Citation Impact of Open Access IFLA Annual Conference Papers: A Methodological Approach

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Abstract:

We used a new data gathering method to assess citation impact of IFLA conference papers. We selected 607 English open access conference papers presented at IFLA annual conference and congress during 2002-2005 and recorded number of citations to them based upon ISI, Scopus and Google Scholar databases. Result showed that 607 IFLA conference papers tended to attract 1,157 formal citations and had a mean and median citation count of 1.91 and 1 respectively. The majority of citations to IFLA conference papers were from Google Scholar (76%) and Scopus (20%) and only 4% of citations were from articles published in highly impact journals indexed by ISI. Subject analysis of IFLA conference sessions showed that information technology; issues related to national libraries; statistics and evaluation; reference work, cataloguing, classification and indexing; school libraries; and health and biosciences libraries were among top highly cited topics during 2002-2005. An important corollary from this study is that the applied method provides new opportunity to assess citation impact of 'conference papers' based upon wider types of citation data which have previously been unknown for monitoring research performance of conferences.

1. Introduction

From the early 1990s, researchers have discussed the potential value of open access (OA) publishing to maximize user access to the research results (e.g., Harnad, 1990; Harnad, 1991;

Harter, 1996). Other studies in several science, social science and humanities disciplines have shown that free online availability substantially increases a paper's impact (e.g., Lawrence, 2001; Antelman, 2004; Harnad & Brody, 2004; Kurtz, 2004; Norris, Oppenheim & Rowland, 2008). There are also emerging trend in development of institutional repositories that let the authors to self-archive their scholarly works and to make their current research results freely accessible to the potential users, even before appearing in print format (e.g., journals)

Result shows that "institutional repositories facilitate more timely and open access to research and scholarship, and that they maximize the potential research impact of archived publications" (Chan, 2004). In physics for instance, *Arxiv* e-prints archive (http://arXiv.org) is often the first choice for authors to publish their research results (Harnad & Car, 2000). *CiteSeer/ResearchIndex* (http://citeseer.ist.psu.edu) is also an open access digital repository that enables users to access postprint and preprint of journal/conference papers in computer science and provides more citations than the ISI especially for new and fast moving fields (Goodrum, et al., 2001; Zhao & Logan, 2002). *Cogprint* (http://cogprints.org) is another important electronic archive for self-archive papers in many subject areas such as psychology, linguistics, philosophy and anthropology which has remarkably influenced research communication and supports substitute forms of journal publishing especially in the social science and humanities.

Open access repository (OAR) can be also considered a key scholarly substitute for publishing conference proceedings in print format. Today, many national or international conference proceedings are only published online and are freely open access to anyone. The International Federation of Library Associations and Institutions (IFLA) is also a leading international organization in open access movement which provides one of the largest collections of open access conference papers in library and information science (LIS). IFLA has traditionally held annual conferences since 1973 and initiated open access publishing of its annual conference papers in 1993. Currently, more than 1,500 full text and quality controlled conference papers, covering various subject areas in LIS profession are accessible though IFLA annual conference Website. This unique collection of LIS conference papers is also searchable by commercial Web search engines such as Google, Google Scholar and Yahoo! Today, IFLA annual conference Website has rapidly become a global scholarly platform for many LIS researchers, instructors, students and librarians around the world to access current development and progress in library and information services. However, the extent to which IFLA open access conference papers are used in research communication is not known.

In the present study we assess the number of citations IFLA English open access annual conference papers receive during 2002-2005 based upon traditional *bibliometrics* as well as *webometrics* techniques (see methods). We used three sources of scientific citation data including Thomson Reuters (formerly ISI) Web of Science, Scopus and Google Scholar to examine how IFLA conferences were formally cited by other scholarly publications indexed by above sources. Moreover, it is not known in which subject areas IFLA conference papers could attract more citations and contributed to the library and information science research. Although, several authors have discussed that conference proceedings are an important source of scientific information (for review see Lisée, Larivière & Archambault, 2008), no previous study has used the applied method in this study for intellectual impact assessment of conference papers. Hence, the study may fill this gap and shed lights on new techniques applicable for monitoring research performance of conference papers.

