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Article

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Reference: Yekini, Nureni Asafe/Adigun, Oyeranmi et. al. (2022). Empirical analysis of webometric ranking in Nigeria polytechnics education sector. In: Technology audit and production reserves 6 (2/68), S. 34 - 38.
<http://journals.uran.ua/tarp/article/download/270322/266572/624965>.
doi:10.15587/2706-5448.2022.270322.

This Version is available at:
<http://hdl.handle.net/11159/13169>

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EMPIRICAL ANALYSIS OF WEBOMETRIC RANKING IN NIGERIA POLYTECHNICS EDUCATION SECTOR

The January 2022 edition of webometric ranking placed Yaba College of Technology as number one from 152 polytechnics in Nigeria. The ranking weight is 66 for country ranking, 8162 world ranking, Impact, Openness, and Excellence of 9698, 4558, and 7190 respectively. The negative variation and low webometric ranking of Yaba College of Technology that happened to be the first higher institution of learning in Nigeria with the slogan the first and still the best is a point of concern and motivates this research work. This research work collected data to evaluate the indicators for webometric ranking among the students and staff of Yaba College of Technology, a total of 346 were sampled students 44.51 % and Staff 55.49 %. The discussion and analysis of data obtained revealed that the poor webometric ranking is due to inadequacy of the necessary ICT infrastructure to encourage robust web presence; non-availability of up-to-date and scanty content on the Polytechnics website; Non-frequent usage of the Polytechnic website by the staff and students of the Polytechnic; the inadequate number of external networks (subnets) links with Polytechnic website; insufficient number of the top-cited publications in high impact Journals from the staff of the Yaba College of Technology; and Scanty number of the profile of staff from the Polytechnic on Google Scholar and ResearchGate, etc. among others. This research work opined that low webometric ranking could result in the following negative impact on the polytechnics lowering the esteem of the Polytechnic in the eyes of stakeholders, potential students and funding agencies, academic exchange with reputable institutions from other parts of the world for teaching, learning and research may writhe. The consequence of our findings recommendations was made to improve webometric ranking in future.

Keywords: polytechnics, webometrics, ranking, transparency, visibility, ICT impact, Google Scholar, Research-Gate, improve webometric ranking.

Received date: 06.11.2022

Accepted date: 17.12.2022

Published date: 26.12.2022

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How to cite

Yekini, N. A., Adigun, O., Akinwole, A. K. (2022). Empirical analysis of webometric ranking in Nigeria polytechnics education sector. *Technology Audit and Production Reserves*, 6 (2 (68)), 34–38. doi: <https://doi.org/10.15587/2706-5448.2022.270322>

1. Introduction

Webometrics is the use of bibliometrics and informetrics approaches to study the web, its information resources, structures, and technologies. The Web Impact Factor, the primary metric for measuring and analyzing website hyperlinks, has quickly established the value of webometrics since its inception in 1997. Link analysis became more focused on link impact analysis and link network analysis, with the number of links interpreted as a reflection of research productivity or prestige. Web citation analysis was created to aid in the investigation of links to journal articles, and keyword and phrase analysis allow for the linking of other types of web content. While webometrics is based on citation analysis theory, its methodology and software contributions may provide the most value and widest applicability.

Today, the worldwide web (web) is one of the primary sources of information and the primary showcase for anyone (institutions, businesses, individuals, etc.) who wish to be acknowledged in the «real world» Universities play a critical role in the academic world. As a means of dis-

seminating scientific and cultural achievements Scholars' web publication is not only a tool for scholarly communication, but it is also a means of reaching out to a wider audience, and, in general, a reflection of the institutions' performance several have occurred. Efforts to develop web indicators that can eventually lead to the construction of a university's rankings, in this context, it appears important to examine the results of the Webometrics ranking of Nigerian universities – the only global university ranking that promotes the development of not only elite but also mass higher education [1].

The proliferation of ICT and the use of the internet have become sine-qua-non as the main source of conveying information among the habitant of an academic community and society at large. Consequently, that web application is now the primary tool for communication within and outside the academic community to reflect the picture of quality and performance of higher institutions [2]. Webometrics is a collaborative (synergistic) activity that combines two other approaches, bibliometrics, and informetrics, into a single element known as bibliometrics and informetrics, for researching the web, its information resources,

structure, and technologies. It involves the study of the quantitative aspects of the construction and use of information resources, structures, and technologies on the Web, drawing on bibliometrics and informetrics approach [3].

Webometrics is a critical step in assessing scientific institutions and scientists. It is critical, especially in countries where international standards and criteria are not implemented through their institutional educational system. The ranking's goal is to promote web publishing, open access initiatives, and electronic access to scientific publications and other academic material. Web indicators better reflect the overall picture based on global performance, university visibility, and many other activities of instructors and researchers [4] and integrated the web research, teaching, and learning culture, increasing global presence, and perceived impact, as well as improving visibility and stakeholder perceptions.

