December 6, 2016

Essential steps to write a Bibliometric paper

Nader Ale Ebrahim

Available at: https://works.bepress.com/aleebrahim/178/
Essential steps to write a Bibliometric paper

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aleebrahim@um.edu.my
@aleebrahim
www.researcherid.com/rid/C-2414-2009
http://scholar.google.com/citations

6th December 2016
Essential steps to write a Bibliometric paper

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=====================================  
Centre for Research Services  
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http://scholar.google.com/citations

Abstract: Bibliometrics can be defined as the statistical analysis of publications. Bibliometrics has focused on the quantitative analysis of citations and citation counts which is complex. It is so complex and specialized that personal knowledge and experience are insufficient for understanding trends and then making decisions. We need tools for analysis of bibliometrics information to recognize the research trends and evaluate scientific/institution/country’s research productivity. This presentation will provide procedure to write a Bibliometrics paper.

Keywords: H-index, Improve citations, Research tools, Bibliometrics, Research Visibility, Research Impact
<table>
<thead>
<tr>
<th>SESSION</th>
<th>DATE</th>
<th>TIME</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7 September 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Citations and its impact to university ranking</td>
</tr>
<tr>
<td>2.1</td>
<td>22 September 2016</td>
<td>10.00 a.m. – 12.00</td>
<td>Research Outreach: Wider Visibility to Increase Citation*</td>
</tr>
<tr>
<td>2.2</td>
<td></td>
<td>2.00 – 5.00 p.m.</td>
<td>Plain Language Summary: The Common Language of Research &amp; Innovation *</td>
</tr>
<tr>
<td>3</td>
<td>28 September 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Analysis of bibliometrics information for select the best field of study</td>
</tr>
<tr>
<td>4</td>
<td>5 October 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>A new system for measuring research impact</td>
</tr>
<tr>
<td>5</td>
<td>12 October 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>How to select a brand name for your research interest?</td>
</tr>
<tr>
<td>6</td>
<td>19 October 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Optimize articles for search engine to improve research visibility</td>
</tr>
<tr>
<td>7</td>
<td>26 October 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Prepare a pre/post print of your documents for advertisement</td>
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<tr>
<td>8</td>
<td>2 November 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Create a publication database for enhancing research visibility</td>
</tr>
<tr>
<td>9</td>
<td>9 November 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Create a google scholar profile to boost research visibility</td>
</tr>
<tr>
<td>10</td>
<td>16 November 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Create and maintain an up-to-date researcherid profile</td>
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<tr>
<td>11</td>
<td>23 November 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Online repository: improving the research visibility and impact</td>
</tr>
<tr>
<td>12</td>
<td>30 November 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Kudos: promote your published research reach and impact</td>
</tr>
<tr>
<td>13</td>
<td>7 December 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Journal selection procedure: select the best journal to ensure the highest citation</td>
</tr>
<tr>
<td>14</td>
<td>14 December 2016</td>
<td>2.00 – 4.30 p.m.</td>
<td>Establish your expertise with a science blog</td>
</tr>
<tr>
<td>15</td>
<td>21 December 2016</td>
<td>9.00 – 11.30 a.m.</td>
<td>Promote your research work on LinkedIn</td>
</tr>
<tr>
<td>16</td>
<td>4 January 2017</td>
<td>9.00 – 11.30 a.m.</td>
<td>Make your data discoverable on a data repository</td>
</tr>
<tr>
<td>17</td>
<td>11 January 2017</td>
<td>9.00 – 11.30 a.m.</td>
<td>Microblogging for enhancing the research accessibility</td>
</tr>
<tr>
<td>18</td>
<td>18 January 2017</td>
<td>9.00 – 11.30 a.m.</td>
<td>Make an audio slides for your research</td>
</tr>
<tr>
<td>19</td>
<td>25 January 2017</td>
<td>2.00 – 4.30 p.m.</td>
<td>Academic social networking (ResearchGate &amp; Academia) and the research impact</td>
</tr>
<tr>
<td>22</td>
<td>1 March 2017</td>
<td>2.00 – 4.30 p.m.</td>
<td>Document publishing tools for research visibility improvement</td>
</tr>
<tr>
<td>23</td>
<td>8 March 2017</td>
<td>2.00 – 4.30 p.m.</td>
<td>Publication’s e-mail marketing procedure</td>
</tr>
<tr>
<td>24</td>
<td>15 March 2017</td>
<td>2.00 – 4.30 p.m.</td>
<td>The use of reference management tools to improve citation</td>
</tr>
<tr>
<td>25</td>
<td>22 March 2017</td>
<td>2.00 – 4.30 p.m.</td>
<td>Content &amp; Wikipedia as an approach to increase research visibility on the web</td>
</tr>
</tbody>
</table>
Next Workshop