2. Research questions

1. How the IFLA annual conference papers (2002-2005) are cited based upon the ISI, Scopus and Google Scholar citation databases?
2. What topics of IFLA annual conferences could attract higher citation impact in the LIS research?

3. Method

3.1. Selection of IFLA Conference Papers

For the purpose of this study, we selected conference papers presented at IFLA World Library and Information Congress during 2002-2005. IFLA conference papers were restricted to English language and open access articles due to minimize the potential impact of both the language diversity (e.g., French or Spanish papers) and the availability of papers (open access vs. non-open access) on the number of citation counts. We chose IFLA conference papers presented during 2002-2005 in order to allow a significant time window for articles (between 4-7 years) to attract citations from other publications indexed by ISI, Scopus or Google Scholar. Ultimately, we had 607 English language conference papers deposited online by IFLA annual meetings during 2002-2005 (see Table 1) and assessed their citation impact using ISI, Scopus and Google Scholar searches. The exact title of each IFLA conference paper was recorded in the spreadsheet, along with its author(s), publication year and the topic of session that it was accepted for presentation (e.g., Library Theory and Research).

Table 1. Number of English open access
IFLA conference papers selected for study in each year

Year	2002	2003	2004	2005	2002-2005
Number of Papers	171	129	123	184	**607**

3.2. ISI Citation Count

We used ISI (now Thomson Reuters) Web of Science as international multidisciplinary database for citation tracking covering more than 10,000 highest impact scientific research journals. Although, the main sources of ISI citation data are from journal articles and conference papers and proceedings are not commonly indexed in the ISI Web of Science, it is possible to use the "*Cited Reference Search*" facility in this database to retrieve citations to conference papers in the references of other journals indexed by the ISI (see Butler & Visser, 2006; Kousha & Thelwall, 2006). In order to mine cited references to all 607 IFLA conference papers during 2002-2007, we searched 1) the cited author (first author), 2) the cited work (IFLA* or other abbreviations) and 3) the cited years (2002-2005) of IFLA conference papers in the cited reference search option in the ISI Web of Science. Figure 1 shows an example of cited reference search for an article presented at the IFLA conference in 2002 (see below).

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Subbiah Arunachalam (2002). Reaching the unreached: How can we use ICTs to
empower the rural poor in the developing world through enhanced access to
relevant information? 68th IFLA Council and General Conference, Glasgow,
Scotland, August 18-24, 2002.
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Figure 1. Cited reference search in ISI Web of Science for locating citation(s) to an article presented at IFLA annual conference

Figure 2 is search result of the Figure 1. It shows that the above IFLA conference paper could attract one citation from a journal article indexed by the ISI. However, a limitation in using this method related to different abbreviations for *World Library and Information Congress* in the ISI databases entered in the citation information. In fact, ISI does not show the full name for cited works and users can only observe the abbreviation(s) for them which are problematic for citation analysis. For example, several different abbreviations such as WORLD LIB INF C IFLA, IFLA GEN C, IFLA COUNC GEN C or IFLA WORLD LIB were used in the cited references by authors in the articles and ISI did not also applied any vocabulary control mechanism for providing consistency between various abbreviations. Therefore, we used other possible queries and applied truncation to maximize mining other variations related to IFLA conference such as IFLA*, World* IFLA*, conf* IFLA* and IFLA* conf*. We also manually checked the cited author, work and year in the search result against the original IFLA conference papers due to avoid false matches in the citation counting process.

