

A Bibliometric Study on the Use of Grey Literature in the Savannah Journal of Agriculture

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Abstract

Purpose: The study used the Bradford's Law of scattered dispersion to measure how grey literatures are used by scholars in the field of agriculture.

Methodology: Citation analysis was used to study a cross-section of articles published in The Savannah Journal of Agriculture (SJA) from 2006 to 2015, of which 131 articles and 2,422 bibliography citations were analyzed.

Findings: Findings of the study show an 8.6% improvement on the 20% Bradford's assumption underlying the study, yet, a dismal use of grey literature exist in the Savannah Journal of Agriculture, only 694(28.6%) of the 2,422 citations were grey literature, compared to published literatures such as books and journals. 6 types of grey literatures were used in the journal of which conference proceeding was the most used while handbook/manual was the least used. The online accessibility of grey literature was awful, only 42(6.1%) of the 694 grey literatures identified had online links that were used to access them.

Implications: Findings of the study shows that there is a wide gap between the use of published and unpublished resources and this buttress the need to embark on the marketing of unpublished resources commonly known as grey literature.

Originality/value: It was recommended that there is the need to embark on marketing the benefits to be derived from grey literatures, so that their use would catch up with other published literatures. There is also the need for scholars to improve their citation technique such that grey literatures obtained online are duly acknowledged with their URL.

Keywords: Agriculture, Bibliometrics, Bradford's Law, Grey Literature, Savannah Journal of Agriculture, Citation Analysis

Paper type: Bibliometrics/Citation Analysis

Introduction

Bibliometrics entails document verification and publication analysis, it is synonymous with scientometrics. It is an old preoccupation of librarians that has taken a center stage in promoting information work. Essentially, its virtue begins with determining the use of library resources, to a scale of ascertaining growth rate of publications to portray the growth and development of areas of knowledge overtime. Bibliometrics as an approach of measuring scientific publications looks at how scholars cite one another in their publications, with a view to facilitate building a network of scholarly communication.

Grey literature is a field in library and Information science that deals with the production, distribution, and access to multiple document types produced on all levels of government, academics, business, and

organization in electronic and print formats not controlled by commercial publishing i.e. where publishing is not the primary activity of the producing body, (www.greynet.org). Aina (2000) corroborates that the debate over what exactly constitutes grey or fugitive literature resulted in a consensus definition at the third International Conference on Grey Literature held in Luxembourg in 1997. The consensus definition stated that "Grey literature is that which is produced by government, academics, businesses and industries, both in print and electronic formats, but which is not controlled by any commercial publishing interests and where publishing is not the primary activity of the [authoring individual] or organization". Pelzer and Wiese (2003) corroborated that what is known as grey literature are intended for low distribution to a limited readership, never reaching dispersion through normal book trade channels.

Though an information system called 'Greynet' exist for over two decades ago to facilitate dialogue, research, and communication between persons and organisations in the field of grey literature, its mandate as an information system lacks touch with articles from Nigeria. Essentially, it needs to be upgraded based on the observed inadequate coverage of Nigeria in the Greynet information system.

The fact that grey literature publications begin and end with their authors still undermines its access for scholarship and researchers. In a study, Lisée, Larivière and Archambault (2008) informed that, "despite that it has been shown by several researchers that other types of literature are often published and cited by researchers, the most frequently used source material in bibliometric studies which consist of published scientific papers". Similarly, Kousha, (2008) noted that researchers' interest in bibliometrics has predominantly concentrated on the citation relationships within formal publications such as books and journals, neglecting informal publications such as conference proceedings, thesis and dissertation, government publications and etcetera that are classified as grey literatures. Some of the established cases whereby grey literatures were neglected include, Harande (2013); Grandbois and Behesti (2014); Bhanudasrao and Khaparde (2016); Tupe & Khaparde (2016). The fourth issue in the sixth volume of the International Journal of Library and Information Studies (2016) proves it all regarding the neglect of grey literatures in the work of bibliometrics. Essentially, the journal had a total of 21 articles out of which 9 articles had to do with bibliometrics, scientometrics or even webometrics, but only 1 had done a bibliometrics on a grey literature coming as Ph.D dissertation, (Reddy & Babu, 2016).