The significance of the ranking is to promote open access and quality research and education by providing public information on the standing of higher education institutions for individual or group decision making, including potential students, and funding agencies; provides additional evidence about the performance of specific academic institutions and study programs and stimulates the evolution of centers of excellence. Institutions were also able to support electronic access to scientific publications and other academic materials, as well as aid in the creation of knowledge through the call for scholarly publications and knowledge dissemination and sharing [5]. The United States ranked 15th in the world in Times Higher Education's Global Webometrics Ranking (2014–2015) among the top 20 universities, the United Kingdom had three, and Switzerland and Canada each had one. African universities were not among the world's top 100. The best performing African university was the University of Cape Town in South Africa, which was ranked 124th with an overall score of 52.6 percent, while California Institute of Technology (USA) took first place with an overall score of 94.3 percent [6].

The use of webometric for ranking is based majorly on the four parameters; an institutions web content; analysis of web technology; institution web usage, and institutions web link [7] According to the July 2018 edition of the world University webometrics ranking, the majority of the higher education institutions of countries are ranked far well than Nigerian educational institutions. Worryingly, no Nigerian higher education institutions were ranked among the top ten higher education institutions or universities in Africa. In fact, only one Nigerian university, the University of Ibadan (ranked 12), is ranked among the top 35 in Africa and among the top 1076 in the world [7].

In the January 2022 Edition of the current webometric ranking, no Nigeria higher institution is among the first 1000. The University of Ibadan happened to be no 1 in Nigeria is ranked 1230 in the World with a continental ranking of 14, Impact, Openness, and Excellence of 2251, 821, and 1372. Yaba College of Technology's country ranking is 66, 8162 world ranking, Impact, Openness, and Excellence of 9698, 4558, and 7190 respectively. The low ranking of Nigeria institutions of learning as treasure in the past and present raking of January 2022 could result in some negative impact on the institutions, the students, and staff in the following areas: lowering of the esteem of the Nigeria institutions in the eyes of stakeholders, especially potential students and funding agencies. Further-

more, academic exchange for teaching and research with reputable universities from other parts of the world may suffer. The focus of this work is to evaluate the determinants factors for poor webometric ranking and proffer solutions to improve the ranking of Nigeria polytechnics for global recognitions.

The webometric ranking started in the year 2004 and it is a product of the Cybermetrics Lab, a unit of the Spanish National Research Council, the main public research body in Spain. The Lab acts as an Observatory of the Science and Technology on the web [8]. The webometric ranking of the higher institutions is based on the institution's web presence, visibility, and access, and it uses the following parameter for ranking the institution's web content; web technology analysis; web usage, and weblink [9]. There is another university ranking system, but webometric seems to be more popular and acceptable compared to other ranking systems because of its larger coverage and focus on other indicators that could reflect global quality apart from the research results and it comes twice a year (January and July).

Other ranking systems apart from webometric are Academic Ranking of World Universities since 2003 (ARWU); Centre for World Universities Ranking (CWUR), since 2012; Lucarelli Symonds (QS) World Universities Ranking. Previously known as Times Higher Education QS World University Rankings, the publisher collaborated with Times Higher Education magazine (THE) to create the rankings to publish its international league tables from 2004–2009 before both started to announce their own version separately [10]. The information available on the websites of the National University Commission (NUC), and National Board of Technical Education (NBTE) that oversees the administration and running of universities and Polytechnics in Nigeria revealed that Nigeria has 152 Polytechnics (Federal Polytechnics 37, State 51, and Private 64), and 202 Universities (Federal Universities 49, state universities 54, and 99 private universities) [11, 12].

The data implied that Nigeria has 354 higher institutions ranked or qualified to be ranked on webometric out of which none is among the first 1000 in the world ranking as the no 1 ranked institution (University of Ibadan) in Nigeria is 1230 in the world ranking for January edition of the webometric. Yaba College of Technology Lagos was ranked 66 in Nigeria and 8162 in the world ranking. The four factors that determine the ranking are web presence (0 %), visibility (Impact ranking) which is the number of external networks (subnets) linking to the institution's webpages (50 %), Transparency (Openness) which corresponds to top-cited researchers (Number of citations from Top 210 authors) 10 %, and Excellence (Scholar) top-cited papers, i. e. number of papers amongst the top 40 % [13].

According to [14] poor ranking is due to low visibility on the web and the inactivity of scholars and researchers in contributing meaningfully to the world of knowledge. Most institutional frameworks for effective activity are deficient, and most research information does not leave the institution's four walls. Knowing the search algorithm and how websites are indexed or crawled is essentially a trade secret. The success of web visibility and presence is also determined by development and knowledge level; for example, a page containing useful information may not be indexed.