Figure 2. Result for cited reference search in the Figure 1

3.3. Scopus Citation Count

Launched in 2005 by Elsevier, Scopus (http://www.scopus.com) is another citation database which we used it as a complementary data source for impact assessment of IFLA conference papers. Scopus indexes about 17,000 journal titles and has much broader coverage than ISI Web of Science. Another advantage of Scopus for the purpose of this study is that it shows the full name for cited works in references. Hence, less effort is needed for manual checking

of cited works. For Scopus searches, we used *"Reference Search"* facility in the Scopus to retrieve possible citations to an IFLA conference paper in the references of other scholarly documents indexed by the Scopus. We manually searched the exact titles of all 607 IFLA conference papers during 2002-2005 as phrase searches and also the first author names in the main Scopus search interface and selected "*references*" field to locate possible citations to IFLA conference papers. Figure 3 is an example of Scopus search for the same paper searched in ISI database.
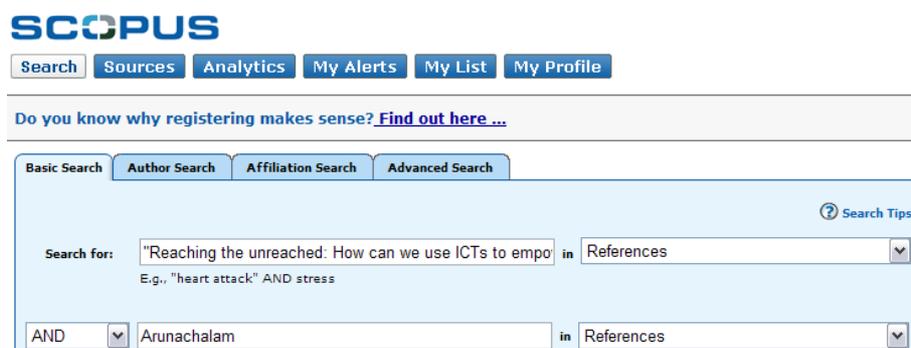
Figure 3. Scopus search strategy for locating citations to IFLA conference papers

Figure 4 is search result of the Figure 3. It shows that the above IFLA conference paper tended to attract three citations from other articles indexed by the Scopus (two citations more than ISI search). We again manually checked the "Abstract +Refs" option below each retrieved results to remove false matches.
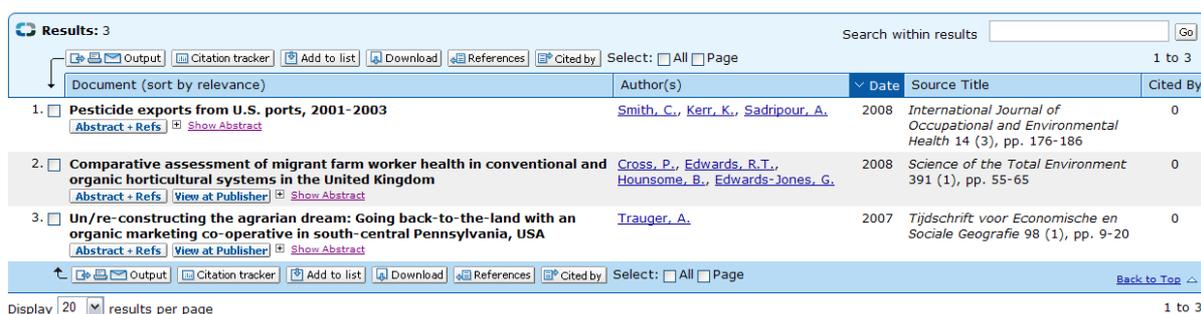
Figure 4. Result for Scopus reference search in the Figure 3

Figure 5 shows the reference list for the first retrieved citing article in the Figure 4 (Pesticide exports from U.S. ports, 2001-2003). As shown below, the second cited reference (in bold) is a same paper presented at the IFLA general conference and matches with the search query in Figure 3.

Figure 5. Citation to IFLA conference paper in the reference list of an article

3.4. Google Scholar Citation Count

We used Google Scholar (http://scholar.google.com) as another new tool for citation counting of IFLA conference papers. Google Scholar claims to include "peer-reviewed papers, theses, books, abstracts and articles, from academic publishers, professional societies, preprint repositories, universities and other scholarly organizations" (About Google Scholar, 2009). Hence, in contrast to both ISI and Scopus, Google Scholar can potentially index open access papers deposited online by personal or institutional self-archiving practices. In other words, Google Scholar indexes many open access documents like IFLA annual conference papers which would be "invisible" to conventional fee-based citation indexes such as Web of Science and Scopus. Our initial searches showed that Google Scholar provided significantly higher citation counts for IFLA conference papers than either the Web of Science or Scopus. However, the quality of sources of citations (citing documents) retrieved by Google Scholar is not clear, and this will be discussed again the conclusion.

