



Citation Performance of Malaysian Scholarly Journals in the Web of Science, 2006–2010

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ABSTRACT

There are several ways for the international scientific community to recognize the quality of a scholarly journal. Although controversial, the most widely used and reliable methodology to identify the importance of a journal is through the citation it receives. This paper identifies the performance of scholarly journals published by Malaysian publishers in the Web of Science and reports the number of citations to Malaysian journals in terms of the cited and the citing journals. A search using the Thomson-Reuters citation database (Web of Science) was performed to identify highly cited Malaysian journals from 2006 to 2010. We identified 212 cited journals that received 9675 cited-papers, and a total of 9427 articles contributing to the 3184 journals citing Malaysian journals. More than fifty percent of all the articles that cited Malaysian journals were published in journals ranked in the first or second quartile by the Journal Citation Report. Further analysis was done on the top 50 cited and citing journal titles. A steady growth of citations with a total increase of 56.9% was evident between the five year period examined.

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1. Introduction

The scientific impact of a scholarly journal is established over time. Because publications inspire future articles, a paper's scientific impact can be measured in terms of the number of citations received (Garfield, 1970), as high quality work by a scientist will trigger more responses (citations) from their scientific peers than low quality work. As such, the frequency of citations serves as a rough guide to the importance of an article and the impact factor (IF) is now generally used to measure the prestige of journals, the influence of articles published in those journals, and by extension, the authors, institutions and countries publishing in those journals. Gross and Gross (1927) were the first to use citation counts to evaluate the importance of scientific works. Since then, academic and research institutions around the world have used citations as an indicator for journal impact (Garfield, 1972; Nicolaisen, 2002) and for assessment of national science policies and disciplinary development (Lewison & Dawson, 1998; Oppenheim, 1995; Oppenheim, 1997; Tijssen, van Leeuwen, & van Raan, 2002) and individual scientists (Cole & Cole, 1973; Garfield, 1970).

The Journal impact factor (JIF) has been found to be a reasonable indicator of quality. Saha, Saint, and Christakis (2003) compared the ratings of practicing and research physicians (on a scale of 0 to 10)

to ten clinical journal's JIF and found a strong correlation between JIF and physicians' ratings of journal quality, being higher among research physicians than the practitioners. An earlier study by Foster (1995) also found JIF as a good operational measure of quality for medical journals. However, to equate JIF to the impact of articles published by a journal has been questioned, as the JIF of a journal is often determined by a small number of articles it publishes. The cumulative curve of articles with different rates of citation indicate that the most cited 15% of articles published by journals account for 50% of citations, and the most cited 50% of articles account for 90% of citations (Seglen, 1992, 1997).

Using JIF to evaluate the quality of research has been questioned as the derivation of JIF scores from the ISI databases are riddled by shortcomings. These include the calculation of citations within a 2 year window (this may not be long enough for papers in the fields of social sciences, for example), the exclusivity of the database – which in 2009 reportedly covered over 8700 journals out of an estimate of 23,750 scholarly journal titles published worldwide (Bjork, Roos, & Lauri, 2009), bias towards journals and exclusion of citations from books and conference proceedings, and preference for English language journals. Furthermore, Rice, Borgman, Bednarski, and Hart (1989) have identified errors in journal-to-journal citations such as discrepancies between citing and cited data, changed or deleted journal titles, and variations in abbreviating journal titles. These errors are some of the causes of missed citations and reduce the validity and reliability of the JIF scores. In addition, authors may not actually cite all articles that are “influential” in a field (MacRoberts & MacRoberts,

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2010) for many reasons including the word or page constraints of journal articles and the pressure to cover more recent articles by journal editors. As such, the use of the JIF as an indicator of quality is considered with concern. However, because of the ready availability of JIF reports from the *SCI Journal Citation Reports*, we used this indicator to evaluate the performance of Malaysian journals.

When choosing their core journals, scientists often consult the citation statistics. The appeal of this method lies with the ease of ranking journals and papers in a system of simple indices that count one paper's citations to another. The research community in Malaysia has been fervently keen on inquiring about journal impact since a journal is considered important if it is cited frequently by other journals. Probably the most widely used measure of importance is the impact score computed in the Web of Science (WoS) and Scopus, which are the two main citation databases that are used to rank journals in a discipline in terms of their productivity and total citations received in order to indicate journal impact, influence, or prestige. Both databases are each grounded by certain principles to cover selectively important journals in all knowledge fields. As of 2012, WoS recognized over 12,000 of the highest impact journals worldwide (Reuters, 2012). Scopus, the largest abstract and citation database, covers 18,500 peer-reviewed journals (Elsevier, 2012). The information generated by these two databases indicates the journals that are internationally visible and active in covering relevant and current research as well as influential in shaping future research fields. Google Scholar (GS) is an Internet bibliographic database that also provides citation information. Increasingly, more studies are using GS to estimate the influence of single journals or compare returns for searchers using GS, WoS, Scopus and other databases (Aalst, 2010; Baldwin, 2009; Noruzi, 2005; Sanni & Zainab, 2011; Sember, Utrobi, & Petrak, 2010). However, due to the broadness of coverage of resources, GS have some limitations in terms of accuracy, inadequate coverage of some fields, and vulnerability to spam – which can result in citation manipulations (Beel & Gipp, 2010; Burright, 2006; Falagas, Pitsouni, Mallietzis, & Pappas, 2007). In this study, we have chosen to use WoS.

The visibility of Malaysian scholarly journals is viewed in terms of its index status by national or universal indexing databases. Zainab, Sanni, Edzan, and Koh (2012) traced a total of 464 journal titles and found that only 105 (22.6%) were indexed by the national indexing system MyAIS (Malaysian Abstracting and Indexing System), the international indexing databases, or subject-based indexes. MyAIS (<http://myais.fsktm.um.edu.my>) is an Open Access indexing system of articles published in refereed scholarly Malaysian journals. The system was funded by a University research grant and developed in 2007 by the Digital Library Research Group, Faculty of Computer Science and Information Technology, University of Malaya. It currently indexes more than 100 Malaysian journal titles and holds over 12,000 records. MyAIS also provide indices on the performance of Malaysian journals (total cites, total publications, impact factor, and h index) confined, however, only to citations received from journals published in Malaysia that are covered by the database. The MyAIS database has been used as the basis for a new citation index system called MyCite (Malaysian Citation Index, <http://mycite.my>), a system mooted by the Ministry of Higher Education Malaysia. MyCite is a very new initiative and was launched in May 2012. The development of this citation index was benchmarked against WoS's citation indices and Scopus as well as other national citation indices currently found in Japan, Korea, Taiwan, China, Thailand, Philippines, and Indonesia (Proceeding: International Conference on Journal Citation Systems in Asia Pacific Countries, 2012). These national citation databases focus on indexing national scholarly journals published in both English and native languages to improve the quality of national journals and increase visibility and accessibility. Although it is possible to currently gauge journal performance within Malaysia, the Malaysian government and public are concerned about journal performance in international databases. As a result, the Malaysian Citation Centre, established

in 2011, was asked to investigate this issue, and this study is the result. Collectively, 51 Malaysian journals are indexed in WoS or Scopus. Nine titles are indexed in WoS, and 49 are indexed in Scopus. Out of the nine (9) titles indexed in WoS, seven titles are also indexed in Scopus. Two titles, *Al-Shajarah* and *Journal of Oil Palm Research* are indexed only in WoS. The seven titles indexed by both databases are listed as follows:

1. *Bulletin of the Malaysian Mathematical Sciences Society*
2. *Journal of Rubber Research*
3. *Journal of Tropical Forest Science*
4. *Malaysian Journal of Computer Science*
5. *Malaysian Journal of Library and Information Science*
6. *Sains Malaysiana*
7. *Tropical Biomedicine*.

The visibility of these journals covered by the international indexing and abstracting services has led to an inquiry as to how many Malaysian scholarly journals have attained such 'visibility' in terms of citations and are being covered by the WoS. Malaysian journals indexed by the WoS are considered to have a certain degree of quality and authority, and since the distribution of this database is worldwide, journals cited in WoS can be said to have achieved a certain degree of "visibility." Also, increasingly Malaysian universities have mandated their academic researchers to publish only in journals indexed by WoS. Malaysia has designated five of its universities as research universities to focus on research, innovations, and publications in the fields of science, medicine and technology. With this designation, the librarians of these universities are placed in an advisory position and are asked periodically by management to provide citation and publication track reports of academics and research group members before tenure, hiring, renewal of contracts, or remunerations can take place. Academics have begun to expect librarians and information professionals to be able to inform them about the core journals in their fields (especially those in the ISI databases). Librarians are being asked to brief management on the yearly citation and publication performance of the university faculty so that comparisons can be made with other national and regional universities. This policy has been endorsed by the Malaysian Ministry of Higher Education, which is pushing for Malaysian journals to improve in terms of quality and visibility. In this context, how Malaysian journals fare in getting citations in international citation databases is little studied. This paper attempts to investigate these issues, which are increasingly becoming important to governments and scholars in developing countries (Andreis & Jokic, 2008).

2. Objectives, Methods and Materials

This paper is motivated by the sense of urgency about communicating the information that is uniquely available from the Institute for Scientific Information's (ISI) databank on the performance of Malaysian journals. The objective for this paper is twofold. Firstly, it attempts to investigate the "visibility" of Malaysian scholarly journals in the Web of Science. Secondly, a select number of these "visible" journals were studied more closely to identify their performance in terms of citations received. In particular, we will examine WoS to answer the following research questions:

- a) What are the cited Malaysian journals in the Web of Science?
- b) What are the journals indexed in the Web of Science that are citing these Malaysian journals?

For this study, Malaysian journals are defined as journals that denote Malaysia as the country or territory of the publication. Scholarly journals refer to those periodicals that publish research articles and are concerned with a serious study within a particular discipline and follow an acceptable form of academic inquiry (Borgman, 1990). "Visibility" of scholarly journals in this context would refer to the

degree of ease with which Malaysian scholarly journals and articles can be obtained and the extent to which these journals are known to international scholars. Typically, scholars use international indexing and abstracting databases such as the WoS and Scopus to obtain relevant literature on the areas of their research. These information services adopt prudent methods of evaluating journals for indexing and often require publishers of journals to submit a number of issues to convince them of the longevity, regularity, and the quality of the journals concerned. Hence, it is expected that those journals covered by major indexing services, such as WoS (despite its shortcomings as pointed out by published literature), should possess a certain degree of quality and authority to qualify as being worthy enough to be indexed.

Citation analysis is used in this study to gauge the overall impact of Malaysian journals in WoS and to identify those specific journals that are cited and the journals citing articles published in Malaysian journals. In bibliometric studies, citation analysis is a well-known technique that has a long history in studies of scholarly communication (Brown & Gardner, 1985). As an artifact of scholarly communication, citations reveal formal communication patterns and scholarly impact. The major advantages of citation analysis are its high reliability and unobtrusiveness. The general presumption of citation analysis is that the number of citations an article receives is an objective measure of its impact or influence. A number of studies have examined the meaning of citation as an evaluation tool for journals (Lim, Ma, Wen, Xu, & Cheang, 2009; McAllister, Anderson, & Narin, 1980; Quental & Lourenço, 2012; Vieira & Teixeira, 2010; Yuan & Hua, 2011). There have been cautions associated with using citation analysis to evaluate journals, such as the difficulty of ascertaining the usefulness or relevance of the articles that journals publish and journal self-citation. Garfield (1972) pointed out that some journals are read by scientists for a particular purpose (he quoted *Scientific American*), such as keeping up with current findings, but may not be cited. This does not mean that the journal is of less importance or less utilized. Despite this caution, Garfield (1972) admits that citation counts do reflect a journal's value, authority, and the use made of it; "Citation frequency of a journal is thus a function – not only of the scientific significance of the material it publishes (as reflected by citations), but also of the amount of materials it publishes" (p. 537).

Data for this study are obtained from two main sources:

- The Malaysian Abstracting and Indexing System (MyAIS, available at <http://myais.fsktm.um.edu.my>), which contains the master list of Malaysian journals.
- Web of Science (WoS) compiled by Thomson Reuters, which contains international scholarly publications and citations from the Science Citation Index Expanded (SCIE), Social Sciences Citation Index (SSCI) and Arts & Humanities Citation Index (A&HCI) between 2006 and 2010.