Poorly written headers, titles, or metatags (keywords), incorrect syntax, and missing tags are common issues in search engine algorithms, and such neglect can seriously harm web

ranking. Because of the heavy use of scripts, many polytechnic websites with dynamic website pages that are generated automatically by the webserver using variables defined by users such as language, geographical location, and search terms may not be well indexed. The deceptive use of scripts to create pages can trap crawlers, leading the search engine to conclude that the page is being used for spamming [15]. There is little emphasis on communicating research findings from Nigerian polytechnics in a web-searchable format, as evidenced by non-publication in electronic journals, particularly open-access journals. There is no significant number of papers published in high-impact factor journals that are indexed by Google Scholar represents the institution's scientific output. The research impact of each institution is measured by its international collaboration, scientific talent pool, excellence with leadership, specialization, and normalized impact [11].

The Polytechnic's website has a limited number of pages that cannot be accessed directly through a menu or link on the site, as well as secondary pages and a number of rich files that demonstrate how vast a particular file can target an audience or the level of content rendering preferences it possesses. This information is derived from the Scimago group [16], which contains information about the domain of discourse for 5200 universities as well as Google Scholar. Consequences of a poor ranking, a low webometrics ranking may reduce staff esteem in the eyes of stakeholders, particularly potential students and funding authorities. Moreover, a small number of parents would gladly send their children to institutions with low rankings. Only top-ranked universities are known to attract candi-

dates with the highest JAMB scores and a strong academic background. Furthermore, academic exchange for teaching and research with reputable universities from other parts of the world may suffer [12].

The basic aim of this work is to identify the reasons for the poor webometric ranking of Nigerian Polytechnics. If the aim is established the following objectives could be achieved among others:

- Investigating the implications of poor ranking performance on the Nigeria Polytechnic;
- Proffering possible solutions to improve the webometric ranking;
- Revealing indicators and methodology of webometrics ranking;
- Suggesting potential solutions to poor ranking in order to improve performance in subsequent rankings.

2. Materials and Methods

Data were collected through online visitation to the webometric site, and structured questionnaires to obtain information from staff and students of Yaba College of Technology.

3. Results and Discussion

The data collected were presented as in Tables 1–5. The total number of ranked institutions for the January 2022 edition is 11999, out of which (280) Polytechnics and Universities were ranked or supposed to be ranked.

Table 1
Ranking Indicators, Meaning, Methodology Source, and Weight

| Indicators | Meaning | Methodology | Source | Weight |
|-------------------------|-------------------------|---|--------------------------------|--------|
| Presence | Availability of Website | This indicator has been discontinued | – | – |
| Visibility | Web contents Impact | Number of external networks (subnets) linking to the institution's webpages | <i>Ahrefs Majestic</i> | 50 % |
| Transparency (Openness) | Top cited researchers | The number of citations from top 210 authors | <i>Google Scholar Profiles</i> | 10 % |
| Excellence (Scholar) | Top cited papers | Number of papers amongst the top 10 % most cited in each one of all 27 disciplines of the full database | <i>Scimago</i> | 40 % |

Table 2
Yaba College of Technology Ranking for July 2017 to January 2022

| Ranking Period | World Ranking | Continental Ranking | Country Rank | Presence | Impact | Openness | Excellence |
|----------------|---------------|---------------------|--------------|----------|--------|----------|------------|
| July, 2017 | 11533 | 208 | 63 | 15034 | 10623 | 9009 | 5789 |
| January, 2018 | 10911 | 203 | 65 | 12511 | 10247 | 9035 | 5777 |
| July, 2018 | 10324 | 201 | 64 | 18984 | 9607 | 9540 | 5984 |
| January, 2019 | 9984 | 201 | 65 | 19365 | 9728 | 9359 | 6033 |
| July, 2019 | 11026 | 219 | 74 | 15460 | 10446 | 7920 | 6115 |
| January, 2020 | 10884 | 221 | 75 | 14354 | 10286 | 7002 | 6084 |
| July, 2020 | 11465 | 251 | 78 | 15091 | 9584 | 5819 | 6626 |
| January, 2021 | 8143 | 199 | 59 | NIL | 10370 | 4074 | 6658 |
| July, 2021 | 6755 | 180 | 58 | NIL | 10136 | 4302 | 6650 |
| January, 2022 | 8162 | 214 | 66 | NIL | 9698 | 4558 | 7190 |