For Google Scholar citation counts, we searched the exact titles of all 607 IFLA conference papers during 2002-2005 as phrase searches in the main Google Scholar search interface. Sometimes it was necessary to omit parts of article titles to generate successful searches, especially when there were non-alphanumeric characters (e.g., :, -, or /). Hence, we usually conducted several searches to maximize the citation counts. For IFLA conference papers with very general titles (e.g., Developing an quality service strategy), we also added extra bibliographic information to the query (e.g., first author name, IFLA or both) to eliminate false matches. We then recorded the number of Google Scholar citations to IFLA conference papers by clicking the "*cited by*" option below each retrieved record after omitting incorrect matches (for details see Kousha & Thelwall, 2007; Kousha & Thelwall, 2008). Figure 6 is an example of a Google Scholar search for a conference paper (Knowledge sharing practices in Asian institutions: a multi-cultural perspective from Singapore) presented at IFLA annual meeting in 2005.

Figure 6. Using Google Scholar for citation counting of IFLA conference papers

As shown in Figure 6, Google Scholar reports that above IFLA article could attract four citations from other Web documents (Cited by 4). We also found that in some cases there are additional citations to IFLA conference papers, but they are not calculated in the "cited by" option. Although it was time consuming task, we manually checked other results and removed duplicate records in order to add the unique citations to the number reported by

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"cited by" option. This problem is also reported in the previous study (Kousha & Thelwall, 2008)

During checking process of cited references from both Scopus and Google Scholar searches, we found citations with similar titles and author(s) to that IFLA conference papers, but published in journals (e.g., IFLA journal). This is because some authors publish similar conference paper titles in journals (e.g., after conference presentation) to disseminate their findings to a wide range of researchers and this is the main reason for finding this type of citing sources. We counted this type of citation as evidence of citation impact for IFLA conference papers if the title and author(s) of the published journal article was exactly similar to that IFLA conference paper. However, we didn't compare the whole contents of conference and journal papers against each other for possible changes to make the project manageable.

Note that all the ISI, Scopus and Google Scholar searches were conducted during April 2009 in order to reduce the potential impact of time on increasing the number of citation counts and of coverage of above databases.

4. Results
4.1. ISI, Scopus and Google Scholar citations
Table 2 shows that the overall descriptive statistics for ISI, Scopus and Google Scholar citation counts to 607 English open access conference papers presented at IFLA World Library and Information Congress during 2002-2005. The first and second columns show the publication years and the associate number of IFLA conference papers selected for the study. The third, fourth and fifth columns report citations counts to IFLA conference papers based on ISI, Scopus and Google Scholar searches respectively (see method). The sixth column also shows the total number, the means and the median of citations from all above three citation indexes. It reports that 607 IFLA conference papers during 2002-2005 tended to attract 1,157 citations from the ISI, Scopus and Google Scholar databases and the citation mean and median for selected papers is 1.91 and 1 respectively. However, we did not assess the extent of citation overlap between three above databases which is an important practical limitation of this study and is discussed again in the next section.

The next three columns report the mean and the median for ISI, Scopus and Google Scholar citations. For instance, it shows that the mean of Google Scholar citations to IFLA conference papers is 1.43 which is considerably higher than the citation means for both ISI (0.07) and Scopus (0.38). The results suggests that Google Scholar has more coverage of citation data from wider types of scholarly works which are not indexed by both ISI and Scopus, although the quality of sources of citations retrieved by Google Scholar is not known. The two last columns of Table 2 report the ratio of Google Scholar citations per both ISI and Scopus respectively. They indicate that the ratio of Google Scholar citations is 19 and 3.7 times higher than ISI and Scopus citations respectively. This high number of Google Scholar citation counts which has remarkably influenced the impact assessment of IFLA conference papers will be discussed again.