Thus, apart from the fact that greynet.com is still deficient in covering developing countries like Nigeria, the need to have a general balance in presenting the information available about the use and growth of both published and unpublished documents, makes this study more imperative. It is hoped that this study portray the growth in the production and use of grey literatures in support of teaching, learning and research. The implication thereof is to; establish a basis for an aggressive marketing of grey literature in libraries that collect them as an

information resource. This study is carried out with the aim of;

- Measuring the use of grey literature in the savannah journal of agriculture
- Identifying the types of grey literatures used in articles published in the journal
- Estimating online versus offline access to grey literatures

Literature Review

Earliest bibliometric studies and even a great majority of the subsequent ones serve as library records that shed light on issues such as; trends in publication, the relative importance of different special fields, title dispersion, subject scattering, time span and period of usefulness, language distribution of pertinent literature and the national origin of published materials. In recent times, bibliometric studies have grown beyond the level of publication analysis; many communities utilize them as a strategy for gathering information that could be useful in understanding a phenomenon or even the growth of their local science (Nwagwu, 2006).

Bibliometrics is best addressed based on the application of fundamental theoretical frameworks that influence and leverage the understanding of library users' information interest and needs. Accordingly, fundamental bibliometric laws such as Bradford's law, Hirsh index law, Leimkuhler Law, Lotka Law as well as the Zipf Law, (Iskra, 2013), are some of the possible hypothetical basis of denoting the growth in the production and use of grey literatures.

This study adopted the Bradford's law to portray that if the bibliographies of citation in a given article are grouped (preferentially) based on forms of information resources, they may be divided into a nucleus of bibliographies that represent different types of information resources, thereby forming a basis of gauging the extent of using publications that emanated from commercial publishing outlets from those that are not from commercial publishing outlets.

The Bradford's law of scattered dispersion has been the most popular theoretical law of bibliometrics and has attracted a lot of interest in studies such as Iskra (2013); Harande (2013); Manley (2011) and Hiremath, et al (2016) whose studies have predominantly portrayed inquiries

carried out with a view of ascertaining those characteristics inherent in a document, especially those that aim at looking at how authors have created a chain of scholarly reference among themselves in a particular field of knowledge.

The Bradford's law is also adopted to guide this study with a view of discovering how grey literature has taken a center stage in the literary output of scholars in the field of life science, most specifically agriculture. Basically, the Bradford's law is anchored on portraying the retrieval and use of published information based on their dispersion within a specific source of information. Bradford formulated his law after studying a bibliography of geophysics, covering 326 journals in the field. He discovered that 9 journals contained 429 articles, 59 contained 499 articles, and 258 contained 404 articles, so it took 9 journals to contribute one-third of the articles 5 times, 9 or 45, to produce the next third and 5 times 5 times 9, or 225, to produce the last third.

The Bradford's law of scattered dispersion incorporates both theoretical and empirical aspects that guide scientific inquiries, the ability to articulate and apply the Bradford's law does not hinge on absolute application, but it is rather subject to modification. Bradford used scattered dispersion to show how different nucleus of distinct groupings can be made with a view of statistically defining where the scale tipped on a given issue of bibliographic interest.

The decision rule of the law explains that; the most used publications are determined by means of those zones where citations are necessary based on frequent use among their dispersed classification, Iskra (2013). Accordingly, Manley (2011) stated that the Bradford's law of scattered dispersion is often described as the 80:20 Rule. The presumption of the rule is that, "when bibliographic citations are scattered and dispersed into various nucleus, 80% of publications are rarely cited while only 20% are often cited.

