Mechanisms Used by Academic Libraries in Kenya to Enhance Webometrics Ranking

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Abstract

Libraries essentially provide equal and fair access to information. Thus, they have a significant influence on the Webometrics ranking of universities across the world. Academic libraries affect Webometrics ranking through the generation of scientific publications and other scholarly resources. The purpose of this study was to examine mechanisms used by academic libraries in Kenya to enhance Webometrics ranking and to analyse the extent to which Webometrics ranking mechanisms in place in university libraries in Kenya have been successful. This study adopted a mixed research design. The target population included staff members of the University of Nairobi, Chuka University, and Kirinyaga University. A total of 73 staff members from the library, ICT, and research departments involved in Webometrics ranking were selected purposively. Semi-structured questionnaires were used as the data collection instruments. Quantitative data was analysed descriptively while qualitative data were analysed using content analysis. The study established that mechanisms put in place to enhance the participation of university libraries in Kenya in the Webometrics ranking include improved use and submission of e-resources as well as promotion of high-quality research in the institutions. Webometrics ranking mechanisms currently in place at the university libraries in Kenya have only been moderately successful. The findings of this study may be used by other institutions of higher learning on the mechanisms they can adopt to increase the capacities of their academic libraries so as to improve the contribution of these libraries to Webometrics and consequently to the overall ranking of the individual universities nationally and internationally.

Keywords: Webometrics, Academic Libraries, Ranking Mechanism, Kenya.

INTRODUCTION

Background of the Study

The Webometrics ranking of universities was originally meant to support and encourage web publications. The chief objectives of the Webometrics ranking of the world universities are open access initiatives and access to electronic scientific publications. Thus, it is the mandate of academic libraries to make available access to scientific publications such as e-journals, repositories, and other scholarly resources. For this reason, Hertzel (2012) observes that the influence of the academic library on the web presence of the university has grown. Because a great deal of content is deposited on library websites the influence of academic libraries on the Webometrics ranking of universities is deemed to be great. Webometrics also has a significant impact on content recruitment in academic libraries. According to Hirsch (2012), Webometrics plays a crucial role in such key aspects of content recruitment in academic libraries as mediated by depositing services, content harvesting, researcher bibliographies, usage information, and self-archiving policies.

Webometrics Ranking Mechanisms

A number of initiatives can be put in place to enhance Webometrics ranking in academic libraries. WebCATS, an online public access directory of catalogues that offers access to OPACs with Web interfaces, is one of these initiatives. Phan *et al*. (2013) offered a similar description regarding what they called 'Project DL'. The objective of the project was to build a site that can help users to access digital library collections and information resources allied to the study of digital libraries. McCready's (1997) research proposes a number of suggestions for crafting a 'library-related' website. The research explored the necessity for a library website, the personnel to develop the website, how to evaluate its usage, and how to organise and structure it. Westman (2010) is another researcher who provides librarians with resources (i.e. database-backed web pages) that can be used for the effective construction of library websites. According to Falk (2005), a library webpage serves two purposes: provides a means by which users access remotely available information from the library as it serves as the patron's guide to the library's collections; and serves as a gateway to the resources of the Web. Webometric mechanisms have been widely applied to enhance Webometrics ranking in academic libraries in Europe and to a lesser extent in other continents such as Asia, Australia, and Africa (Orduña-Malea & Ontalba-Ruipérez, 2013). Against this background, the current study seeks to examine mechanisms used by academic libraries in Kenya to enhance Webometrics ranking.