Although it is discussed that the time has a potential impact on citation counts and older articles can potentially receive more citations than more recent papers, we surprisingly found that the total citation mean (sixth column) for IFLA conference papers presented in the year 2005 is higher (1.61) than the year 2004 (1.47) and also very close to the total citation mean in the year 2003 (1.78). This might suggests that the topics of papers in 2005 tended to attract more citations. In the next section, we assess top 20 topics in IFLA annual conferences during 2002-2005 in order to explore which topic could receive higher citation impact.

Table 2. Descriptive statistics for ISI, Scopus and Google Scholar citation counts to 607 English OA IFLA conference papers during 2002-2005

	Number of Articles	ISI citations	Scopus citations	GS* citations	GS, Scopus and ISI citations (Mean; median)	ISI Mean, Median	Scopus Mean Median	GS Mean Median	GS /ISI citations	GS /Scopus citations
2002	171	15	91	345	451 (2.64; 1)	0.08 0	0.53 0	2.01 0	23	3.79
2003	129	11	42	176	229 (1.78; 1)	0.08 0	0.32 0	1.35 0	16	4.19
2004	123	7	39	135	181 (1.47; 0)	0.05 0	0.31 0	1.09 0	19.2	3.46
2005	184	12	65	219	296 (1.61; 1)	0.06 0	0.35 0	1.19 0	18.2	3.36
Total	**607**	**45**	**237**	**875**	**1,157 (1.91; 1)**	**0.07 0**	**0.38 0**	**1.43 0**	**19.4**	**3.69**

*GS=Google Scholar

4.2. Subject Analysis of Highly Cited Papers

Table 3-6 shows highly cited topics presented in IFLA conference sessions during 2002-2005. The results suggest that which topics tended to attract more citations from LIS community. For instance, the first column of the Table 3 shows topics of sessions (e.g., classification and indexing, cataloguing and etc.) at IFLA annual conference in 2002. The second column reports number of English open access papers presented in each session. The third, fourth and fifth columns report number of citations from ISI, Scopus and Google Scholar to conference papers respectively. The sixth column shows the total number of citations by all three sources of citation data (ISI, Scopus and Google Scholar) and the last column also reports the average citations per papers for each topic in the sessions. Table 3 shows top 20 highly cited topics in 2002. It indicates that *classification and indexing, cataloguing, information technology, national libraries with information technology and school libraries* are top five highly cited sessions respectively in terms of total number of citations per papers.

3. Subject analysis of top 20 highly cited IFLA conference papers in 2002

Topics of sessions at the IFLA annual conference 2002	Number of Articles	ISI citations	Scopus citations	GS citations	GS, Scopus and ISI citations	Total citations per papers
Classification and Indexing	2	3	10	31	44	22.00
Cataloguing	3	1	17	35	53	17.67
Information Technology	4	2	7	42	51	12.75
National Libraries with Information Technology	5	0	7	25	32	6.40
School Libraries	4	1	5	16	22	5.50
Regional Activities	3	0	4	12	16	5.33
Africa	2	0	2	8	10	5.00
User Education	4	0	3	14	17	4.25
Library and Research Services for Parliaments	2	1	0	7	8	4.00
Audiovisual and Multimedia	4	0	4	10	14	3.50
Education and Training	5	0	3	12	15	3.00
Science and Technology Libraries	3	1	2	6	9	3.00
University Libraries with Management and Marketing	3	1	2	5	8	2.67
Library and Information Science Journals	4	0	2	8	10	2.50
Health and Biosciences Libraries with EAHIL	3	2	1	4	7	2.33
Libraries Serving Disadvantaged Persons	3	0	0	6	6	2.00
Document Delivery and Interlending	4	0	2	5	7	1.75
Government Libraries	3	0	0	5	5	1.67
National Libraries	5	0	3	5	8	1.60
Reference Work	6	0	2	7	9	1.50

*Table 3 is ranked based upon the total citations per papers (the last columns)

Table 4 also shows that *libraries for children and young adults, information technology, Africa, document delivery and interlending & cataloguing and national libraries & statistics and evaluation* are top five highly cited topics at IFLA annual conference in 2003.

