl)
- [www.journalindicators.com](http://www.journalindicators.com)
- [www.vosviewer.com](http://www.vosviewer.com)
- [www.citnetexplorer.com](http://www.citnetexplorer.com)
- [m.neijssel@cwts.leidenuniv.nl](mailto:m.neijssel@cwts.leidenuniv.nl)
Thank you for your attention