Rationale of the Study

Webometrics ranking has created an interactive world that has fundamentally improved communication practices and research. These have continued at an unrelenting pace. Furthermore, the proficiency of libraries in scholarly communications and information management means that they are in a better place to help scholars to realise the full benefits of a networked digital world. The introduction of Webometrics in libraries has brought about opportunities and challenges for researchers and libraries. The major challenges are unwillingness to abandon prevailing practices that seem to work well; misunderstandings about what it comprises; shortage of time to learn Webometrics techniques or procedures; or lack of clarity about the benefits that Webometrics may bring (Onyancha & Ocholla, 2007). Nonetheless, libraries have prospered in progressing library operations and services to exploit and promote Webometrics ranking. However, not much has been explored regarding the Webometrics ranking mechanisms put in place to enhance the participation of university libraries in influencing the Webometrics ranking. This study thus sought to shed more light on mechanisms used by academic libraries in Kenya to enhance Webometrics ranking. The specific objectives of this study were to examine mechanisms used by academic libraries in Kenya to enhance Webometrics ranking, and to analyse the extent to which Webometrics ranking mechanisms in place in university libraries in Kenya have been successful.

Theoretical Framework

This study was based on the Information-Centred Research (ICR) Theory proposed by Thelwall and Wouters (2008). The Information-Centred Research theory argues that it is important for information scientists to explore innovative web-based data sources in order to find out the disciplines in which the sources may be convenient as well as the ways that may be suitable for data management (Thelwall & Wouters, 2008). This study argues that, progressively, a key strand of research in Webometrics ranking is the generation of metrics from the influence of academic articles via evidence from web searches that mentions them. Thus, the Information-Centred Research Theory is relevant to this study because it postulates that librarians may possibly play a crucial role in assisting information scientists by guiding researchers to data sources and useful tools for their research needs - an argument that this study wholly embraces. The primary argument of the Information-Centred Research Theory is that information scientists are involved in exploring various web-based data sources. It is against this backdrop that this study examined the ways in

which the University of Nairobi, Chuka, and Kirinyaga University libraries influence the improvement of Webometrics ranking, the mechanisms put in place to enhance the participation of University of Nairobi, Chuka, and Kirinyaga University libraries in the improvement of Webometrics ranking, and the extent to which Webometrics ranking mechanisms currently in place at the University of Nairobi, Chuka University and Kirinyaga University libraries are successful. With this understanding, the current study seeks to identify strategies necessary to upscale the input of academic libraries in Kenya to Webometrics ranking.

LITERATURE REVIEW

Several mechanisms need to be in place for universities to get better Webometrics ranking. These include link analysis, web citation analysis, search engine evaluation, and purely descriptive studies of the web.

Link Analysis

Link analysis refers to the quantitative study of hyperlinks between web pages. Ingwersen's Web Impact Factor (WIF) triggered the use of links in bibliometrics. WIF was created through analogy to the Journal Impact Factor (JIF), and the potential that hyperlinks may be usable by bibliometricians in ways analogous to citations (Eom, 2009). The standard WIF measures the average number of links per page to a web space (for example, a website or a whole country) from external pages. The supposition on which early link analysis was based was that the number of links targeting an academic website might be proportional to the research productivity of the owning organisation, at the level of individual scientists, research groups, departments, or universities (Danman, 2011). Essentially, the two are connected since more prolific researchers appear to yield more web content, on average, despite the content not attracting more links per page. Nevertheless, the pattern could be unnoticeable in all but large-scale studies of the often-indirect association between productivity research and web visibility. For instance, according to Romero (2010), some researchers yield greatly noticeable web resources as the main output of their research whereas others with comparable great quality offline research draw less online attention.

Succeeding hyperlink research has brought new metrics, applications, and improved counting methods, such as the Alternative Document Models (Greenberg, 2003). Often, these researches have concentrated on method development or case studies. The multiple reasons why links are created and the fact that, unlike citing, linking is not essential to any science discipline has resulted in hyperlinks seldom being used in an evaluative role (Greer & Fowler, 2013). Nonetheless, they can be of use in relating the connectivity of research groups in a field and development, mainly in comparison with other sources of related information, such as patents or citations. In addition, links have value in gaining insights into web usage in diverse contexts, such as by departments in different fields (Hertzel, 2012).