4. Subject analysis of top 20 highly cited IFLA conference papers in 2003

Topics of sessions at the IFLA annual conference 2003	No. of Articles	ISI citations	Scopus citations	GS citations	GS, Scopus and ISI citations	Total citations per papers
Libraries for Children and Young Adults	1	13	0	0	13	13.00
Information Technology	3	16	1	8	25	8.33
Africa	3	10	2	5	17	5.67
Document Delivery and Interlending & Cataloguing	3	9	1	4	14	4.67
National Libraries & Statistics and Evaluation	4	14	1	3	18	4.50
Free Access to Information and Freedom of Expression (FAIFE)	1	2	0	2	4	4.00
University Libraries and other General Research Libraries & Information Literacy	3	8	0	4	12	4.00
Libraries Serving the General Public	3	7	1	1	9	3.00
Copyright and Other Legal Matters	3	9	0	0	9	3.00
Reference Work	6	10	1	5	16	2.67
Libraries Serving Disadvantaged Persons	3	8	0	0	8	2.67
Library Theory and Research	5	13	0	0	13	2.60
Plenary Session - Rainer Kuhlen	1	1	0	1	2	2.00
Public Libraries	3	4	1	1	6	2.00
Asia and Oceania & Public Libraries	6	10	0	1	11	1.83
Genealogy and Local History	4	6	0	0	6	1.50
Bibliography	4	6	0	0	6	1.50
Management of Library Associations	4	2	0	3	5	1.25
Preservation and Conservation	2	2	0	0	2	1.00

As shown in Table 5, papers presented in the IFLA conference sessions in 2004 including *UNESCO, education and research, library and information science journals, reference work and management and marketing with public libraries* tended to attract more citation counts based upon the ISI, Scopus and Google Scholar searches.

5. Subject analysis of top 20 highly cited IFLA conference papers in 2004

Topics of sessions at the IFLA annual conference 2004	No. of Articles	ISI citations	Scopus citations	GS citations	GS, Scopus and ISI citations	Total citations per papers
UNESCO	1	10	0	7	17	17.00
Education and Research	6	22	2	7	31	5.17
Library and Information Science Journals	5	12	3	8	23	4.60
Reference Work	2	7	0	2	9	4.50
Management and Marketing with Public Libraries	1	2	0	1	3	3.00
National Libraries	3	7	0	0	7	2.33
Preservation and Conservation (PAC) with National Libraries and Preservation and Conservation	1	2	0	0	2	2.00
Health and Biosciences Libraries	5	8	1	1	10	2.00
Libraries for the Blind with Libraries Serving Disadvantaged Persons	4	6	0	2	8	2.00
Public Libraries with Statistics & Evaluation	3	5	0	1	6	2.00
Education and Training	4	6	0	1	7	1.75
Cataloguing Developments in cataloguing guidelines	2	2	0	1	3	1.50
Bibliography	2	3	0	0	3	1.50
Women's Issues	5	5	0	2	7	1.40
Social Science Libraries with Division VIII. - Regional Activities	4	5	0	0	5	1.25
School Libraries and Resources Centres with Libraries for Children and Young Adults	4	4	0	1	5	1.25
Library and Research Services for Parliaments	2	2	0	0	2	1.00
Rare Books and Manuscripts	4	2	0	2	4	1.00
Library Buildings and Equipment	1	1	0	0	1	1.00
President- Elect Brainstorm Session	1	0	1	0	1	1.00

Finally, Table 6 indicates that *social science, knowledge management, statistics and evaluation, e-learning DG and Bibliography* are among top 5 highly cited topics considered for IFLA conference sessions in 2005.

