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A BIBLIOMETRIC STUDY OF THE JOURNAL TROPICAL VETERINARIAN 2000-2009

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ABSTRACT

The objective of the study was to make a bibliographic and citation analysis of articles published in the journal Tropical Veterinarian from 2000 – 2009. The methodology applied in the study is bibliometric analysis, which is used to study in detail the bibliographic features of the articles and citation analysis of the references at the end of each article published in Tropical Veterinarian from 2000-2009. The study shows that 229 articles were published in the ten volumes-20 (2000) to 29(2009) studied. The study revealed that maximum number of contributions comes from joint authors with 88.2%. Also, most of the articles (64.4%) contain references which include journals.

Introduction

Bibliometrics is a type of research method used in library and information science. It utilizes quantitative analysis and statistics to describe patterns of publication within a given field or body of literature (Dhimon, 2000). According to Thanuskodi (2010), the term "bibliometrics" was coined by Pritchard in 1969. A pioneering example of a bibliometric study was statistical analysis of the literature of comparative anatomy from 1543 to 1860, done by counting book and journal titles, and grouping them by countries of origin and periods. Hulme conducted a study in 1923, entitled "Statistical Analysis of the History of Science". His analysis was based on the entries in the *English International Catalogue of Scientific Literature*. A third study was the work of Gross and Gross reported in 1927. They counted and analyzed the citations in articles from the *Journal of the American Chemical Society*, and produced a list of journals deemed important to chemical education. Another prominent work was Bradford's

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1934 article on the distribution of literature in lubrication research. It is an important part of the theoretical foundation of bibliometrics, and "Bradford's Law of Scattering."

The great library scientist, S.R. Ranganathan in 1948 coined the term "librametry", which historically appeared first and was intended to streamline the services of librarianship. Bibliometrics is similar to Ranganathan's librametrics, scientometrics, infometrics, and sub-disciplines like econometrics, psychometrics, sociometrics, biometrics, technometrics, chemometrics, climetrics, and webometrics where mathematics and statistics are applied to study and solve problems in their respective fields. Scientometrics is now used for the application of quantitative methods to the history of science and overlaps with bibliometrics to a considerable extent (Ranganathan 1969).

Objectives of the Study

The study was undertaken to:

- make an analysis of articles published in *Tropical Veterinarian* from 2000-2009.
- identify the number of contributions published during the period of study.
- determine the distribution of articles per year.
- study the length of articles.
- study the authorship pattern
- discover the number of cited documents and the average number of references per article.
- identify the number and forms of documents cited.
- identify the distribution of cited journals per year.

Literature Review

Diodato (1994) in his *Dictionary of Bibliometrics* gives eight definitions of the term bibliometrics, the first of which comes from F.W. Lancaster, who defines bibliometrics as "The application of various statistical analyses to study patterns of authorship, publication and literature use…" Historically, bibliometric studies have two broad categories (Borgman & Furner 2002). In the first category are those studies that evaluate and often assess the suitability of the tools and theories used in bibliometrics. The second type has to do with those studies which "use bibliometric methods in order to describe, explain, predict, and evaluate the communication behavior of scholars." The second type itself may be divided into two distinct types. Borgman and Furner (2002) describe "Relational Link Analysis", where:

> Link counts are used as indicators of the level of connectedness, the strength of relationship or the direction of flow, between documents, people, journals, groups, organizations, domains or nations. Relational citation analysis is used to answer research questions of the type, "Who is related to whom?"

Borgman and Furner (2002) then consider "Evaluative Link Analysis", where link counts are used:

> …as indicators or measurements of the level of quality, importance, influence, or performance, of individual documents, people, journals, groups domains (subject areas, fields, or disciplines) or nations. Evaluative link analysis is used

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to answer research questions of the type, "Whose research or influence is better, or has greater impact, than whose?