Table 3
Frequency of Yaba College of Technology website access among students (154) and staff (192)

| Website access | Frequency (students) | Frequency (staff) | % | % |
|----------------------|----------------------|-------------------|-------|-------|
| Once a month or less | 29 | 19 | 18.83 | 9.90 |
| Once a week | 29 | 21 | 18.83 | 10.94 |
| Several times a week | 13 | 21 | 8.44 | 10.94 |
| Everyday | 9 | 31 | 5.84 | 16.15 |
| Several times a day | 3 | 11 | 1.95 | 5.73 |
| Non-user | 71 | 89 | 46.10 | 46.35 |

Table 4
Webometrics ranking perceptions of respondents

| Respondents | Satisfactory | Not Satisfactory | No Opinion | Total |
|-------------|--------------|------------------|------------|-------|
| Staff | 142 | 39 | 11 | 192 |
| Students | 108 | 33 | 13 | 154 |
| Total | 250 | 72 | 24 | 346 |

Table 5
Number of the top-cited papers in high-impact journals published

| Strategy | Frequency | Percent | Cumulative Percent |
|--|-----------|---------|--------------------|
| Upload publications Publishing in high Journal | 78 30 | 39 | 111 |
| Scholarly research and publications Increase awareness Collaboration and partnerships Archive Content Institutional Repositories | 108 | 33 | 13 |
| Total | - | 72 | 24 |

Table 1 shows that visibility (Impact ranking), Transparency (Openness) and Excellence (Scholar) are the major attributes for webometric ranking, and the attributes carry weight of 50 %, 40 %, and 10 %, respectively. Table 2 shows that there is improvement in world ranking of Yaba College of Technology from July, 2017 to January, 2019. There was improvement in ranking from January, 2021, July, 2021, and January, 2022, within the periods Yaba College of Technology was ranked no 1 among the Nigeria Polytechnics. Country ranking for the three recent ranking is from 59 to 58 and drop to 66. There is significant improvement in the Impact ranking for January, 2021, July, 2021, and January, 2022 which are 10370, 10136, and 9698, respectively. Table 2 revealed that openness and excellence ranking drop significantly for January, 2021, July, 2021, and January, 2022, respectively. The usage of the school website was not impressive as revealed by Table 3, with 46 % of students sampled as non-user of the school website, 18.83 % using the website once a month or less, also 18.83 % using the website once a week. Table 4, with 46.35 % of staff sampled as non-user of the school website, and 9.90 % uses the website once a month or less, while 10.94 % uses the website once a week.

The findings from the data collected reveal the following as regards the negative variation and poor webometric ranking of Yaba College of Technology:

- Non-availability of the necessary ICT infrastructure to encourage robust web presence;
- Non-availability of up-to-date and scanty content on the Polytechnics website;
- Infrequent use of the Polytechnic website by staff and students;
- Scanty number of external networks (backlinks or subnets) links with Polytechnic website;
- Scanty number of the top-cited papers in high-impact journal;
- A small number of the profile of staff from the Polytechnic on Google Scholar and ResearchGate, etc.

Consequent to our finding recommendations were made to improve webometric ranking in the future. Management must as a matter of urgency put in place a policy to improve webometric ranking by doing the followings:

- Putting in place an enforce ICT Policy that specifies minimum benchmarks in the utilization of ICT services in the Polytechnic;
- Enforce all academic staff to enroll on Google scholar and other academic forum platforms like ResearchGate, LinkedIn, and other social media, and points be assigned during evaluation and assessment process;
- Enforce usage of Polytechnic website for teaching and learning process by directing staff to develop quality OER (open educational resources), and lecture materials for uploading on the polytechnic website, and uploading of student’s PDF copies of abstract and project dissertation on the website for global visibility;
- Polytechnic should engage in activities that influence the immediate community, the country & the world at large, and publish such activities on the polytechnic website;
- Management should encourage and motivate staff to put academy services online to increase the number of available links;
- Staff should be encouraged and given financial support to publish research work in top-cited journals across the world on a regular basis because old articles are not scored.

4. Conclusions

This study aimed at identifying the causes of negative variation and low webometric ranking of Yaba College of Technology Lagos Nigeria. Data were collected online by careful navigation of the webometric ranking website and the Yaba College of Technology website. Data were also sourced through the use of questionnaires to gather information from students and staff of the College on the usage of the school website to support the teaching and learning process towards the improvement of the school webometric ranking. It is clear from the study that the students and staff of the Yaba College of Technology were not interested in using the school website to supports teaching and learning. The action contributed to the negative variation and low webometric ranking of the school. Findings of the study as mentioned in section 3 of this documentation could impact the institution negatively as in lowering the esteem of the College in the eyes of stakeholders, potential students, funding agencies, and academic exchange with

reputable institutions from other parts of the world for teaching and research may suffer. Consequent to our finding recommendations were made to improve webometric ranking in the future.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

Financing

Presentation of research in the form of publication through financial support in the form of a grant from SUES (Support to Ukrainian Editorial Staff).

Data availability

Data will be made available on reasonable request.

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