6. Subject analysis of highly cited IFLA conference papers in 2005

Topics of sessions at the IFLA annual conference 2005	No. of Articles	ISI citations	Scopus citations	GS citations	GS, Scopus and ISI citations	Total citations per papers
Social Science	1	7	2	2	11	11.00
Knowledge Management	4	24	1	7	32	8.00
Statistics and Evaluation	4	20	1	9	30	7.50
E-Learning DG	2	9	1	1	11	5.50
Bibliography	4	16	2	3	21	5.25
Health and Biosciences Libraries	3	5	0	9	14	4.67
Information Technology	3	8	0	4	12	4.00
Statistics and Evaluation with University Libraries	7	18	1	8	27	3.86
School Libraries and Resource Centres	7	13	0	5	18	2.57
Education and Training with Library Theory and Research	10	23	0	2	25	2.50
Plenary Session	1	2	0	0	2	2.00
Newspapers	3	5	0	0	5	1.67
Science and Technology Libraries	3	5	0	0	5	1.67
Acquisitions and Collection Development	4	5	0	1	6	1.50

UNIMARC with Information Technology	4	0	0	6	6	1.50
Management and Marketing with Information Literacy	2	3	0	0	3	1.50
Reference and Information Services	5	5	0	2	7	1.40
Division of Libraries Serving the General Public	4	3	1	1	5	1.25
New Professionals' DG	2	2	0	0	2	1.00
Plenary Session II.	1	1	0	0	1	1.00

Table 7. categorizes top 10 similar topics presented at IFLA conference sessions during 2002-2005. For instance, the second row of Table 7 shows that "*information technology*" was among top 10 highly cited topics of IFLA conference sessions. It also shows that IFLA conference papers surroundings different aspects of "*national libraries*" as well as "*statistics and evaluation*" of libraries (e.g., national, public and university libraries) could also receive more citation counts during studied years.

Table 7. Similar top ten topics attracted more citation impact at IFLA annual conferences during 2002-2005

2002	2003	2004	2005
-Information Technology	-Information Technology -National Libraries with Information Technology	-	-Information Technology
-National Libraries with Information Technology	-National Libraries & Statistics and Evaluation	-National Libraries -National Libraries and Preservation and Conservation	-
-	-National Libraries & Statistics and Evaluation	-Public Libraries with Statistics & Evaluation	-Statistics and Evaluation -Statistics and Evaluation with University Libraries
-Africa	-Africa	-	-
-	-Reference Work	-Reference Work	-
-Cataloguing Classification and Indexing	-Document Delivery and Interlending & Cataloguing	-	-
-School Libraries	-	-	-School Libraries and Resource Centres
-	-	-Health and Biosciences Libraries	-Health and Biosciences Libraries

4.3. Highly cited IFLA conference papers

Table 8 shows top ten highly cited English open access papers presented at IFLA annual conferences during 2002-2005. Note that number of citations (cit.) is based upon ISI, Scopus and Google Scholar searches

Table 8. top ten highly cited papers at IFLA annual conferences (2002-2005)

2002	cit.	2003	cit.	2004	cit.	2004	cit.
Indigenous Knowledge and the Cultural Interface: Underlying issues at the intersection of knowledge and information systems	36	International children's digital library	13	Post-independence literacy programmes in Botswana: implications for library services	31	KM moves beyond the organization: the opportunity for librarians	13
Data mining MARC to find: FRBR	35	Yourself Library without a library customer service desk: the Singapore experience	7	Latin American journals in library and information science	23	KM Education in LIS Programs	12
Ensuring interoperability among subject vocabularies and knowledge organization schemes: a methodological	24	A moral reflection on the digitization of Africa's documentary heritage	15	Information literacy for lifelong learning	17	Evidence based librarianship: a case study in the social sciences	11
Reaching the unreached: How can we use ICTs to empower the rural poor in the developing world through enhanced access to relevant information?	23	The bibliographic advantages of a centralised union catalogue for ILL and resource sharing	11	Empowering patients through health information literacy training	10	Improving the quality of university libraries through citation mining and analysis using two new dissertation bibliometric	18
Subject-based Interoperability: Issues from the High Level Thesaurus (HILT) Project	20	RFID in libraries - introduction to the issues	11	ICT skills for information professionals in developing countries: perspectives from a study of the electronic information environment in Nigeria	9	A collaborative lecture in information retrieval for students at universities in Germany and Switzerland	9
The role of the principal in an information literate school community: findings from an International Research Project	18	Experiences in implementing RFID solutions in a multi-vendor environment	11	Copyright protection as access barrier for people who read differently: the case for an international approach	8	Recommendations for urgently needed improvement of OPAC and the role of the National Bibliographic Agency in achieving it	16
Report on the successful AustLit: Australian Literature Gateway implementation of the FRBR and INDECS event models, and implications for other	13	A metadata lifecycle model for digital libraries: methodology and application for an evidence-based approach to library research	7	The British Library and E-learning	7	Delivering Sizzling Services and Solid Support with Open Source Software	8
Archiving the Web - some legal aspects	13	FAST (Faceted Application of Subject Terminology): a simplified LCSH-based vocabulary	9	Opportunities and challenges of regional cooperation in library education in the developing world	7	Measuring the impact of new library services	8
XML and bibliographic data: the TVS (Transport, Validation and Services) model	12	Benchmarking: overview and context	13	Libraries as a source of relevant information to support and enhance economic development for women	7	Successful web survey methodologies for Measuring the Impact of Networked Electronic Services (MINES) for libraries	12