The search of Malaysian journals in the WoS database (<http://www.isiwebofknowledge.com>) was conducted on 1 December 2011 and verified again on 31 December 2011. Citations received in 2011 are not included because not all journals published during that year had been indexed by WoS. The search strategy takes the form of searching for the word 'Malaysia' from the fields provided for publisher of sources or for country/territory of publication of sources indexed. The list of Malaysian journals from MyAIS, which has a total of 519 journal titles (as accessed in February 2012), is compared with the list compiled by the Malaysian Citation Centre traced from Zainab et al. (2012), which provides an overall total of 464 titles. The latter has 79 titles less as journals published by Asia Pacific-based professional societies where the editorial secretariat are currently located in Malaysia as well as journals identified as "unscholarly" based on an audit exercise are excluded from the list. For example, the *Asia-Pacific Journal of Public Health*, which is published by Sage Publications Inc. and has Malaysia as the journal country/territory was not included in Zainab's journal audit but is included in this study since it fits with the contextual definition of Malaysian journal and appears in ISI's journal master list. Cited reference search was used to trace citations of Malaysian journals. Prior to the search, abbreviated journal names of the 519 Malaysian journals were ascertained as this is required when searching for journal titles in WoS. From the result retrieved, we refined the search to records published between 2006 and 2010 only. The result reflects the citations received by Malaysian journals in WoS indexed papers published over the same period of time. The accuracy of the journal title search is detrimental to getting accurate results as variations in abbreviating journals were found in citations, and on occasion, the abbreviated titles were shortened making identification difficult. The Thomson helpdesk explained the situation as follows: "... Title abbreviations are created to provide a unique, stable and recognizable version of the title. This is needed to allow citation aggregation. Although we try to use standard abbreviations, the 20 character limit on the title abbreviations and the need for each cited title to be unique often requires non-standard uses."

For each Malaysian journal indexed in WoS, cited journal data (Malaysian journals being cited) and the citing journal data (journals citing Malaysian journals) were obtained. Since WoS indexes thousands of scholarly journals, which it represents as the most significant journals in the various fields of scholarship, a cited reference search should retrieve the majority of all citations made in scholarly journals to the cited work. To identify Malaysian journals referenced in WoS, each title listed in the MyAIS master list was searched in the WoS Cited Reference Search "cited work" field. The search retrieved a total of 212 Malaysian journals cited in WoS for the five-year period. This includes a total of 11 Malaysian journals indexed in WoS. Zainab et al. (2012) reported nine Malaysian journal titles, since *Asia-Pacific Journal of Public Health* and *Neurology Asia* were excluded.

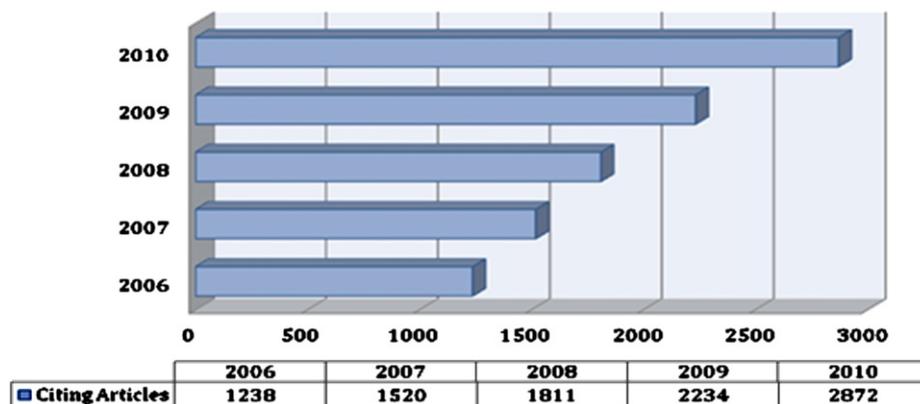


Figure 1. Citation received by Malaysian cited journals in the Web of Science 2006–2010 (N = 9675).

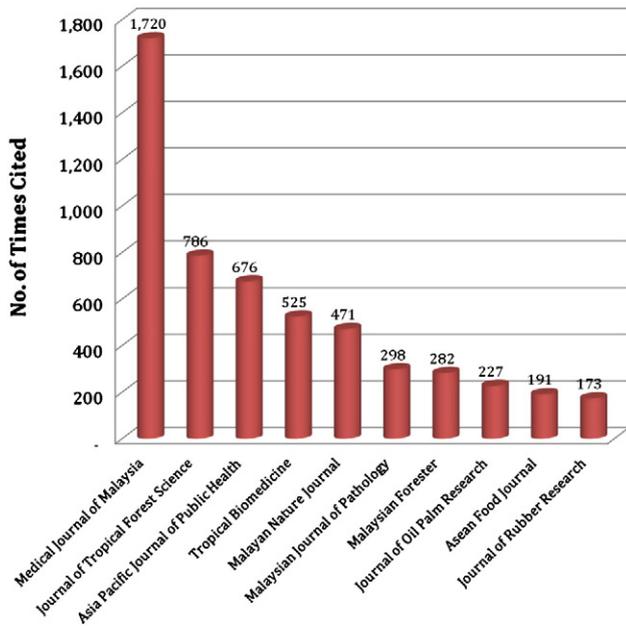


Figure 2. Malaysian Top 10 Cited Journals in the Web of Science 2006–2010.

3. Results

3.1. Cited Malaysian Journals in WoS

Out of 519 Malaysian journals traced in this study, a total of 212 (41%) Malaysian journals are cited in WoS, whereas 307 (59%) of them are not cited at all. There are altogether 9675 articles citing Malaysian journals in WoS from 2006 to 2010. Figure 1 presents the year wise distribution of the citations received, which indicates a steady growth with an increase of 56.9% for the five year period.

Figure 2 presents the top 10 cited Malaysian journals in WoS, of which all are either from the sciences or medical and health sciences discipline. *Medical Journal of Malaysia* (ISSN: 0300-5283), published since 1890 and originated as the *Journal of the Straits Medical Association* and at present the official organ of the Malaysian Medical Association (MMA) leads, with a total of 1720 citations. This is followed by *Journal of Tropical Forest Science* (ISSN: 0128-1283) (786 citations), *Asia Pacific Journal of Public Health* (ISSN: 1010-5395) (676 citations), *Tropical Biomedicine* (ISSN: 0127-5720) (525 citations), *Malayan Nature Journal* (ISSN 0025-1291) (471 citations), *Malaysian Journal of Pathology* (ISSN: 0126-8635) (298 citations), *Malaysian Forester* (ISSN: 0302-2935) (282 citations), *Journal of Oil Palm Research* (ISSN: 1511-2780) (227 citations), *Asean Food Journal* (ISSN: 01277324) (191 citations), and *Journal Rubber Research* (ISSN: 151-1768) (173 citations). Figure 3 depicts the year wise distribution of the citations