Moed (2005) describes evaluative bibliometrics as "…a subfield of quantitative science and technology studies, aimed to construct indicators of research performance from a quantitative analysis of scholarly documents. Citation analysis is one of its key methodologies." There have been many hundreds of studies which have attempted to evaluate the performance of academics, their departments, their institutions and even the country in which they work by using evaluative bibliometrics tools. Bibliometric methods are concerned with the study of the formal channels of scholarly communication (Borgman 1990). This general field of study has expanded to embrace new terms which in themselves seek to incorporate the diversity of scholarly communication. Egghe (2005) uses the broader term Informetrics to "cover allmetrics studies related to information science…scientometrics (social policy, citation analysis, research evaluation…) webometrics (metrics of the web, the Internet or other social networks…)". The analysis of these formal channels of scholarly communication by standardized metrics is essentially a twentieth century device, with its origins in the study of bibliographical records. The few early studies were principally interested in the statistical analysis of library collections and the nature of particular disciplines (Hertzel 2003).

The first notable study was by Cole and Eales in 1917, who examined the history of animal anatomy through 6436 publications taken from the period 1543-1860. They analysed the data by country and subject and could demonstrate the influence of individuals, events and public bodies on the research as reflected in the subject matter within the literature current at the time. Hertzel (2003) gives a second important example related to growth of scientific literature, where the contents of 13 annual issues of *The International Catalogue of Scientific Literature* were analysed by Hulme. Hulme was able to show the productivity of different countries and the way various subjects grew or decayed depending on the way the subject was influenced by general changes in the external environment. Interest in the subject grew, with an increasing number of studies looking at a larger range of subjects. Meadows (2000) has quantified this growth, noting an increase in the number of bibliometrics studies rising from 10 in the first decade of the twentieth century to over 350 by the sixth.

Al-Ghamdi et al (1998) examined the authorship patterns of articles published in Journal of the American Society for Information Science and Technologist (JASIST) from 1970 to 1996. The trends in authorship were analysed in terms of authorship frequency, co-authorship pattern, author distribution by gender, geographical location and institutional affiliation. Lotka's law of author dispersion was confirmed when the results showed that the majority of authors contributed not more than two articles and only a small percentage of authors were highly productive. The majority of articles were also single authored (61%) indicating a field that is not highly collaborative although the number is increasing in recent years. The study also found an increasing trend of female authors, non-American authors and authors from Library and Information Science (LIS) schools.

Rao and Bhusan (2008) compared JASIST with Scientometrics in their coverage of the subject "software studies". There was a trend towards two or more authored works in both journals both as a whole and also in articles on software studies. Tsay (2008) analysed the

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citations referenced in articles published by JASIST in 1980, 1985, 1990, 1995, 2000 and 2004 to analyse the characteristics of cited references in terms of the document type, the most cited resource, the country and subject distribution of the articles. Tsay's contention was that citations would reflect the documents preferred by researchers in the discipline, the journals and books most used, the subjects covered by the journals and books. Tsay found that (a) the article productivity in JASIST increased two to three times over the period studied with a trend to publish more issues and more articles per issue per year; (b) the average number of citations also increased over the years from 14.3 in 1980 to 28 in 1995 and 36.9 in 2004; (c) authors cited more journal articles (51%) compared to books and book chapters (23%), conference proceedings (15%) and electronic resources (5%); (d) journal self-citation was high (18.6%); (e) authors cited more journals published in the United States (63%), followed by those published in the United Kingdom (20%) and the Netherlands (6%) and the number of countries represented increased from nine to 26 over the years; (f) the subject areas covered by the journals were mainly library science (50%), science (22.7%) and social sciences (6.3%), and mainly covered subjects such as general bibliography, machine methods in information and retrieval, mechanized bibliographic control.

Coleman (2006) conducted a study on the Journal of Education for Library and Information Science (JELIS). JELIS is a quarterly journal published by H.W. Wilson for the Association for Library and Information Science Education and is being indexed by several indexing databases including Current Contents, Current Index to Journals in Education, Education Index, Education Abstracts, Information Science Abstracts, Library and Information Science Abstracts, Library Literature , Social Science Citation Index, and Research into Higher Education Abstracts. Coleman assessed the value of the journal by using three measures, (a) the journal attraction power (degree of foreign authored works), author associativity (degree of collaboration) and journal consumption power.

