Use of Bibliometrics in Peer Review

Gunnar Sivertsen

Nordic Institute for Studies in Innovation, Research and Education, Oslo, Norway
Overview of this presentation

1. The role of bibliometrics in peer review
2. Bibliometric data sources
3. Citation indicators
4. *Journal Impact Factors* and the *H-index*
5. Peer review versus bibliometrics in overall funding models for universities
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The **European Peer Review Guide** shortly recommends:

- “Care should be taken when applying these quantitative measures; these must be used as complementary information and not as sole determining factors in valuing publication track records.”
Most **bibliometricians** will agree

- “Care should be taken when applying these quantitative measures; these must be used as complementary information and not as sole determining factors in valuing publication track records.”

- Bibliometrics may **inform**, but **not replace** peer review.
Most bibliometricians will agree, based on evidence

- “Care should be taken when applying these quantitative measures; these must be used as complementary information and not as sole determining factors in valuing publication track records.”

- Bibliometrics may inform, but not replace peer review

- The outcome of peer review is often correlated with bibliometric indicators, but seldom strongly, and sometimes weakly,
Most bibliometricians will agree, based on evidence

- “Care should be taken when applying these quantitative measures; these must be used as complementary information and not as sole determining factors in valuing publication track records.”

- Bibliometrics may inform, but not replace peer review

- The outcome of peer review is often **correlated** with bibliometric indicators, but **seldom strongly**, and **sometimes weakly**, indicating that the **combination** of them is advisable in most instances.
Most bibliometricians will agree, based on evidence

- “Care should be taken when applying these quantitative measures; these must be used as complementary information and not as sole determining factors in valuing publication track records.”

- Bibliometrics may inform, but not replace peer review

- The outcome of peer review is often correlated with bibliometric indicators, but seldom strongly, and sometimes weakly,

- indicating that the combination of them is advisable in most instances,

- But this depends on the purpose and level of analysis
Levels of analysis

- Countries
- Institutions or Organizations
- Departments
- Research Groups
- Individuals
An example of **discussion and disagreement**

“Empirical evidence shows that for the natural and formal sciences, the bibliometric methodology is **by far preferable to peer-review**. Setting up national databases of publications by individual authors, derived from Web of Science or Scopus databases, would allow **much better, cheaper and more frequent national research assessments.**”

An example of discussion and disagreement

“Empirical evidence shows that for the natural and formal sciences, the bibliometric methodology is by far preferable to peer-review. Setting up national databases of publications by individual authors, derived from Web of Science or Scopus databases, would allow much better, cheaper and more frequent national research assessments.”


“Bibliometrics are not independent of peer review assessment. The correlation between peer assessment and bibliometric indicators is significant but not perfect. Peer review should be integrated with bibliometric indicators in national assessment exercises.”

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5. Peer review versus bibliometrics in overall funding models for universities
1. Title: UNDERSTANDING PATTERNS OF INTERNATIONAL SCIENTIFIC COLLABORATION
   Author(s): LUUKKONEN T; PERSSON O, SIVERTSEN G
   Times Cited: 136 (from Web of Science)
   BIDSYS

2. Title: THE MEASUREMENT OF INTERNATIONAL SCIENTIFIC COLLABORATION
   Author(s): LUUKKONEN T; TUSSEN RJW; PERSSON O; et al.
   Source: SCIENTOMETRICS Volume: 28 Issue: 1 Pages: 15-36 DOI: 10.1007/BF02016282 Published: SEP 1993
   Times Cited: 98 (from Web of Science)
   BIDSYS

3. Title: The effect of highly cited papers on national citation indicators
   Author(s): Aksnes DW. Sivertsen G
   Source: SCIENTOMETRICS Volume: 59 Issue: 2 Pages: 213-224 DOI: 10.1023/B:SCIE.0000016529.58334.eb Published: 2004
   Times Cited: 23 (from Web of Science)
   BIDSYS

4. Title: Publishing affects funding in neurology
   Author(s): Gilhus N.E., Sivertsen G
   Times Cited: 23 (from Web of Science)
   BIDSYS

5. Title: Are Female Researchers Less Cited? A Large-Scale Study of Norwegian Scientists
   Author(s): Aksnes Dag W.; Rorstad Kristoffer; Flio Fredrik; et al.
   Times Cited: 0 (from Web of Science)
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Refine results: | Limit to | Exclude |
Indexed journals
Journals and series

Coverage of 55,000 publications from Norway 2005-2010

Scopus
Web of Science
Publication types
Based on 55,000 scholarly publications from Norway 2005-2010

![Graph showing publication types by field.](image-url)
Understanding patterns of international scientific collaboration
O Persson, G Sivertsen - Science, Technology & ..., 1992 - sth.sagepub.com
Abstract International scientific collaboration has increased both in volume and importance.
In this article, the authors study the interpretation of macro-level data on international co-authorship collaboration. They address such questions as how one might explain country- ...
Cited by 271 - Related articles - All 8 versions

The measurement of international scientific collaboration
RJW Tijssen, O Persson, G Sivertsen - Scientometrics, 1993 - akademiai.com
Abstract A growing science policy interest in international scientific collaboration has brought about a multitude of studies which attempt to measure the extent of international scientific collaboration between countries and to explore intercountry collaborative ...
Cited by 165 - Related articles - BL Direct - All 4 versions

The effect of highly cited papers on national citation indicators
G Sivertsen - Scientometrics, 2004 - akademiai.com
Abstract Citation distributions are extremely skewed. This paper addresses the following question: To what extent are national citation indicators influenced by a small minority of highly cited articles? This question has not been studied before at the level of national ...
Cited by 46 - Related articles - BL Direct - All 14 versions