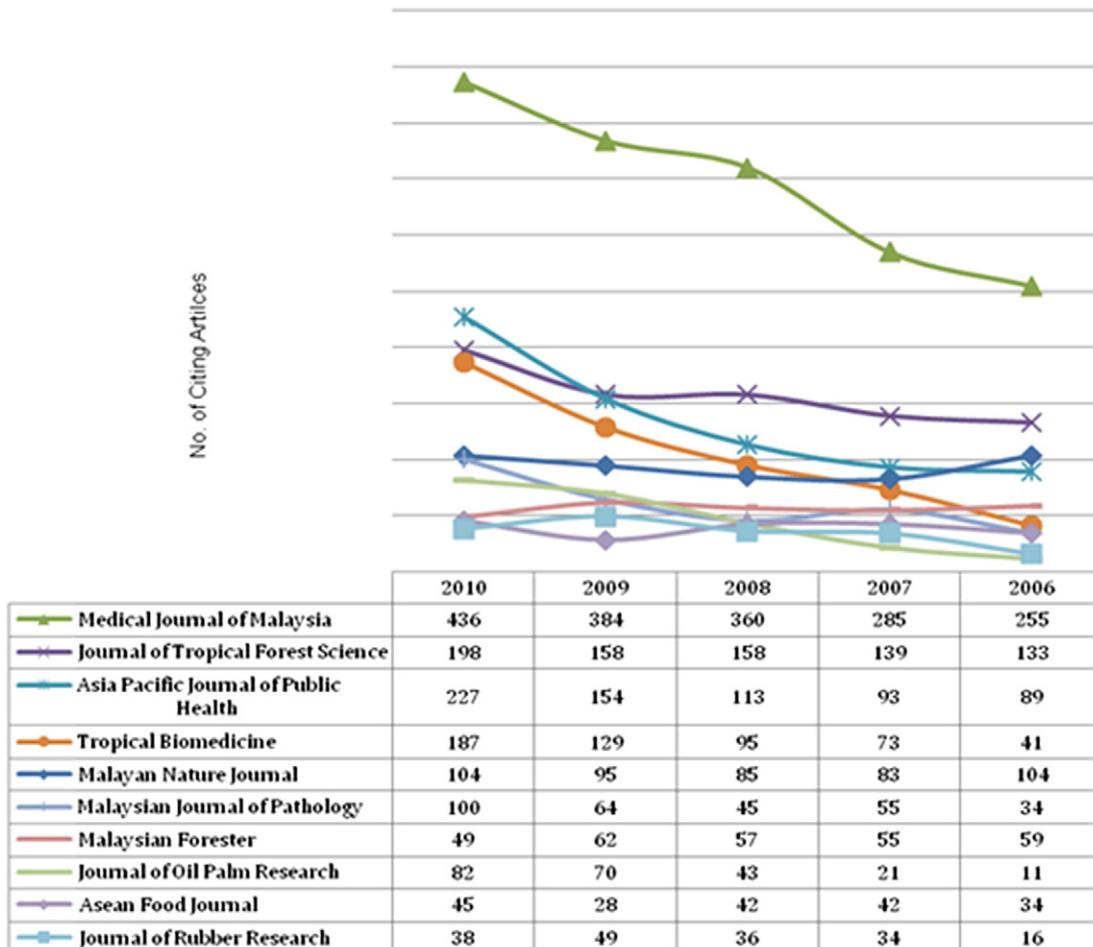


Figure 3. Citation received by Malaysian top 10 cited journals in the Web of Science 2006–2010.

received for these eleven journals, which in general show an increase for all journals except for *Malaysian Forester*.

Out of these ten journals, five are also citing journals in WoS, and the other five are cited-only journals (Table 1). For example, *Medical Journal of Malaysia*, *Malayan Nature Journal*, *Malaysian Journal of Pathology*, *Malaysian Forester*, and *Asean Food Journal* are cited-only journals since they appear elsewhere in WoS but not in the Citing Journal Listing. This means that the references in the latter journals are not included in WoS. This is significant when comparing journals because self-citations from cited-only journals are not included in WoS. Self-citations often represent a significant percentage of the citations that a journal receives. The five cited-only journals in the

top 10 list, although not indexed in WoS, are all being indexed in Scopus.

Only 25 Malaysian journals reached the classic denomination (journals with more than 100 citations) (Table 1), so we further evaluated the top 50 journals (the top 25%) revealing a total of 52 titles, since a few titles have the same number of citations. These journals are ranked by the total number of citations they received in WoS, i.e., the total number of times that the journal has been cited by all journals included in the database. The table also shows the number of citations they received by year, the number of citing journals, and self-citations. Citing journal shows how many citations a journal made to other journals (including itself) in WoS, whereas journal

Table 1
Top 50 Malaysian cited journals 2006–2010.