Web Citation Analysis

Numerous Webometrics inquiries have concentrated not on websites but on academic publications using the web to enumerate the frequency of journal articles cited. Noruzi (2006) indicates that the basis for this is partially to offer an alternative view for the traditional Institute for Scientific Information (ISI) data, and partly to determine if the web can yield proof of broader application of research, comprising informal scholarly communication and commercial applications. A number of studies (Kousha, 2010; Ahmed, 2012; Golder & Macy, 2014) have returned outcomes that show that Web-based citation counting correlates meaningfully with ISI citation count across an array of disciplines, with web citations being characteristically more frequent. Nonetheless, numerous of online

citations are comparatively insignificant, for instance, appearing in journal contents lists and not in the reference sections of academic articles. This would offer an interesting alternative to the ISI citation indexes if it can be automated (Holmberg, 2009).

Search Engines
A substantial amount of research in Webometrics has appraised commercial search engines. Sadowsky (2006) notes that the two chief topics of inquiry have been: 1) the extent of the coverage of the web, and 2) the accuracy of the reported results. According to Hertzel (2012), research in developing search engine algorithms (information retrieval) and in how search engines are used (information seeking) are not part of Webometrics. The two audiences for Webometrics search engine research are researchers who use the engines for data gathering (e.g. the link counts above) and web searchers wanting to understand their results (IDEA, 2009).

Search engines have been the key means of access to the web for most users from the early years, thus the rationale for the need to evaluate how much of the web they cover. According to Smith (2005), in 1999, a survey of the main search engines estimated that none covered more than 17.5% of the 'indexable' web and that the overlap between search engines was unexpectedly low. Here, the 'indexable' web is roughly the set of pages that a perfect search engine could be expected to find if it found all website home pages and followed links to find the remainder of pages in the sites. The absence of comparable figures after 1999 is due to three factors. First, an obscure Hypertext Transfer Protocol technology, the virtual server, has made the sampling method of Lawrence and Giles in their study, Accessibility, and Distribution of Information on the Web, ineffectual. The Hypertext Transfer Protocol technology is often associated with poor performance resulting from the use of Secure Sockets Layer (SSL) encryption. The server must thus perform a lot more computations, thus increasing the response time. Second, the increase in dynamic pages suggests that it is no longer sensible to talk in terms of the "total number of web pages" (Ito, 2007). Finally, given that search engine coverage of the web is only partial, the exact percentage is not particularly relevant unless it has substantially changed. A consequence of the study by Ito (2007), though, was that there was strong proof that meta-search engines could return more results by the use of a combination of several engines. Nevertheless, the search engines have lost out to Google, ostensibly since the crucial task of a search engine is to return relevant results in the first results page, and not provide an all-inclusive list of pages (Greenberg, 2003).

The subject of the accuracy of search engine results is many-sided and relates to the degree to which a search engine fittingly reports its own knowledge of the web. There is proof that search engines are not internally reliable in the way they report their results to the end users. In longitudinal scrutiny of the results of the query "Informetric OR Informetrics" in Google, it is clear that search engines report only a portion of the pages in their database. Though some of the omitted pages duplicate other returned results, this is not always the case and, therefore, a portion of the information will be lost to the user. A related analysis with Microsoft (2007) indicated that one cause of the lost information could be due to the search engine policy of returning a maximum of two pages per site.

Web Description
Given the importance of the web, some Webometrics ranking research has been purely descriptive. A big range of statistics has been reported by means of numerous survey methods (Hertzel, 2012). These include the average size of the web page, the average quantity and category of meta-tags used, and the average use of technologies like Java and JavaScript. Additionally, several commercial web intelligence companies have reported basic statistics such as the number of users, pages, and web servers, broken down by