MJLIS was revisited by Aryati and Wilson in 2008. They analysed publication and citation patterns of articles published in MJLIS from 2001 to 2006 and compared their findings with those obtained by Tiew, Abrizah and Kiran (2002). To make statistical comparisons with the previous study the $\chi 2$ test at the 0.05 level of significance was used. The authors carried out publication analyses (number of articles published, number of references per article, authorship patterns and productivity, author's geographical and institutional affiliation, subject category of articles, author and journal self-citations and length of articles and citation analyses. They found that the majority of the articles have on average between 11 to 20 citations. Two-authored articles were more predominant and the most prolific authors were still the academics from the library school at the Faculty of Computer Science and Information Technology, University of Malaya. Most of the authors were from Malaysia, followed by India and Bangladesh. There was an increase contributions from authors affiliated to academic libraries. The number of self-citation Anyi K.W.U., Zainab A.N. & Anuar N.B. was 40% where else journal self-citation was only 15%. The authors concluded that there had been significant changes in the types of articles, number of references cited perarticle and length of articles published in MJLIS.

In 2006, Crawle-Low (2006) analysed citation patterns of researchers publishing in the American Journal of Veterinary Research (AJVR). This journal is published by the American Veterinary Medical Association since 1965 and is indexed by BIOSIS Previews, Science

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Citation Index and Medline (PubMED). The outcome of this single journal study is a core list of veterinary medicine journals which served as a useful tool for medical librarians. The study analysed a total of 25,000 bibliographic references referenced by articles in the AJVR published between 2001 and 2003. The citations were analysed in terms of material type, date of publication (to determine recency) and frequency of journals cited, The cited journals were than ranked in order of decreasing productivity to create a core list of journals most frequently used by veterinary medical researchers.

The majority of cited items were journals (88.8%), followed by books (9.8%) and grey literature. The Bradford's zonal distribution of productive journals was indicated as 24 (core): 139: 1,409 producing 7,361:7,41; 7,422 cited articles respectively. The study highlighted that 65% of co-citations to journals and 77% citation to books were published since 1990, indicating the age of resources which researchers in this field found relevant. Olofinsawe (2003) carried out a study of the bibliometric practices of professional librarians in two states between the period of 1994 and 1999. The aim of the research was to study the mode of the literature work cited by professional librarians of these two states. The research proved that professional librarians actually use works written in English Language, relied mostly on foreign originated work and other Librarian publications. It was proved that all their published works were supported with references more than two i.e. their research were all scholarly research work.

Methodology

The methodology applied in the study is bibliometric analysis, which is used to study in detail the bibliographic features of the articles and citation analysis of the references at the end of each article published in *Tropical Veterinarian* from 2000-2009. For this the relevant data are collected and recorded. Then they are tabulated and analysed for making observations.

Source Journal

Tropical Veterinarian is an international journal devoted to all aspects of health and disease of animals in the tropics published by the faculty of Veterinary Medicine, University of Ibadan, Ibadan Nigeria. It is published quarterly with the first volume appearing in 1983.

Findings

The total number of contributions in the ten volumes is 229 which purely consist of research articles.

Distribution of Publication per Year

Table 1 - Distribution of publication per year

YEAR	No. of Articles	Percentage
2000	40	17.46
2001	42	18.34
2002	39	17.03
2003	21	9.17

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2004	20	8.73
2005	15	6.55
2006	16	6.98
2007	20	8.73
2008	5	2.18
2009	11	4.8
Total	229	100

In table one above, details regarding the distributions of the 229 articles published from 2000 – 2009 are given. The table shows that maximum number of articles published in 2001 was the highest, that is, 42 which represent 16.34% of the total published articles. This is followed by 40 (17.46) articles in 2000 and 5 articles representing 2.2 % is the lowest number of articles published in 2008. The journal publishes on an average of 23 articles per year.

Authorship Pattern

Table 2 - Authorship pattern

YEAR	**NO. OF AUTHORS**							**TOTAL**
	1 Author	*2 Authors*	*3 Authors*	*4 Authors*	*5 Authors*	*6 Authors*	*7 Authors*	
2000	7	12	8	7	4	1	1	40
2001	7	10	11	10	3	1	0	42
2002	3	8	12	12	4	0	0	39
2003	3	7	7	1	1	2	0	21
2004	1	8	7	2	0	1	1	20
2005	3	5	1	2	1	0	3	15
2006	0	3	4	4	4	1	0	16
2007	2	6	7	2	1	2	0	20
2008*	1	1	2	1	0	0	0	5
2009*	0	5	6	0	0	0	0	11
Total	27	65	65	41	18	8	5	229
%								

*Two issues were missing

Table 2 shows the authorship pattern of the articles published during the period under study. The largest number of articles had two and three authors (28.3%). This is followed by four author 41 (17.9), single author 27 (11.7%) and five author with 18 (7.8%) of the total articles.