| No | Source title | Year/no. of citing articles | | | | | Indexing database | No. of citing journals | Journal self citations | |
|----|--|-----------------------------|------|------|------|------|-------------------|------------------------|------------------------|------|
| | | Total | 2010 | 2009 | 2008 | 2007 | | | | 2006 |
| 1 | Medical Journal of Malaysia | 1720 | 436 | 384 | 360 | 285 | 255 | S | 976 | 0 |
| 2 | Journal of Tropical Forest Science | 786 | 198 | 158 | 158 | 139 | 133 | W/S | 311 | 62 |
| 3 | Asia Pacific Journal of Public Health | 676 | 227 | 154 | 113 | 93 | 89 | W/S | 404 | 53 |
| 4 | Tropical Biomedicine | 525 | 187 | 129 | 95 | 73 | 41 | W/S | 238 | 81 |
| 5 | Malayan Nature Journal | 471 | 104 | 95 | 85 | 83 | 104 | S | 221 | 0 |
| 6 | Malaysian Journal of Pathology | 298 | 100 | 64 | 45 | 55 | 34 | S | 240 | 0 |
| 7 | Malaysian Forester | 282 | 49 | 62 | 57 | 55 | 59 | S | 131 | 0 |
| 8 | Journal of Oil Palm Research | 227 | 82 | 70 | 43 | 21 | 11 | W | 137 | 34 |
| 9 | Asean Food Journal | 191 | 45 | 28 | 42 | 42 | 34 | S | 89 | 0 |
| 10 | Journal of Rubber Research | 173 | 38 | 49 | 36 | 34 | 16 | W/S | 81 | 0 |
| 11 | Asia Pacific Journal of Molecular Biology & Biotechnology | 171 | 50 | 42 | 37 | 27 | 15 | S | 122 | 0 |
| 12 | Malaysian Journal of Nutrition | 168 | 57 | 38 | 33 | 22 | 18 | S | 121 | 0 |
| 13 | Sarawak Museum Journal ^a | 164 | 47 | 35 | 27 | 34 | 21 | S | 85 | 0 |
| 14 | Pertanika | 155 | 37 | 24 | 33 | 35 | 26 | S | 17 | 0 |
| 15 | Journal of Natural Rubber Research | 138 | 17 | 21 | 28 | 45 | 27 | M | 68 | 0 |
| 16 | Biomedical Imaging and Intervention Journal ^b | 135 | 54 | 43 | 31 | 7 | 0 | S | 99 | 0 |
| 17 | Bulletin of the Malaysian Mathematical Sciences Society | 132 | 65 | 45 | 9 | 10 | 3 | W/S | 69 | 18 |
| 18 | Malaysian Journal of Science | 127 | 50 | 31 | 24 | 11 | 11 | S | 99 | 0 |
| 19 | Neurology Asia ^b | 126 | 48 | 39 | 27 | 10 | 2 | W/S | 75 | 22 |
| 20 | The Planter | 124 | 34 | 25 | 23 | 21 | 21 | M | 94 | 0 |
| 21 | Malaysian Applied Biology | 122 | 34 | 25 | 21 | 25 | 17 | M | 98 | 0 |
| 22 | Journal of the Federated Malay States Museum ^a | 121 | 40 | 20 | 19 | 21 | 21 | M | 45 | 0 |
| 23 | Malaysian Journal of Medical Sciences ^b | 113 | 40 | 37 | 21 | 10 | 5 | S | 90 | 0 |
| 24 | Journal of the Rubber Research Institute of Malaya | 111 | 17 | 25 | 29 | 24 | 16 | M | 65 | 0 |
| 25 | Sains Malaysiana | 105 | 38 | 36 | 15 | 8 | 8 | W/S | 72 | 28 |
| 26 | Malaysian Journal of Analytical Sciences | 87 | 43 | 24 | 12 | 4 | 4 | S | 64 | 0 |
| 26 | Journal of Tropical Medicinal Plants | 87 | 25 | 17 | 18 | 16 | 11 | M | 62 | 0 |
| 28 | Journal of the Malayan Branch of the Royal Asiatic Society ^a | 86 | 19 | 21 | 13 | 18 | 15 | M | 49 | 0 |
| 29 | Malaysian Journal of Library & Information Science ^a | 82 | 24 | 22 | 18 | 16 | 2 | W/S | 24 | 31 |
| 30 | Palm Oil Developments | 81 | 13 | 26 | 17 | 14 | 11 | M | 50 | 0 |
| 31 | Malaysian Agricultural Journal | 77 | 7 | 14 | 18 | 21 | 17 | M | 70 | 0 |
| 32 | BuletinPersatuanGeologi Malaysia (indexed as Bulletin of the Geological Society of Malaysia) | 65 | 19 | 15 | 6 | 14 | 11 | S | 46 | 0 |
| 33 | Pertanika: Journal of Tropical Agricultural Science ^b | 58 | 22 | 12 | 10 | 8 | 6 | S | 51 | 0 |
| 34 | Folia Malaysiana | 49 | 13 | 9 | 11 | 9 | 7 | M | 28 | 0 |
| 35 | Journal of Plant Protection in the Tropics | 44 | 12 | 5 | 4 | 10 | 13 | M | 40 | 0 |
| 36 | Pertanika: Science & Technology | 42 | 17 | 13 | 5 | 3 | 4 | S | 37 | 0 |
| 36 | Serangga: JurnalPusatSistematikSerangga | 42 | 16 | 6 | 9 | 7 | 4 | M | 22 | 0 |
| 38 | Journal of Engineering Science and Technology ^b | 38 | 25 | 11 | 2 | 0 | 0 | S | 35 | 0 |
| 38 | MARDI PenyelidikanBuletin (indexed as Mardi Research Bulletin) | 38 | 5 | 7 | 8 | 10 | 8 | M | 32 | 0 |
| 40 | International Food Research Journal | 35 | 30 | 5 | 0 | 0 | 0 | S | 26 | 0 |
| 40 | Malaysian Management Review ^a | 35 | 16 | 3 | 10 | 5 | 1 | M | 29 | 0 |
| 42 | PORIM Bulletin | 34 | 8 | 8 | 7 | 6 | 5 | M | 25 | 0 |
| 43 | Malaysian Journal of Microbiology ^b | 33 | 24 | 7 | 1 | 1 | 0 | S | 29 | 0 |
| 43 | Federation Museums Journal: New Series ^a | 33 | 4 | 5 | 11 | 5 | 8 | M | 22 | 0 |
| 43 | Malaysian Journal of Biochemistry and Molecular Biology | 33 | 10 | 12 | 7 | 3 | 1 | M | 29 | 0 |
| 46 | Malaysian Journal of Tropical Geography ^a | 31 | 5 | 5 | 10 | 4 | 7 | M | 26 | 0 |
| 47 | International Journal of Business and Society ^a | 30 | 15 | 8 | 3 | 1 | 3 | S | 24 | 0 |
| 47 | JurnalVeterinar Malaysia | 30 | 10 | 8 | 5 | 4 | 3 | M | 26 | 0 |
| 49 | Malaysian Journal of Computer Science | 29 | 13 | 10 | 2 | 4 | 0 | W/S | 23 | 3 |
| 49 | International Medical Journal ^b | 29 | 14 | 7 | 4 | 4 | 0 | M | 26 | 0 |
| 49 | JurnalTeknologi | 29 | 13 | 9 | 3 | 2 | 2 | M | 28 | 0 |
| 49 | Sandakania | 29 | 10 | 6 | 2 | 4 | 7 | M | 21 | 0 |

W – indexed by Web of Science, S – indexed by Scopus and M – indexed by MyAIS.

^a Social sciences, arts and humanities journals.

^b Listed in DOAJ.

self-citation is a reference to an article from the same journal. [Table 1](#) reveals the following:

- Medical Journal of Malaysia* is the most cited Malaysian journal in WoS with a total of 1720 articles in WoS citing this journal. It received 255 citations in 2006, which rose to 285 the following year. The number of citations then shot up to 360 in 2008, 384 in 2009, and 436 in 2010.
- A steady citation growth occurred for nearly all cited Malaysian journals in WoS, except for *Federation Museums Journal: New Series* and *Journal of the Rubber Research Institute of Malaya*.
- All 52 Malaysian journals cited in WoS are visible through international and or national citation indexes and are, therefore, easily accessible for reference. This may have increased the chances of articles published in these journals to be used and cited. A total of 57.7% (30) of the 52 journal titles are either indexed in both WoS and Scopus or only in Scopus, while the rest are indexed by MyAIS.
- The number of self-citations is relatively low for most Malaysian journals indexed in WoS (less than 30%) except for *Malaysian Journal of Library & Information Science* (MJLIS) with 37.8% self-cites. This may be because MJLIS is the only journal in the field of library and information science (LIS) in the East Asia region that is indexed in both WoS and Scopus and may have become an important channel for publication as well as resource for reference for LIS authors in this region. Based on the 2011 Journal Citation Report, the impact factor for MJLIS is 0.381, and it is ranked 60 out of 82 journals.
- Very few titles listed in [Table 1](#) are listed in the Directory of Open Access Journal (DOAJ). DOAJ listed 66 Malaysian Journals, and this is only 12.7% (66/519) of total journal titles. We may conclude that the citations were garnered due to their relevance rather than their accessibility, even though the latter is equally important.
- When comparing journals in each of five major subject areas: Sciences, Engineering and Technology, Medical and Health Sciences, Social Sciences, and Arts and Humanities, the majority of Malaysian cited-journals are from the science-based disciplines comprising 30 titles from the sciences, 10 titles from medical and health sciences and 4 titles from engineering and technology (*Journal of Engineering Science & Technology, Pertanika: Science & Technology, Malaysian Journal of Computer Science* and *Jurnal Teknologi*). In contrast, social sciences and arts & humanities Malaysian journals have a total of 8 titles cited in WoS.
- Medical Journal of Malaysia* is highly referenced, and this is remarkable as the journal is not indexed by WoS. A number of other Malaysian medical journals are also in this situation including *Malayan Nature Journal* (471 citing articles) and *Malaysian Journal of Pathology* (298 citing articles). This implies the good influence of these journals and the potential of their indexation in WoS in the future.
- It is notable that the majority of the journals in [Table 1](#) are journals published by professional associations or societies and research institutes.