DECEMBER
19 & 20, 2016
(MONDAY & TUESDAY)
9.00 am — 4.30 pm

Programme Details

DECEMBER 19 & 20, 2016 (MONDAY & TUESDAY)
9.00 am — 4.30 pm
Venue: To Be Confirmed (in University of Malaya)
Fees: RM 400.00 (UM STAFF & STUDENTS)
RM 1,500.00 (NON-UM STAFF & STUDENTS)

Dr. Nader Ale Ebrahim
Visiting Research Fellow, Centre for Research Services, IPPP, UM
- Winner of ‘Refer-a-Colleague Competition’
- Creator of "Research Tools" Box
- Developer of “Publication Marketing Tools”
- Conducted over 280 workshops

For more details, please visit: http://umconference.um.edu.my/s

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Introduction of bibliometrics

- Bibliometrics can be defined as the quantitative analysis of science and technology performance and the cognitive and organizational structure of science and technology.
- Basic for these analyses is the scientific communication between scientists through (mainly) journal publications.
- Key concepts in bibliometrics are output and impact, as measured through publications and citations.
- Important starting point in bibliometrics: scientists express, through citations in their scientific publications, a certain degree of influence of others on their own work.
- By large scale quantification, citations indicate influence or (inter)national visibility of scientific activity, but should not be interpreted as synonym for ‘quality’.

Informetrics, scientometrics, bibliometrics, webometrics, cybermetrics and altmetrics

Bibliographies – largely references

Whole Internet, cyberspace

Science of Science

Web presence, visibility and impact – links, pages, documents

Alternative metrics – views, downloads, web citations, etc


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## Frequently Used Terms for Research Evaluation Metrics

<table>
<thead>
<tr>
<th>Term</th>
<th>Short Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bibliometrics</td>
<td>Bibliometrics is a set of methods to quantitatively analyse academic literature and scholarly communications.</td>
</tr>
<tr>
<td>Informetrics</td>
<td>Informetrics is the study of quantitative aspects of information. This includes the production, dissemination, and use of all forms of information, regardless of its form or origin.</td>
</tr>
<tr>
<td>Scientometrics</td>
<td>Scientometrics is the study of quantitative features and characteristics of science, scientific research and scholarly communications.</td>
</tr>
<tr>
<td>Webometrics</td>
<td>Webometrics is the study of quantitative features, characteristics, structure and usage patterns of the world wide web, its hyperlinks and internet resources.</td>
</tr>
<tr>
<td>Cybermetrics</td>
<td>Cybermetrics is an alternative term for Webometrics.</td>
</tr>
<tr>
<td>Librametrics</td>
<td>Librametrics is a set of methods to quantitatively analyse availability of documents in libraries, their usage and impact of library services to its user community.</td>
</tr>
<tr>
<td>Patentometrics</td>
<td>Patentometrics is a set of methods to quantitatively analyse patent databases, patent citations and their usage patterns.</td>
</tr>
<tr>
<td>Altmetrics</td>
<td>Altmetrics is new metrics proposed as an alternative to the widely used journal impact factor and personal citation indices like the h-index. The term altmetrics was proposed in 2010, as a generalization of article level metrics, and has its roots in the twitter #altmetrics hashtag.</td>
</tr>
<tr>
<td>Article Level Metrics (ALM)</td>
<td>Article level metrics is an alternative term for Altmetrics.</td>
</tr>
</tbody>
</table>