country. On the web, a few pages attract millions of links whereas hundreds of millions of pages attract few. Hill (2009) explains that this imbalance is because when a new link is created, it is more probable to target pages that already have many links. As a matter of fact, none bothers to count links to pages before they decide where their link should target, yet the mediating factor is search engines. It is easier to know about pages that have several links to them for search engines use links to find pages and to rank them. This explains why pages with many links to them are more visible online (Thelwall & Wouters, 2008). A study by Orduña-Malea and Ontalba-Ruipérez (2013) regarding the distribution of links to pages found that this cumulative advantage phenomenon fitted some types of pages, such as company home pages, but not others, like university home pages because these links are specifically designed to suit particular contexts. In the latter case, a second element, for example, prior knowledge of the existence of the page, must have been at work, (Sadowsky, 2006). The end result of either case is that a page without links to it is likely not to attract many more links. Therefore, website owners need to initiate the creation of a few links to their site to help attract more and thus increased the visibility of their websites. What this implies for Webometrics ranking is that counts of links to a page are not reliable as indicators of the quality of the page's contents. Pages may have many links because were greatly visible at some time in the past (Dresang *et al.,* 2011).

METHODOLOGY

This study adopted a mixed research design. This is because it provides a better understanding of the research problem. It also collects, analyses, and involves the mixing of both qualitative and quantitative data.

In this study, the target population included staff members of the University of Nairobi, Chuka University, and Kirinyaga University. The staff was drawn from the library, ICT, and research departments. These are the departments that are mainly involved in Webometrics ranking. According to Owens (2002), 10 – 45 % of the population size is deemed to represent the entire population. The researcher collected data from a representative sample of 30 % of the entire target population. This population provided reliable information regarding the mechanisms used by academic libraries in Kenya to enhance Webometrics ranking. At the University of Nairobi, the researcher purposively selected 40 librarians, including the Deputy University Librarian – Technical, the head of the repository content section, the repository manager, and 6 librarians involved in that section. In addition, it involved heads of sections and colleges, 10 ICT staff, and 3 staff from the research production & extension department, giving 53 respondents. At Chuka University, the researcher purposively selected a Senior Assistant Librarian, 6 key librarians involved as head of sections, 3 ICT personnel, and the Director in charge of the research department, giving 10 respondents. While in Kirinyaga University, the researcher purposively selected the Deputy University Librarian, 5 key librarians involved as heads of sections, 2 ICT personnel, and 2 staff involved in research activities, giving 10 respondents.

The study adopted document review as the data collection technique. Semi-structured questionnaires were used as the data collection instruments. Quantitative data was analysed descriptively while qualitative data was analysed using content analysis.

FINDINGS AND DISCUSSIONS

This section presents and discusses the findings of the study. The first section presents the background characteristics of the participating staff members. The rest of the sections are presented based on the research objectives.

Demographic Information

The majority of 31 (55.4%) of the staff members were male while 25 (44.6%) were female. With regard to age, the majority, 30 (53.5%), of the staff members were aged between 31 to 40 years; 17 (30.4%) were between 21 and 30 years old, whereas 9 (16.1%) were between 41 and 50 years. Pertaining work experience, the majority, 43 (76.8%), of the respondents had an experience of 5 years and above. The others, 13 (23.2%), had an experience of 3 to 4 years. In reference to the highest level of education attained, 2 (3.6%) had attained their doctorate degrees; 19 (33.9%) had master's degrees; 29 (51.8%) had bachelor's degrees; while 6 (10.7%) had diploma qualifications.

Mechanisms Used by Academic Libraries in Kenya to Enhance Webometrics Ranking

To establish the mechanisms used by academic libraries in Kenya to enhance Webometrics ranking, the staff members were first asked to point out mechanisms put in place by their library to enhance Webometrics ranking. They pointed out the following:

Encouraging users to use e-resources and subscriptions to open-access journals where recent publications can be accessed. All the universities in the study were found to already have an open access policy that provides guidance to scholarly output resulting from academic activities undertaken at the universities as well as promotes high standards in the management of research outputs. The results are consistent with the studies conducted by Chigbu et al. (2016), Rani & Kaur (2021), and Salau & Gama (2015), which indicate that university libraries have implemented an open access policy for electronic resources and have subscribed to open-access journals.