[CITATION] A bibliometric model for performance based budgeting of research institutions
G Sivertsen - Proceedings of the 9th International Conference on ..., 2005
Cited by 10 - Related articles

[CITATION] Internationalization via journals: scientific and scholarly journals edited in the Nordic countries
G Sivertsen - 1992 - Nordic Council of Ministers ...
Cited by 7 - Related articles

[CITATION] Nordic Collaboration in Science: A Bibliometric Study
T Luukkonen, G Sivertsen - 1991 - Nordic Council of Ministers ...
Cited by 6 - Related articles

[CITATION] A performance indicator based on complete data for the scientific publication output at research institutions
G Sivertsen - ISSI Newsletter, 2010
Cited by 3 - Related articles - All 3 versions
### Author impact analysis

**Author's name:** gunnar sivertsen

**Exclude these names:**

**Year of publication between:** 0 and: 0

### Results

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Search for a publication of UniBasel

Author¹):

Title and Abstract¹):

Year:

Publication type:

Organization:

- Faculty of Theology
- Faculty of Law
- Faculty of Medicine
- Faculty of Humanities
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- Faculty of Business and Economics
- Faculty of Psychology
- Interdisciplinary Institutions
- Associated Institutions

¹) Search accepts "*" as wildcard - this means: A* will find A., Andi, Andreas ...
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THE MEASUREMENT OF INTERNATIONAL SCIENTIFIC COLLABORATION

Author(s): LUUKKONEN, T (LUUKKONEN, T); TJUSSEN, RJW (TJUSSEN, RJW); PERSSSON, O (PERSSSON, O); SIVERTSEN, G (SIVERTSEN, G)

Source: SCIENTOMETRICS Volume: 28 Issue: 1 Pages: 15-36 DOI: 10.1007/BF02016282 Published: SEP 1993

Times Cited: 81 (from Web of Science)

Abstract: A growing science policy interest in international scientific collaboration has brought about a multitude of studies which attempt to measure the countries and to explore intercountry collaborative networks. This paper attempts to clarify the methodology that is being used or can be used for this purpose. The paper concludes that, in an analysis of collaborative links, it is essential to use both absolute and relative measures. The latter normalize differences in information. Absolute measures yield an answer to questions such as which countries are central in the international network of science, whether collaboration and which countries are the most important collaborative partners of another country. Relative measures provide answers to questions of the intensity of cooperation between countries.

Document Type: Article

Language: English

KeyWords Plus: COOPERATION

Reprint Address: LUUKKONEN, T (reprint author), ACAD FINLAND, POB 57, SF-00551 HELSINKI, FINLAND

Addresses:
1. LEIDEN UNIV, CTR SCI & TECHNOL STUDIES, 2300 RB LEIDEN, NETHERLANDS
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Web of Science Category: Computer Science, Interdisciplinary Applications; Information Science & Library Science

Subject Category: Computer Science; Information Science & Library Science

IDS Number: LW521

ISSN: 0138-9130
Data for a citation database: **2. All adresses!**

**Web of Science**

**THE MEASUREMENT OF INTERNATIONAL SCIENTIFIC COLLABORATION**

**Author(s):** LUUKKONEN, T (LUUKKONEN, T); TUISSEN, RJW (TUISSEN, RJW); PERSSON, O (PERSSON, O); SIVERTSEN, G (SIVERTSEN, G)

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**Cited References:** 20  [view related records]  **Citation Map**

**Abstract:** A growing science policy interest in international scientific collaboration has brought about a multitude of studies which attempt to measure the ties between countries and to explore intercountry collaborative networks. This paper attempts to clarify the methodology that is being used or can be used for this purpose. The paper concludes that, in an analysis of collaborative links, it is essential to use both absolute and relative measures. The latter normalize differences in the data, so that countries with lower absolute measures yield an answer to questions such as which countries are central in the international network of science, whether collaboration is significant and which countries are the most important collaborative partners of another country. Relative measures provide answers to questions of the intensity of collaboration.

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The need for normalization: **time**
Citedness in year after publication

- **Annual**
- **Accumulated**
The need for normalization: discipline or subfield
Average number of citations after 5 years

- CELL BIOLOGY
- NUCLEAR PHYSICS
- IMMUNOLOGY
- BEHAVIORAL SCIENCES
- GEOLOGY
- PSYCHOLOGY
- ECONOMICS
- POLITICAL SCIENCE
- MATHEMATICS
- LINGUISTICS
- PHILOSOPHY
- HISTORY

Citations range from 0 to 30.
Overview of this presentation

1. The role of bibliometrics in peer review
2. Bibliometric data sources
3. Citation indicators
4. *Journal Impact Factors* and the *H-index*
5. Peer review versus bibliometrics in overall funding models for universities
The skewness of citation distributions:
Citations to 149 articles published in *Scientometrics* in 2006

The Journal Impact Factor measures the average
The skewness of citation distributions:
Citations to 162 articles by a highly cited biochemist born in 1945

Average = 50.7
H-index = 49
The **skewness** of citation distributions:
Citations to 162 articles by a highly cited **biochemist** born in **1945**

- Average number of authors per article: 4.4
- H-index = 49
Overview of this presentation

1. The role of bibliometrics in peer review
2. Bibliometric data sources
3. Citation indicators
4. *Journal Impact Factors* and the *H-index*
5. **Peer review versus bibliometrics in overall funding models for universities**
"The dual funding system"
(A simplified model excluding international sources, etc.)

Government

Research Councils
Projects and Programmes
Competition
Research Evaluation

Direct grants
Historical, Political
Strategic
**Performance based**

Higher Education Institutions
Same aims, methods, and effects?

Government

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Projects and Programmes
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Higher Education Institutions