Reasons for bibliometric studies

• Understanding of *patterns*
  – discovery of regularities, behavior
  – “order out of documentary chaos” [Bradford, 1948]

• Analysis of *structures & dynamics*
  – discovery of connections, relations, networks
  – search for regularities - possible predictions

• Discovery of *impacts, effects*
  • relation between entities & amounts of their various uses
  – providing support for making of decisions, policies

Source: https://comminfo.rutgers.edu/~tefko/Courses/e530/Lectures/Lecture09%20Bibliometric%20searching.ppt
Use of evaluative bibliometrics

• Academic, research & government institutions for:
  – promotion and tenure, hiring, salary raising
  – decisions for support of departments, disciplines
  – grants decision; research policy making
  – visualization of scholarly networks, identifying key contributions & contributors
  – monitoring scholarly developments
  – determining journal citation impact

• Resource allocation:
  – identifying authors most worthy of support;
  – research areas most worthy of funding
  – journals most worthy of support or purchase; etc.

Source: https://comminfo.rutgers.edu/~tefko/Courses/e530/Lectures/Lecture09%20Bibliometric%20Searching.ppt

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Applications of Scientometrics and Bibliometrics in Research Evaluation

• For Institution/ Collaborative Research Group

• For a scientist:
  – Mapping of collaborations, collaborating institutions, collaborating countries, co-authors, highly cited papers, top publishing journals, percentage of cited vs. uncited papers, percentage of self-citations, author-level indicators such as h-index, i10-index, etc.

• For a country

• For a journal

## Major Citation Databases

<table>
<thead>
<tr>
<th>Name of Citation Database</th>
<th>Launched</th>
<th>Scope</th>
<th>Owned by</th>
<th>Terms of Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Science Citation Index (SCI)</em></td>
<td>1964</td>
<td>Global</td>
<td>Thomson Reuter</td>
<td>Subscription-based with Web of Science</td>
</tr>
<tr>
<td><em>Social Science Citation Index (SSCI)</em></td>
<td>1972</td>
<td>Global</td>
<td>Thomson Reuter</td>
<td>Subscription-based with Web of Science</td>
</tr>
<tr>
<td><em>Arts &amp; Humanities Citation Index (A&amp;HCI)</em></td>
<td>1978</td>
<td>Global</td>
<td>Thomson Reuter</td>
<td>Subscription-based with Web of Science</td>
</tr>
<tr>
<td><em>Scopus</em></td>
<td>2004</td>
<td>Global</td>
<td>Elsevier B.V.</td>
<td>Subscription-based</td>
</tr>
<tr>
<td><em>Google Scholar Citations</em></td>
<td>2004</td>
<td>Global</td>
<td>Google Inc.</td>
<td>Freely Available Online</td>
</tr>
<tr>
<td><em>Microsoft Academic Search</em></td>
<td>2003</td>
<td>Global</td>
<td>Microsoft Research</td>
<td>Freely Available Online</td>
</tr>
<tr>
<td><em>CiteSeerX (CiteSeerX.ist.psu.edu)</em></td>
<td>1997</td>
<td>Global; Subject specific</td>
<td>Pennsylvania State University, USA</td>
<td>Freely Available Online</td>
</tr>
</tbody>
</table>

The Institute for Scientific Information (ISI)

- The Institute for Scientific Information (ISI) was founded by Eugene Garfield in 1960. It was acquired by Thomson Scientific & Healthcare in 1992, became known as Thomson ISI and now is part of the Healthcare & Science business of the multi-billion dollar Thomson Reuters Corporation.