Authorship Pattern per Year

Table 3 - Authorship pattern per year

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AUTHORSHIP	YEAR										TOTAL	%
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
Single Author	7	7	3	3	1	3	0	2	1	0	27	11.8
Joint Authors	33	35	36	18	19	12	16	18	4	11	202	88.2
Total	40	42	39	21	20	15	16	20	5	11	229	100

Table three shows that out of the 229 articles single authors contributed 27(11.8%) while the rest 202 (88.2%) articles were contributed by joint authors. It can be seen that author tend towards collective writing and research work is group oriented.

Length of Articles

Table 4 - Length of Articles

PAGES	YEAR										TOTAL	%
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
1-3	5	8	4	0	3	1	0	1	0	1	23	10
4-6	18	17	19	9	11	8	10	9	2	6	109	47.5
7 & Above	16	15	15	12	6	7	3	10	3	5	97	42.3
Total	39	40	38	21	20	16	13	20	5	12	229	100

Most of the articles 109 representing 47.5% are 4-6 pages long, followed by 97 (42.3%) articles with 7 and more pages and the remaining 23 (10%) have the length of 1-3 pages.

Referencing Characteristics

Table 5 - Articles and references

Category	No. of Contributions	%
With Reference	226	98.7
Without Reference	3	1.3
Total	229	100

Table 5 shows the number of articles with and without references. Nearly all articles contributed have references (98.7%).

Forms of Documents and their Citation

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Table 6 - Forms of Documents cited

Forms of Document	Total No. of Citation	%
Journals	2,493	64.4
Books	1066	27.5
Conferences/seminars	157	4.1
Dissertations	60	1.6
Web	32	0.8
Others	60	1.6
Total	3,868	100

Various kinds of published documents are used by researchers during the course of their work. These documents are in the form of books, journals or published literature like reports, conference proceedings, symposia, web, etc. Literature from these sources is being cited by the researchers as per their use and needs. Table 6 shows that out of the total of 3,868 citations, 2,493 (64.4%) are based on journal publications followed by books (1066). It could be seen in table 6 also that researchers contributing article to this journal have not fully embraced web materials as on 32 (0.8%) web articles are cited out of the 3,868 articles.

The *Tropical Veterinarian* is a prominent journal in the Nigerian veterinary discipline. The journal published 229 articles during the period under study. The maximum number of contributions comes from joint authors with 88.2%. The study revealed that most of the articles (64.4%) contain references which include journals. The study also revealed that researchers in this field are yet to embrace fully web materials.

Recommendations

It is therefore recommended as follows:

- Publishers of journals in Nigeria and indeed Africa should explore the opportunities and infrastructures provided by other international bodies such as INASP and AJOL to publish their journals online, thereby increasing their global visibility.
- Irregularity and delays in the publication of journals should be addressed by journal publishers.
- The journal should make deliberate efforts to source for articles from all the zones in Nigeria, for adequate representation in all the geographical zones.
- Authors should embrace e-resources too.

Conclusion

Bibliometrics is an important field of information science because it represents a unique set of techniques for the monitoring and analysis of information resources and for the management of knowledge in social and organisational contexts. Bibliometric methods are used in studies of properties and behaviour of recorded knowledge, for analysis of the structures of scientific and research areas, and for evaluation of research activity and administration of scientific information. Various statistical methods are applied to study to measure, authorship,

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citation and publication pattern, and the relationship within scientific domains and research communities and to structure of specific fields. In this sense, bibliometrics is also relevant for researchers, policy and decision makers and also researchers outside the library and information science (LIS) field to track the trend in the specific field in their research work. Moreover, bibliometrics studies should be encouraged to evaluate research performance of a particular field of research in a country. Even national science policy can be decided on the basis of bibliometrics study. It is expected that more and more subject experts would take keen interest in this area of study.

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