For instance, a study carried out by Lisée, Larivière and Archambault (2008) investigated the Thompson's citation index for conference proceedings mainly because their importance has not been measured scientifically for quite long. The authors informed that, "though the traditional model of the growth of scientific literature considers conference proceedings as a prototype document that do not stand the test of time, they still remain one of the final product of

scientific research", whose value ought to be ascertained. Though, the study revealed that a slight growth was recorded from 8% to 10% references on cited conference proceedings in engineering documents from 1980 to 2005, an increase from 0.32 in the 1980s to 0.38 as at 2005 was the average number of proceedings citations per paper in 25 years. It was proven that conference proceedings have a relatively limited impact which is approximately 2% of total citations; in essence, it represents only 1.7% of reference citations that were made in the natural sciences and engineering and only 2.5% in the fields of social sciences and humanities. In essence, the study clearly shows that conference proceedings are yet to be perceived as information resources that could be used to create and share knowledge. Thus, the relative importance of conference proceedings as information resources has diminished overtime.

Usman and Dansale (imprint) studied the usability traits of thesis and dissertation as sources of information among agricultural students mainly to find out what is the rationale behind why students use them. The authors noted that; theses and dissertations are grey literatures which do not have any commercial interest, rather, they represent a scientific report that provide detailed information on how a given research oriented project or activity has been conducted by a student and supervised on academic grounds by a supervising lecturer. Essentially, their study revealed that use of thesis and dissertation as source of information is still not popular among members of academic community for those purposes that are not related to learning how to conduct and write research report. The study, reported that use of thesis and dissertation by post graduate students who might publish articles from their study is as low as 12.9%, compared to 87.1% usage by undergraduates who may not publish part of their thesis report as journal article. Thus, this extremely small use of thesis and dissertation by a section of the academic community where publication is expected is an implication for why little citation of grey literature coming as thesis and dissertation could be observed in journal articles.

In addition, Manley (2011) wrote a doctoral thesis that investigated the transition from traditional paper distribution to the digital distribution of technical reports with the aim of ascertaining whether the internet has contributed to the increased access of scientific and technical

information. The doctoral thesis explained technical report as a grey literature because "Prior to the widespread use of the Internet, technical reports were disseminated in print format with the use of specifics, and often have limited distribution lists, they only serve as significant documents published to indicate scientific trends that often portray public and governmental interests in emerging fields". The study proved that (traditional print or digital) format did not play a role in whether the reports would be more cited or not. Out of the 623 reports identified, only 141(23%) were cited while 482(77%) were not cited. Essentially, the Bradford law's rule that states that 80% publication are rarely cited while 20% are often cited was confirmed by the study, the subset of observed reports was at an average of 2.3times compared to an average 0.52 for the total set of cited technical reports.

Furthermore, Pelzer and Wiese (2003) used citation analysis technique to examine the nature and use of grey literature in veterinary medicine by analyzing and characterizing the bibliographic citation in twelve core veterinary journals. The authors confirmed that the incidence of using grey literature is sporadic or occasional, their study highlighted that only 3,564 (6.38%) out of the 55,823 citations were grey literature that have basic research orientation in sources such as conference papers, government publications and literature of corporate organization.

In a study Maz-Machado, Jimenez-Fanjul and Adamuz-Povedano (2014) carried out an analysis of the citation patterns of the Education & Educational Research Spanish Journals within the Journal Citation Report (JCR). The study reported a dismal regard for grey literature by authors. Out of 53,818 total bibliography references, only 1,303(2.42%) were grey literature. The study outlined focused on 4 types of grey literature of which thesis and dissertation was the most used grey literature while reports were the least used. The distribution of grey literature discovered in the study shows that 762(1.42%) were thesis and dissertation, 277(0.51%) were conference proceedings, 134(0.25%) were government publications while 131(0.24%) were reports.