- ISI offered bibliographic database services. Its speciality: citation indexing and analysis, a field pioneered by Garfield. It maintains citation databases covering thousands of academic journals, including a continuation of its long time print-based indexing service the Science Citation Index (SCI), as well as the Social Sciences Citation Index (SSCI), and the Arts and Humanities Citation Index (AHCI). All of these are available via ISI's Web of Knowledge database service.
Thomson Reuters (formerly ISI) has been the authority on citation data for over 50 years.
Scopus (Launched 2004)

- Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. Delivering a comprehensive overview of the world's research output in the fields of science, technology, medicine, social sciences, and arts and humanities, Scopus features smart tools to track, analyze and visualize research.

- As research becomes increasingly global, interdisciplinary and collaborative, you can make sure that critical research from around the world is not missed when you choose Scopus.

Source: [http://www.elsevier.com/online-tools/scopus](http://www.elsevier.com/online-tools/scopus)
A Comparison between Two Main Academic Literature Collections: Web of Science and Scopus Databases

Author Level Indicators

- H Index
- i10 index
- Articles with Citation Data
- Average Citation per Article
- Total Citations Count
- Cited vs. Uncited Papers Ratio
- Eigenfactor® score
- Impact Points
- RG Score

Keywords search
Research Tools Mind Map

1. Searching the literature
2. Writing a paper
3. Targeting suitable journals
4. Enhancing visibility and impact

Virtual Teams will become as important as...
Example of Keywords selection

Survey for bibliometric study on “physical activity and older adults”.

Hello,
We are doing a bibliometric study on “physical activity and older adults”. Which keywords would you use to search for “physical activity” and “older adults”? Please select from the lists below. You can select more than one keyword from each list and also add words to the lists. Thank you

* Required

"Physical Activity" key words: *
Which keywords would you use to search for “physical activity”?

- Exercise
- Sport(s)
- Fitness
- Walking
- Aerobics
- Training

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Selecting keywords
Keywords Plus

• KeyWords Plus® are index terms created by Thomson Reuters from significant, frequently occurring words in the titles of an article's cited references.

Keywords and Keywords Plus®

Authors sometimes provide a list of keywords or terms that they feel best represent the content of their paper. These keywords are contained in the ISI record (1991 data forward, depending on the database) for each article and are searchable. In addition, ISI generates KeyWords Plus for many articles. KeyWords Plus are words or phrases that frequently appear in the titles of an article's references, but do not necessarily appear in the title of the article itself. KeyWords Plus may be present for articles that have no author keywords, or may include important terms not listed among the title, abstract, or author keywords.

Source: http://wos.isitrial.com/help/helpdefs.html
KeyWords Plus- Example

- New Product Development in Virtual Environment (ISI Indexed)
- Author Keywords: New product Development; Virtual teams; Concurrent Collaboration; Review paper
- KeyWords Plus: DEVELOPMENT TEAMS; PERFORMANCE; TECHNOLOGY; KNOWLEDGE; COMMUNICATION; PERSPECTIVE; INTEGRATION; INNOVATION; NETWORK; WORKING
Web of Science℠

Citation Report  Topic="(virtual Teams)"
Timespan=All Years. Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH.
This report reflects citations to source items indexed within Web of Science. Perform a Cited Reference Search to include citations to items not indexed within Web of Science.

Published Items in Each Year

Citations in Each Year

Results found: 741
Sum of the Times Cited [?] : 7561
Sum of Times Cited without self-citations [?] : 4771
Citing Articles [?] : 3928
View Citing Articles
View without self-citations
Average Citations per Item [?] : 10.20
h-index [?] : 42

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Key Words Selection

Results: 26
(from Web of Science Core Collection)
You searched for:
TITLE: ("Envelope Design")
Timespan: All years. Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH.