Enhancing the quality of research through the introduction of anti-plagiarism software and referencing tools. The University of Nairobi and Chuka University have implemented a strict anti-plagiarism framework for detecting, deterring, and dealing with plagiarism in order to promote the principle of academic integrity across institutions. On the other hand, Kirinyaga University has a set of rules and regulations for detecting, preventing, and addressing plagiarism. The findings align with prior research conducted by Mansoor & Ameen (2020), Sun & Hu (2022), Kumar & Srivastava (2021), and Ramadhan (2017), which suggest that higher education institutions have established a rigorous anti-plagiarism framework to uphold the value of academic integrity.

Continuous repository content recruitment, website updates, and easy access to the library website by making it a default website on all browsers. These measures have been implemented by the University of Nairobi particularly to enhance the long-term preservation of the university's research output, for enhanced visibility and impact of the university's research, and for improved collaboration with the global research community. Chuka University and Kirinyaga University have similar initiatives that are in the preliminary stages due to infrastructural inadequacies. The results are consistent with previous studies conducted by Jelagat et al (2021), Njagi & Namande, (2018), Makori et al. (2015), and Emmytone et al. (2018), which have demonstrated that Kenyan institutions consistently engage in the recruitment of repository content and the updating of their websites.

The University of Nairobi and Chuka University have electronic resources that are accessible through mobile devices available to university students, lecturers, and staff. The resources are accessed via Internet connectivity within the university system or remotely at the user's convenience. At Kirinyaga University, the resources are only accessed through computer labs within the university system or configured users' laptops. The results of this study align with the conclusions drawn by Mtega et al. (2014), Rivo & Žumer, (2022), and Otike & Barát, (2021), which suggest that universities provide electronic resources that can

be accessed via mobile devices by their respective student bodies, faculty members, and administrative staff.

Extent to Which the Webometrics Ranking Mechanisms in Place in University Libraries in Kenya Have Been Successful

The study also sought to determine the extent to which the Webometrics ranking mechanisms in place in university libraries in Kenya have been successful. In order to attain this objective, the staff members participating in the study were asked to indicate the extent to which the Webometrics ranking mechanisms currently in place at their respective university libraries were successful.

The majority (60.3%) of the staff members in the study indicated that Webometrics ranking mechanisms currently in place at their respective university libraries had succeeded to a moderate extent; 26.2% of the staff members indicated that the Webometrics ranking mechanisms had succeeded to a greater extent; whereas 13.5% of the staff members observed that the ranking mechanisms had succeeded to a less extent. Similar to this study, Munene (2013), Musangi et al. (2019), and Osumba (2014) reported that webometrics ranking mechanisms in place at several universities in Kenya.

CONCLUSION

The study established that mechanisms put in place to enhance the participation of university libraries in Kenya in the Webometrics ranking include improved use and submission of e-resources as well as promotion of high-quality research in the institutions. Webometrics ranking mechanisms currently in place at the university libraries in Kenya have only been moderately successful.

RECOMMENDATIONS

This study recommends that academic library staff members should adopt strategies and Open-Access policies geared toward the promotion of Webometrics in order to set a trend that will result in acquiring more support from the universities' management. Academic library staff members should also intensify the use of anti-plagiarism software to improve the quality of research. The staff members should further emphasize Open-Access approaches to both academic library users and university management. University management should conduct training workshops for academic library staff members on the dynamics and importance of Webometrics. Academic library users should strive to attain more information on their own regarding the importance of Webometrics and quality research. They should overcome technophobia and implement technological approaches in their research.

Practical Implications of the Findings

The findings of this study may be used by other institutions of higher learning on the mechanisms they can adopt to increase the capacities of their academic libraries so as to improve the contribution of these libraries to Webometrics and consequently to the overall ranking of the individual universities nationally and internationally. The findings may also help policymakers and policy implementers to effectively understand the influence of the Webometrics ranking of universities in Kenya and hence improve opportunities for upscaling Webometrics in academic institutions.

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