Despite the presence of grey literature on the electronic platform for wider access as remarked by scholars such as; challabi (nd), Manley (2011) as well as Pelzer and Wiese (2003) whose study

reported that, the appearance of closed community email forums and specialized online discussion groups are example of what could become a new kind of grey literature in the nearest future, it is clear that the literature reviewed has clearly proven that authors have nonchalant attitude towards the use of grey literatures in making their publication and their accessibility online still leaves more to be desired.

Research Methodology

The Savannah Journal of Agriculture (SJA) is the official publication of the Faculty of Agriculture at Bayero University, Kano. The journal is a peer reviewed journal that publishes original research papers, reviewed articles and short communication (scientific publications) in the field of agriculture and its related areas. The maiden edition of the journal was published in June 2006 and currently has 10 volumes with 30 issues.

This study quantitatively surveyed. The Savanna Journal of Agriculture that were published over 10 years, precisely from 2006-2015. A total of 131 articles and 2,422 reference citations were identified as the subject of investigation in this study. As a methodology, a cautious analysis of the bibliography reference of each article published in the Savanna Journal of Agriculture was carried out with the aim of sieving out grey literature based on the principle of non-commercial publication or principle of targeted limited audience. Essentially, the study was carried out with a vested interest in identifying those grey literatures that conform with publications such as conference proceedings, thesis and dissertation, technical reports/specifications, government publications, institutional publications and etcetera. Data collected was coded and presented in tables, of which data was analyzed using frequency count and percentages.

The major limitation of the study is the unavailability of journals produced in the year 2007 and 2010 because they were totally out of print, all effort made to obtain them through publishers of the journal was not successful. Despite the painstaking approach adopted in carrying out the grey literature search in the bibliography citation of articles published in The Savanna Journal of Agriculture, the study was hindered by incomplete and improper citation of some bibliography reference, leading to no basis for their categorization as grey literature.

Another major hindrance to the study is the inability to judge whether cited documents emanating from professional societies which contain issue or volume number constitute grey literature or not.

The main focus of this study was to use the citation count of articles published in the Savannah Journal of Agriculture for ascertaining how grey literatures are regarded and used by scholars in the field of agriculture. The result obtained from the citation count is organized and presented in table 1 below

Analysis and Discussions

Use of Grey Literature

Table 1: Use of Grey Literature in Agriculture

Years	No. of Articles	No. of Citations	No. of G. L. Citations
2006	28	424	97(22.6%)
2007	-	-	-
2008	11	198	55(27.7%)
2009	9	145	47(32.4%)
2010	-	-	-
2011	13	265	92(34.7%)
2012	19	349	105(30%)
2013	19	383	101(26.1%)
2014	16	338	97(28.7%)
2015	16	320	100(31.3%)
Total	131	2422	694(28.6%)

Source: S J A citation count

Table 1 show the result of a citation count conducted to measures the use of grey literature in the field of agriculture and its allied fields through articles in the Savannah Journal of Agriculture, produced by the Faculty of Agriculture at Bayero University, Kano.

The assumption behind measuring the use of grey literature in this study was based on the bradford's law of scattered dispersion which argues that; when resources of interest are logically scattered and dispersed, only 20% of the resources of interest would be cited while 80% would hardly be cited (Manley, 2011).

Data analyzed shows that articles in the Savanna Journal of Agriculture form 2006 to 2015 excluding those of 2007 and 2010 were counted for the study, of which a total of 2,422 citations were analyzed and only 693(28.6%) of them were grey literature.

Essentially, there was a positive 8.6% deviation from the 20% citation interest assumption that this study was built on. However, this still informs that there is a dismal use of grey literature among scholars in the field of agriculture when compared to 71.4% use of

other literatures such as books and journals that are produced with commercial interest and via formal publication outlets. In fact, up to four articles were identified without any single grey literature citation in them one was even totally written with journals all through.

Essentially, data shows that the year 2011 has the highest of 34.7% use of grey literature in the savannah journal of agriculture, followed by 32.4% in 2009, 31.3% in 2015 and 30% in 2012. Furthermore, the year2006 has the lowest in terms of grey literature citation count with 22.6%, followed by 26.1% in 2013, 27.7% in 2008 and 28.7% in 2014.