Results: 477
(from Web of Science Core Collection)
You searched for:
TITLE: ("efficiency envelope*"") OR (envelope NEAR/5 building) OR (envelope NEAR/5 energy) OR ("envelope* energy* saving**") OR ("Envelope* System**") OR ("thermal* envelope*"") OR ("Envelope* Design**")
Timespan: All years. Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH.
### TABLE 1: Search phrases used

<table>
<thead>
<tr>
<th>Field</th>
<th>Search Strings</th>
</tr>
</thead>
<tbody>
<tr>
<td>general/other</td>
<td>brain surgery – neurosurgery – hydrocephalus – peripheral nerve surgery</td>
</tr>
<tr>
<td>spine</td>
<td>spine fusion – spine fixation – spine surgery – spinal surgery – spinal fusion – spinal fixation – [cervical or thoracic or lumbar] and [disc* or disk*]</td>
</tr>
</tbody>
</table>

* The asterisk was included in the search string as a wild card character. For example, the search “disc*” would return results for “disc” or “discs” or “discectomy.”


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100 top-cited scientific papers in limb prosthetics

Arezoo Eshraghi¹*, Noor Azuan Abu Osman¹, Hossein Gholizadeh¹, Sadeeq Ali¹ and Babak Shadgan²

Abstract

Research has tremendously contributed to the developments in both practical and fundamental aspects of limb prosthetics. These advancements are reflected in scientific articles, particularly in the most cited papers. This article aimed to identify the 100 top-cited articles in the field of limb prosthetics and to investigate their main characteristics. Articles related to the field of limb prosthetics and published in the Web of Knowledge database of the Institute for Scientific Information (ISI) from the period of 1980 to 2012. The 100 most cited articles in limb prosthetics were selected based on the citation index report. All types of articles except for proceedings and letters were included in the study. The study design and level of evidence were determined using Sackett's initial rules of evidence. The level of evidence was
100 top-cited scientific papers in limb prosthetics

Figure 4 The top 10 journals that published the highest number of top cited papers.
Global scientific production on GIS research by bibliometric analysis from 1997 to 2006

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>R (%)</td>
<td>P</td>
</tr>
<tr>
<td>GIS</td>
<td>236</td>
<td>1 (24)</td>
<td>740</td>
</tr>
<tr>
<td>Remote sensing</td>
<td>435</td>
<td>2 (4.4)</td>
<td>154</td>
</tr>
<tr>
<td>Geographic information system</td>
<td>395</td>
<td>3 (4)</td>
<td>150</td>
</tr>
<tr>
<td>Geographic information systems</td>
<td>370</td>
<td>4 (3.8)</td>
<td>145</td>
</tr>
<tr>
<td>Spatial analysis</td>
<td>136</td>
<td>5 (1.4)</td>
<td>43</td>
</tr>
<tr>
<td>Geographical information systems</td>
<td>119</td>
<td>6 (1.2)</td>
<td>55</td>
</tr>
<tr>
<td>Land use</td>
<td>118</td>
<td>7 (1.2)</td>
<td>30</td>
</tr>
<tr>
<td>Geographical information system</td>
<td>116</td>
<td>8 (1.2)</td>
<td>39</td>
</tr>
<tr>
<td>Geographic information systems (GIS)</td>
<td>112</td>
<td>9 (1.1)</td>
<td>36</td>
</tr>
<tr>
<td>GPS</td>
<td>99</td>
<td>10 (1)</td>
<td>33</td>
</tr>
<tr>
<td>Geographic information system (GIS)</td>
<td>96</td>
<td>11 (1)</td>
<td>30</td>
</tr>
<tr>
<td>Modeling</td>
<td>94</td>
<td>12 (1)</td>
<td>35</td>
</tr>
<tr>
<td>Water quality</td>
<td>89</td>
<td>13 (0.9)</td>
<td>30</td>
</tr>
<tr>
<td>Conservation†</td>
<td>85</td>
<td>14 (0.86)</td>
<td>17</td>
</tr>
<tr>
<td>Modelling</td>
<td>81</td>
<td>15 (0.82)</td>
<td>25</td>
</tr>
</tbody>
</table>

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### Table 1. Characteristics by year of publication outputs from 1991 to 2006