3.2. Journals Citing Malaysian Journals in WoS

For each article citing Malaysian journals, the journals publishing the articles were noted. There are a total of 9427 articles contributing to the 3184 journals citing Malaysian journals during 2006 to 2010, showing an average of three articles per journal. Nine of these journals are Malaysian journals indexed by WoS, citing 503 articles. Another three are Malaysian journals published by international publishers with secretariat based in Malaysia; they are *Asia-Pacific Journal of Public Health* (publisher Sage Publications, Inc.), *Neurology Asia* (publisher Asean Neurological Association) – both indexed by WoS, and *Asian Myrmecology* (publisher Penerbit Universiti Malaysia Sabah) covered

Table 2
Citing journals.

| Journals citing Malaysian journals | No. of journals | Citing articles | Percentage % |
|--|-----------------|-----------------|--------------|
| All journals | 3184 | 9427 | 100.00% |
| Malaysian journals | 9 | 503 | 5.34% |
| Malaysian journals – Secretariat based in Malaysia | 3 | 96 | 1.02% |
| International journals | 3172 | 8828 | 93.65% |

by the Web of Knowledge. A total of 8828 citing articles come from 3172 international journals, indicating the significance of Malaysian journals being cited at all. [Table 2](#) presents these findings.

Among the most popular journal evaluation metrics is WoS *Journal Citation Report's* (JCR) impact factor. More than fifty percent of all the articles that cited Malaysian journals were published in journals ranked in the first or second quartile by JCR 2010, suggesting that these are among the highest quality journals in the world in their respective fields. An approximate 23% of the articles citing Malaysian journals were ranked in the third quartile; another 19% were ranked in the fourth quartile. About 5% of the articles citing Malaysian journals were published in journals that do not have impact factors at the point of the study. [Figure 4](#) details these findings.

The top 50 journals contributing at least 18 citations in the period 2006–2010 were included in the list of major journals citing Malaysian journals. [Figure 5](#) provides the journal titles that contained citations to Malaysian journals, and the largest citations were from *Zootaxa* (IF 0.853) with 167 citations followed by *Tropical Biomedicine* (IF 0.581, 131 citations) and a Quartile 1 journal, *Forest Ecology and Management* (IF 1.992, 123 citations). *Journal of Tropical Forest Science* (IF 0.519) and *Sains Malaysiana* (IF 0.152) both Malaysian indexed journals in WoS contribute to 105 and 92 citations respectively. Among these journals, only three are from the non-science disciplines, namely *Malaysian Journal of Library & Information Science*, *African Journal of Business Management*, and *Journal of Southeast Asian Studies*. This confirms the tendency for science-based journals to be easily cited by their peers as they receive a higher number of citations than articles in social sciences, arts, and humanities journals.

4. Discussion and Conclusion

In most research fields, citing journals is an essential aspect of scholarly communication, and citation analysis has been used for such purposes as evaluating the research contributions of articles, journals, institutions, and individuals. In this study, we used citation analysis to gauge the overall impact of Malaysian journals in WoS and to identify those specific journals that are cited and the journals citing Malaysian journals. This study augments the body of research into scholars' use of journal articles by examining the citation performance of Malaysian journals in WoS. While the number of articles

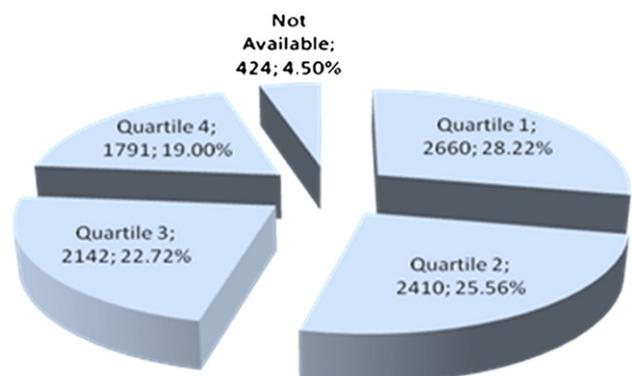


Figure 4. Citing journals based on JCR 2010 quartile in category.

with such citations is small, it is significant given the fact that only a small number of WoS-indexed journals come from Malaysia. The results show that, while only a small percentage of all articles contained citations to Malaysian journals, Malaysian journals are, in fact, being cited as a credible information source in articles in high-ranked journals indexed in WoS. The findings may be useful to Malaysian or any journal publishers (especially those from developing countries) to gauge their citedness in WoS, to provide an incentive for further improvement of their quality, and ultimately to gain indexation in WoS

and justify continued financial support from university governance, professional associations, and government agencies.