5. Discussion and Conclusions

In answer to first research question we found that 607 English open access IFLA conference papers during 2002-2005 tended to attract 1,157 formal citations based on ISI, Scopus and Google Scholar Searches and the citation mean and median for selected IFLA conference papers were 1.91 and 1 respectively (see Table 1). In other words, results suggest that the impact of IFLA conference papers during 2002-2005 is about 2 based on citation data in ISI, Scopus and Google Scholar. However, only 4% (45 of 1,157) of citations to IFLA conference papers were from highly impact journal articles indexed by ISI Web of Science and the majority of citing sources were from Google Scholar (76%) and Scopus (20%) respectively. A possible explanation for the above differences in number of citations to IFLA conference papers might be more coverage of Google Scholar of scholarly-related works such as preprints, postprints, non-ISI journals, conference papers, research reports, dissertations and books. This finding supports previous findings that Google Scholar is a more comprehensive tool for citation tracking for social science (Kousha & Thelwall, 2007). Nevertheless, the quality of sources of Google Scholar citations targeting IFLA conference papers should also take into account, because Google Scholar also contains citation data, but includes a less quality controlled and perhaps more non-refereed collection of publications comparing to ISI and Scopus databases. One practical limitation of this study is that we did not assess the extent of citation overlap between ISI, Scopus and Google Scholar. Hence, future studies may address this.

Citation impact analysis of topics in IFLA conference is a useful quantitative approach to explore which sessions could attract more citations from LIS publications and how IFLA annual conferences were used. The results showed that IFLA conference papers presented in the following sessions could relatively received higher citations during 2002-2005 including, information technology; issues related to national libraries; statistics and evaluation; reference work, cataloguing, classification and indexing; school libraries; and health and biosciences libraries. Although citation analysis of scholarly works is now widely used for impact assessment and reveals how topics of IFLA sessions has been useful to be cited by other researchers, it can not assess other possible practical benefits of the IFLA conference papers, especially in terms of library and information services. For instance, many libraries and information centres around the world may practically use the experiences and results reported in the IFLA conference papers, but they might never formally cited them in the scholarly works. Therefore, more qualitative investigations (e.g., interview, questionnaire) are also needed to disclose the practical benefits of IFLA annual conference papers in the library and information services.

Although, for a long time ISI citation databases have been widely used for impact assessment of "*journal articles*", the methods here showed a novel practical approach to extract citation data from different citation databases for impact assessment of "*conference papers*". Results suggests that for IFLA conference papers ISI Web of Science is insufficient data source and broader types of publications (e.g., non-ISI journals, conference papers, thesis, research reports) are also needed for impact assessment. Hence, the methods applied in this study may shed light on how current citation databases (ISI, Scopus and Google Scholar) can be used to monitor research performance and impact of conference papers. Every year, hundreds of scholarly conferences and meetings are held worldwide and the citation extraction technique applied in this study may also be used to assess citation impact of other conferences in science, social science and humanities.

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