<table>
<thead>
<tr>
<th>Year</th>
<th>TP</th>
<th>PG</th>
<th>PG/P</th>
<th>NR</th>
<th>NR/P</th>
<th>AU</th>
<th>AU/P</th>
<th>J</th>
<th>P/J</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>905</td>
<td>7,058</td>
<td>7.8</td>
<td>31,081</td>
<td>34</td>
<td>4,011</td>
<td>4.4</td>
<td>289</td>
<td>3.1</td>
</tr>
<tr>
<td>1992</td>
<td>1,089</td>
<td>8,250</td>
<td>7.6</td>
<td>36,467</td>
<td>33</td>
<td>5,224</td>
<td>4.8</td>
<td>307</td>
<td>3.5</td>
</tr>
<tr>
<td>1993</td>
<td>1,270</td>
<td>10,027</td>
<td>7.9</td>
<td>46,039</td>
<td>36</td>
<td>6,080</td>
<td>4.8</td>
<td>324</td>
<td>3.9</td>
</tr>
<tr>
<td>1994</td>
<td>1,421</td>
<td>11,408</td>
<td>8.0</td>
<td>49,858</td>
<td>35</td>
<td>7,292</td>
<td>5.1</td>
<td>378</td>
<td>3.8</td>
</tr>
<tr>
<td>1995</td>
<td>1,629</td>
<td>12,845</td>
<td>7.9</td>
<td>59,473</td>
<td>37</td>
<td>89,94</td>
<td>5.5</td>
<td>425</td>
<td>3.8</td>
</tr>
<tr>
<td>1996</td>
<td>2,080</td>
<td>16,398</td>
<td>7.9</td>
<td>75,887</td>
<td>36</td>
<td>11,633</td>
<td>5.6</td>
<td>484</td>
<td>4.3</td>
</tr>
<tr>
<td>1997</td>
<td>2,284</td>
<td>18,222</td>
<td>8.0</td>
<td>83,873</td>
<td>37</td>
<td>12,912</td>
<td>5.7</td>
<td>527</td>
<td>4.3</td>
</tr>
<tr>
<td>1998</td>
<td>2,417</td>
<td>19,487</td>
<td>8.1</td>
<td>90,149</td>
<td>37</td>
<td>14,454</td>
<td>6.0</td>
<td>571</td>
<td>4.2</td>
</tr>
<tr>
<td>1999</td>
<td>2,723</td>
<td>22,024</td>
<td>8.1</td>
<td>100,211</td>
<td>37</td>
<td>16,444</td>
<td>6.0</td>
<td>606</td>
<td>4.5</td>
</tr>
<tr>
<td>2000</td>
<td>3,070</td>
<td>23,986</td>
<td>7.8</td>
<td>112,950</td>
<td>37</td>
<td>18,536</td>
<td>6.0</td>
<td>660</td>
<td>4.7</td>
</tr>
<tr>
<td>2001</td>
<td>3,338</td>
<td>26,302</td>
<td>7.9</td>
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TP: Number of publications; PG: Page count; NR: Cited reference count; AU, J: Number of authors and journals; PG/P, NR/P, and AU/P: average of pages, references, and authors in a paper; P/J: average of papers in a journal.
Qualitative and quantitative analysis of solar hydrogen generation literature from 2001 to 2014
Major trends in knowledge management research: a bibliometric study

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Figure 1. Publication output in PA and aging between 1980 and February 6, 2015.
Evaluating the academic trend of RFID technology based on SCI and SSCI publications from 2001 to 2014

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Evaluating the academic trend of RFID technology based on SCI and SSCI publications from 2001 to 2014
Figure 3. Analysis of Relationship between Journal Impact Factors and Number of Citations. Amongst 10 papers (circles and black boxes) with highest effect on the correlation, four papers (circles) increased the r and decreased P values.
Impact of Article Page Count and Number of Authors on Citations in Disability Related Fields: A Systematic Review Article

Fig. 1: Total citation count based on the range of article page count
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