WoS is a selective database and covers about 10% of the world's scientific productivity. As such, national journals from peripheral or small countries, especially those in ethnic languages are excluded. Hence, if a country wants to know the performance of their journals in citation indexes like WoS, another approach is needed. While it is proper to report the few journals that are being covered by WoS, it is also necessary to find out how other not-indexed national journals

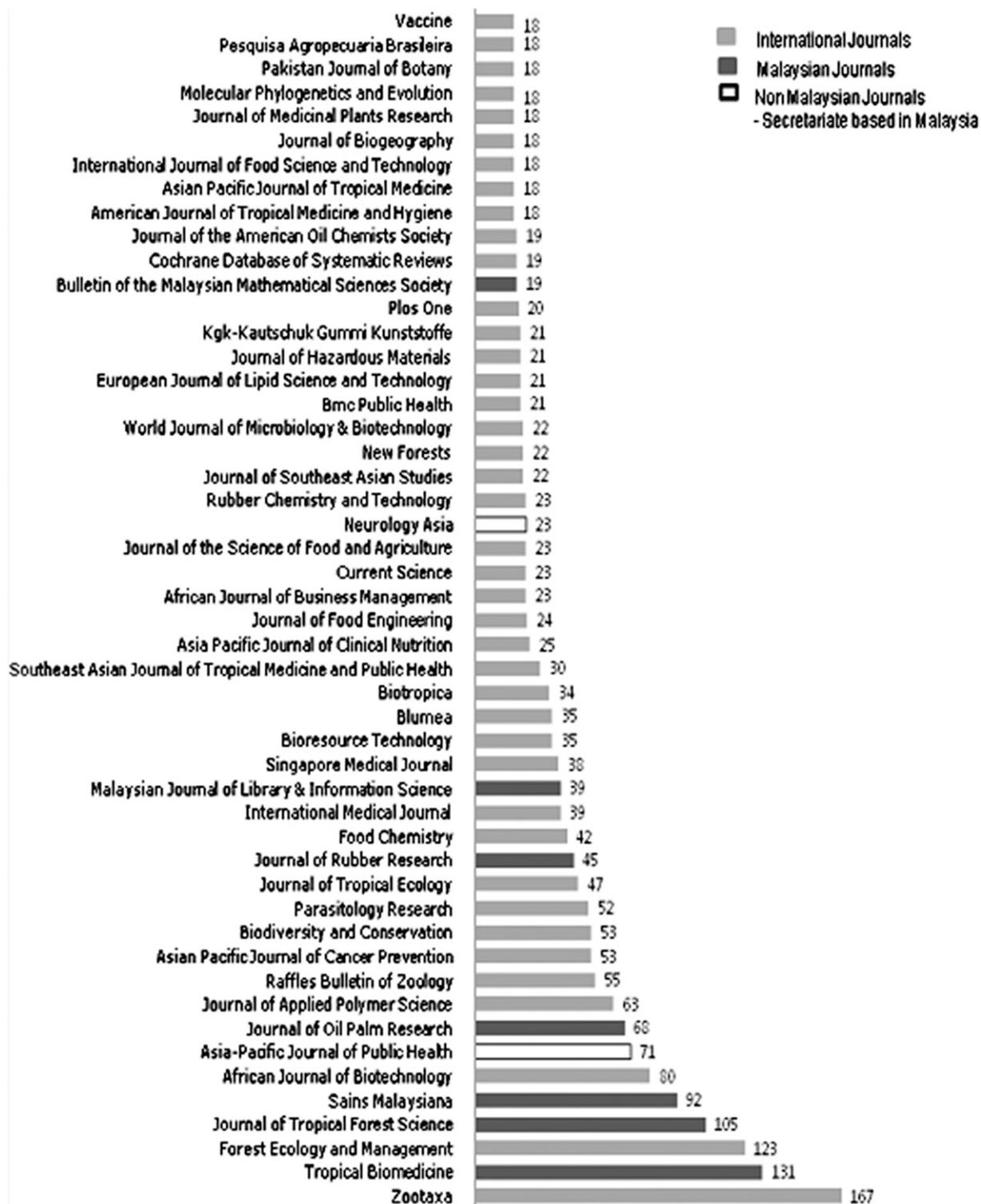


Figure 5. Citing journals and the number of cited articles.

perform in order to gauge their significance. In this situation, it is viable to search for each title that is not indexed to see whether they are cited. Similarly, Andreis and Jokic (2008) undertake this effort to investigate the impact of Croatian journals measured by citation analysis from the SCI expanded database. The need to establish the performance of national journals is equally important to the Malaysian government. Editorial staff can use information about the citedness of Malaysian journals in WoS to better understand how to improve highly-cited-but-not-indexed journals so that indexation status could be obtained in the future.

The global scientific village has a new member that is represented by the Asia-8 countries (China, South Korea, Japan, Taiwan, India, Singapore, Malaysia, and Thailand) where there is an increased awareness in research and development and where spending by Asia-8 economies has reached second place behind the US and surpassing those of EU-27 (European Union) (Chan, 2000). The National Science Board's Key Science and Engineering indicators (National Science Foundation, 2010) show an increase in publication output from the Asia-8 countries from 1995 to 2007. Mature economies like the United States (0.7%) and the EU-27 (1.9%) show as slower publication growth rate as compared to the Asia-8 countries (9.0%), indicating a plateauing trend for the US and EU. Increased growth is expected to be true of publications from Malaysia whose contributions to WoS have increased over the last five years, which has perhaps resulted in more publications being available for reference and citations. Hence, even though few Malaysian journals are covered in WoS, their availability in Scopus, PubMed, and other subject-based databases may have contributed to their use by authors in the Science, Technology, Engineering and Medicine (STEM) disciplines.

Also, most of the STEM journals published in Malaysia are in the English language. In terms of the English language proficiency index among Asian countries, Malaysia ranked 9th (Score 55.54) compared to Hong Kong (54.44), South Korea (54.19), Japan (54.17), and Taiwan (48.93) (Asian Scientist Newsroom, 2011). The English language is being taught as the second language in schools and is the medium of instruction for STEM disciplines in Malaysian universities. This again increases the usage and citations of the articles published in the journals.

A limitation of this study is that it could not measure the motives for citing Malaysian journals. Such information could be gathered in future studies that use techniques such as surveys and focus groups. Researchers could also use the method outlined in this article to examine citations to Malaysian journals in specific research fields or to determine if citations to Malaysian journals continue to show an upward trend in the coming years. The results of this citation analysis could be different if another citation database, such as Scopus, had been selected. This study of citations of Malaysian journals is descriptive in nature and does not judge the appropriateness of citing them, but if the number of citations to these journals continues to increase, the Web of Science may need to have a collective discussion about the value and acceptability of the journals to be covered in their prestigious database. This is in line with Thomson Scientific's mission "to maintain a database of world-wide scholarly content that helps researchers find the highest quality literature relevant to their work" (Saha et al., 2003) not only through the high standards of a journal's publication practices and editorial content, but also considering citation data in the review of a title. Citation data presents an implicit statement by the scholars in the subject that the content of a journal is relevant and valuable to their work.