Types of Grey Literatures in the Savannah Journal of Agriculture

The types of grey literature that serve as source of information to authors who publish in the savannah journal of agriculture were analyzed. Data collected shows that there are 6 major grey literatures that are of interest to scholars in the field of agriculture. These grey literatures and their extent of use in the SJA are presented in table 2

Table 2: Types of Grey Literatures Used in the Savannah Journal of Agriculture

Year	Conference proceedings	Government Publications	Handbook/ Manual	Institutional publication	Theses and Dissertations	Technical reports	Total
2006	35	6	4	11	24	17	97
2007	-	-	-	-	-	-	-
2008	7	12	3	19	7	7	55
2009	14	9	3	3	8	10	47
2010	-	-	-	-	-	-	-
2011	32	11	9	8	21	11	92
2012	44	9	10	17	16	9	105
2013	28	19	2	24	24	4	101
2014	24	15	4	29	20	5	97
2015	24	21	5	35	11	4	100
Total	208	102	40	146	131	67	694

Source: S J A citation count

Table 2 indicates that there are 6 categories or types of grey literature used by authors who publish in the savannah journal of grey literature. These types include; conference proceedings, government publications, handbook/manuals, institutional publications, thesis and dissertation as well as technical reports. Out of 694 total grey literatures that were discovered during the study period, data shows that conference proceedings was the most used grey literature with 208(30%) reference citations, then followed by institutional publications with 146(21%) reference citations. Thesis and dissertation with a reference citation rate of 131(18.8%) was third in the count, followed by government publications with 102(14.6%) reference citations. Consequently, data shows that technical reports and manuals were less used, their reference counts are 67(9.6%) and 40(5.7%) respectively.

Institutional publications were crucial to the articles published in the Savanna Journal of Agriculture, they actually constitute the second category of grey literatures that satisfy the information needs of scholars in the field of basic sciences precisely agriculture and its allied field. Some of these observed institutions or agencies whose publications were found to be pertinent to the information needs of scholars in the field of agriculture in Nigeria include the publications of; Alliance for Green Revolution in Africa (AGRA), Chartered Institute of Architectural Technologists (CIAT), Department of Petroleum Resources (DPR), Food and Agriculture Organization (FAO), Institute for

Agricultural Research (IAR), International Fund for Agricultural Development (IFAD), International Institute of Tropical Agriculture (IITA), International Soil Reference and Information Center (ISRIC), National Agricultural Extension and Research Liaison Services (NAERLS), National Population Commission (NPC), United Nations International Children and Emergency Fund (UNICEF), United States Agency for International Development (USAID), World Food Program (WFP) and World Health Organization (WHO).

Government publications were also found to be crucial to satisfying the information needs of scholars whose articles were published in the Savannah Journal of Agriculture. Apart from the publications of the Federal Ministry of Agriculture and Mineral Resources or Rural Development, the publications of Jigawa, Kano, Nasarawa, Niger and Sokoto states were observed sources from where scholars who publish in the Savanna Journal of Agriculture seek information. Essentially, the journal has contributions from the publications of Northern states of Nigeria only. Perhaps, this is could be due to the proximity of such scholars to these states or because these scholars that publish in the SJA are even from these states.

Accessibility of Grey Literature

Data obtained regarding how grey literature citations were accessed was very dismal for online means as in shown in table 3

Table 3 Online versus Offline Accessibility of Grey Literature

Years	No. of G. L. Citations	Online	Offline
2006	97	1(1%)	96(99%)
2007	-	-	-
2008	55	5(9.1%)	50(90.9%)
2009	47	1(2.1%)	46(97.9%)
2010	-	-	-
2011	92	4(4.3%)	88(95.7%)
2012	105	3(2.9%)	102(97.1%)
2013	101	7(6.9%)	94(93.1)
2014	97	7(7.2)	90(92.8%)
2015	100	14(14%)	86(86%)
Total	694	42(6.1%)	652(93.9%)

Source: S J A citation count

The issue of online versus offline access is very critical to the widespread use of grey literature. Data presented in table 3 indicates that going by the underlying 20:80 assumption of the Bradford's law of scattered dispersion in this study, there is much to be desired regarding the accessibility of grey literatures from online means. Only 42(6.1%) of the total 694 grey literatures citations were with online links for accessing them while 652(93.9%) were offline, this could be attributed to incomplete or improper citation by scholars who failed to properly acknowledge some sources of information that were deduced to be obtained online.

The highest count for online grey literature was in the year 2015, from a total of 100 grey literature citations that were obtained for that year 14(14%) were online while 86(86%) were offline citations. Furthermore, the lowest count for grey literature was as far as the onset of the maiden edition of this journal in the year 2006 as well as 3 years after in the year 2009, where only 1 literature citation was identified.

Conclusion

Informal publications, otherwise known as grey literature support scholars to make publications that are not necessarily informal. In the case of scholars that publish in Savannah Journal of Agriculture, grey literatures still remain relatively unused when compared with other formal publications such as books and journals. There were six grey literatures that support scholars to publish in the savanna journal of agriculture and they include; institutional publications, thesis and dissertation, government publication, technical reports as well as manuals and handbooks. The accessibility of grey literature is predominantly offline than online basically because; grey literatures suffer online

availability or incomplete citation by authors that merely provide citations for used literatures without their online links. Example of such documents that were retrieved online without properly acknowledging their source with their URL are those documents obtained from universities such as Ainslams University, Cairo University, North Carolina University as well as some documents of the Food and Agricultural Organization (FAO). It can be concluded that;

- Because grey literatures are documents that do not have commercial interest that will make them available in markets or bookshops, they tend to be less available for use by scholars compared to other published literatures such as books and journals that have commercial interest that influence their sale and distribution.
- Grey literatures such as conference proceedings, thesis and dissertation, government publications, institutional publications, handbooks and manuals as well as technical reports satisfy the information needs of scholars that publish in the Savannah Journal of agriculture. Accordingly, conference proceedings was one that is most used while handbooks and manuals were less used grey literatures by scholars who publish in the journal.
- Government publications and institutional publications are essential sources from where scholars in the field of agriculture obtained information.
- Because the publishers of the savanna journal do not attach much importance to scrutinizing bibliography references of each article that was published as much as they do to the content of the articles they publish, the online citation of grey literature is very poor compared to how offline grey

literatures citation in the journal were presented.

Recommendations

Presenting how information resources are used is very crucial to information work; essentially it opens up a basis for improving library services in areas where deficient use is observed. Thus, it is recommended that;

- There is the need to embark on the marketing of benefits to be derived from grey literatures so that their use would catch up with formally published literatures. Similarly, scholars who publish grey literatures should also make effort of promoting their work by donating copies of their work to libraries with a view to making them more available and accessible.
- Greynet should do more in living up to its mandate of being a database for collecting grey literature, by identifying and sponsoring research in countries where little or nothing is known regarding how they use unpublished information sources that constitute grey literature,
- The electronic publishing of grey literatures should be highly practiced to enhance their accessibility online.
- It is recommended that librarian's expertise in book trade should be tapped from by governments and institutions whenever they make publications in order for grey literatures to be made more accessible for scholarship and research.
- Journal publishers should ensure that their blind review of articles does not stop at the main content of the work only; it is recommended that they (employ a specialist to) do a thorough check of the reference citations in articles before they are published, so that improper referencing of grey literatures are corrected and prevented.
- Findings of the study are open for further expansion; it is recommended that the study should be carried out again in other places or fields of knowledge, with a view of finding out how they regard grey documents that are not producing via the normal channel of publishing.

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