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References

- Aalst, V. J. (2010). Using Google scholar to estimate the impact of journal articles in education. *Education Research*, 39, 387–400.
- Andreis, M., & Jokic, M. (2008). An impact of Croatia journals measured by citation analysis from SCI-expanded database in time span 1975–2001. *Scientometrics*, 75(2), 263–288.
- Asian Scientist Newsroom (2011, March 29). Worldwide study: Asia's English proficiency lower than expected. *Asian Scientist* (Retrieved 8 August 2012 from <http://www.asianscientist.com/academia/asia-english-proficiency-lower-than-expected-worldwide/>)
- Baldwin, V. A. (2009, Winter). Using Google Scholar to search for online availability of a cited article in engineering disciplines. *Issues in science and technology librarianship* (Retrieved from <http://www.istl.org/09-winter/article1.html>)
- Beel, J., & Gipp, B. (2010). Academic search engine, spam and google scholar's resilience against it. *Journal of Electronic Publishing*, 13(3) (Retrieved from <http://quod.lib.umich.edu/cgi/t/text/textidx?c=jep;view=text;rgn=main;idno=3336451.0013.305>)
- Bjork, B. C., Roos, A., & Lauri, M. (2009). Scientific journals publishing: yearly volumes and open access availability. *Research Information*, 14(1) (Retrieved from http://informationr.net/ir/14_1/paper391.html)
- Borgman, C. L. (1990). *Scholarly communication and bibliometrics*. Newbury Park, CA: Sage.
- Brown, L. D., & Gardner, J. C. (1985). Using citation analysis to assess the impact of journals and articles on Contemporary Accounting Research (CAR). *Journal of Accounting Research*, 23(1), 84–109.
- Burright, M. (2006, Winter). Google Scholar — Science & technology. *Issues in Science & Technology* (Retrieved from <http://www.istl.org/06-winter/databases2.html>)
- Chan, J. (2000, April 3). Asia: the growing hub of scientific research. *Asian Scientist* (Retrieved 8 August 2012 from <http://www.asianscientist.com/features/asia-future-hub-scientific-research/>)
- Cole, J. R., & Cole, S. (1973). *Social stratification in science*. Chicago, IL: University of Chicago Press Chicago.
- Elsevier, B. V. (2012). Sciverse open to accelerate science: About scopus. Retrieved 3 April, 2012 from <http://www.info.sciverse.com/scopus/about>
- Falagas, M. E., Pitsouni, E. I., Mallietzis, G. A., & Pappas, G. (2007). Comparisons of PubMed, Scopus, Web of Science and Google Scholar: Strengths and weaknesses. *The FASEB Journal*, 22(2), 338–342.
- Foster, W. R. (1995, Nov 11). Impact factor as the best operational measure of medical journals. *Lancet*, 346(8985), 1301.
- Garfield, E. (1970). Citation indexing for studying science. *Nature*, 227, 669–671.
- Garfield, E. (1972). Citation analysis as a tool in journal evaluation — Journals can be ranked by frequency and impact of citations for science policy studies. *Science*, 178, 471–479.
- Gross, P. L. K., & Gross, E. M. (1927). College libraries and chemical education. *Science*, 66, 385–389.
- Lewison, G., & Dawson, G. (1998). The effect of funding on the outputs of biomedical research. *Scientometrics*, 41(1), 17–27.
- Lim, A., Ma, H., Wen, Q., Xu, Z., & Cheang, B. (2009). Distinguishing citation quality for journal impact assessment. *Communications of the ACM*, 52(8), 111–116.
- MacRoberts, M. H., & MacRoberts, B. R. (2010). Problems of citation analysis: A study of uncited and seldom-cited influences. *Journal of the American Society for Information Science and Technology*, 61(1), 1–13.
- McAllister, P. R., Anderson, R. C., & Narin, F. (1980). Comparison of peer and citation assessment of the influence of scientific journals. *Journal of the American Society for Information Science*, 31(3), 147–152.
- National Science Foundation (2010). *Key science and engineering indicators: 2010 digest*. National Science Foundation (Retrieved 3 April, 2012 from <http://www.nsf.gov/statistics/digest10/nsb1002.pdf>)
- Nicolaisen, Jeppe (2002). The J-shaped distribution of citedness. *Journal of Documentation*, 58(4), 383.
- Noruzi, A. (2005). Google scholar: The new generation of citation indexes. *Libri*, 55, 170–180.
- Oppenheim, C. (1995). The correlation between citation counts and the 1992 research assessment exercise ratings for British Library and Information Science university departments. *Journal of Documentation*, 51(1), 18–27.
- Oppenheim, C. (1997). The correlation between citation counts and the 1992 research assessment exercise ratings for British research in genetics, anatomy and archaeology. *Journal of Documentation*, 53(5), 477–487.
- Proceeding: International Conference on Journal Citation Systems in Asia Pacific Countries (2012, May). *Putra Jaya*. Putra Jaya: Malaysian Citation Centre, Ministry of Higher Education, Malaysia.
- Qental, N., & Lourenço, J. (2012). References, authors, journals and scientific disciplines underlying the sustainable development literature: A citation analysis. *Scientometrics*, 90(2), 361–381.
- Reuters, Thomson (2012). Products A to Z: Web of Science. Retrieved 2 April, 2012 from http://thomsonreuters.com/products_services/science/science_products_a-z/web_of_science/
- Rice, R. E., Borgman, C. L., Bednarski, D., & Hart, P. J. (1989). Journal-to-journal citation data: Issues of validity and reliability. *Scientometrics*, 15(3–4), 257–282.
- Saha, S., Saint, S., & Christakis, D. A. (2003). Impact factor: A valid measure of journal quality? *Journal of the Medical Library Association*, 91(1), 42–46.
- Sanni, S. A., & Zainab, A. N. (2011). Evaluating the influence of a medical journal using Google Scholar. *Learned Publishing*, 24(2), 145–154.
- Seglen, P. O. (1992). The skewness of science. *Journal of American Society of Information Science*, 45, 628–638.

- Seglen, P. O. (1997). Why the impact factor of journals should not be used for evaluating research. *British Medical Journal*, 314, 498–502.
- Sember, M., Utrobi, I. A., & Petrak, J. (2010). Croatia medical journals citation score in Web of Science, Scopus and Google Scholar. *Croatian Medical Journal*, 51, 99–103.
- Tijssen, R. J. W., van Leeuwen, T. N., & van Raan, A. F. J. (2002). *Mapping the scientific performance of German medical research: An international comparative bibliometric study*. Stuttgart: Schattauer Verlag.
- Vieira, P., & Teixeira, A. (2010). Are finance, management, and marketing autonomous fields of scientific research? an analysis based on journal citations. *Scientometrics*, 85(3), 627–646.
- Yuan, S., & Hua, W. (2011). Scholarly impact measurements of LIS Open Access journals: Based on citations and links. *The Electronic Library*, 29(5), 682–697.
- Zainab, A. N., Sanni, S. A., Edzan, N. N., & Koh, A. P. (2012). Auditing scholarly journals published in Malaysia and assessing their visibility. *Malaysian Journal of Library & Information Science*, 17(1), 65–92.