PERCEIVED IMPACT OF DIGITIZATION ON THE RESEARCH PRODUCTIVITY OF LIBRARIANS IN NIGERIA.

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Abstract

This work is focused on establishing how digitization of library information materials affects the research productivity of Librarians in Nigeria. The descriptive survey research design was adopted for the study and the purposive sampling technique was employed in selecting 20 libraries that have digitized their information resources. Ten librarians, each from the universities were randomly selected for the study, making the sample size 200. Self-constructed questionnaire was the instrument used for data collection. Data collected was analyzed using SPSS software. The outcome revealed that the types of information resources digitized by the libraries include theses and dissertations, research works published in local journals, conference papers, and inaugural lectures. Opportunities presented by digitization that impact the research productivity include; enhanced access to existing local scholarly works, giving visibility to individual and institutional research output, making researchers discoverable, and exposing them to the knowledge of other researchers in their areas of interest for collaboration purposes, etc. The perceived impacts of digitization on the research productivity of librarians are; enhanced quality of research, enhanced research output, high citation impacts, created room for multi-disciplinary, national, and international collaborations, and made them visible to grantors and funding bodies. The major challenges hindering the effective utilization of these resources include; irregular Internet access, limited awareness of the availability of the resources, infrastructure limitations, and erratic power supply.

Keywords: Digitization, Scholarly publishing, Scholarly communication, Research productivity, University libraries, Nigeria

Introduction

Before the era of digitization, research outcomes were primarily communicated and distributed in print format. This limited easy and broader access to them, as one had to physically visit libraries to access them. The constraints of library hours and locations created significant challenges for the effective circulation of resources by the library and the efficient utilization of those same resources by researchers.

For instance, libraries were confronted with the challenge of acquiring multiple copies of a particular volume of a journal. A large population of researchers at that period had limited access to information resources for their scholarly works because very few of them could afford to pay and access the electronic resources made available through online subscription databases. Libraries on their part were scarcely able to subscribe to these databases as a result of their outrageous subscription costs.

However, the advent of information and communication technologies altered this course. They enable digitization which paved the way for new scholarly publishing, access, and communication procedures. Today's world, according to Nuseir (2018), has been captured by digital media products, and these products have been spread enormously in almost all industries, including those that are not formally included with digital media, such as health, government, and education.

Digitization according to Mutula (2004) cited by Saminu (2016) means the conversion of non-digital materials to digital form to enable greater access to them. It is the process of transforming information materials in analog format into digital format to facilitate enhanced access to them by the users. Digitization enables seamless access to vast collections of research works either presented at conferences or published in print local journals which are dumped in the libraries. The advent of digitization has dramatically reshaped the landscape of information management and research, impacting various professions, including librarianship, and playing a major role in shaping research output. Consequently, digitization is reflected in the quantity and quality of articles published by researchers and faculty members, which is often a key requirement for the promotion of academic staff in higher learning institutions.

Digitization and adoption of technological tools in information handling processes is rapidly evolving, hence, understanding the perceived impact of this digital shift on the research productivity of scholars with emphasis on librarians is crucial. This research examines the impact of digitization on the research activities of librarians in Nigeria, exploring the opportunities it presents as well as the challenges it poses. It considers the perceived effects on various aspects of research productivity, including information access, research methodology, collaboration, and dissemination of research findings. By examining these perceptions, this study aims to provide insights into the current state of research within the Nigerian library profession and to inform strategies for enhancing research capacity in the digital age.

Statement of problem

Universities globally are investing substantially in the digitization of their content to provide scholars with resources that would be accessed devoid of time and location constraints. The belief is that these digital contents would enable improved access to library resources and, by extension, lead to increased scholarly and research productivity. Following the global trend, university libraries in Nigeria have also embraced the digitization project and uploaded many of their local contents to their institutional repositories. In line with the already-known fact that availability and accessibility sometimes do not automatically translate to usability. Non-effective utilization of these digitized materials has been a common issue discussed among Nigerian librarians at several informal forums. The assumption is that this situation could affect the digitized content's role in enhancing research productivity. While existing studies reported the influence of these resources on the service provision of librarians as well as the usage behavior of users (Oyedipe, Adekunmisi & Akinbode, 2017; Saminu, 2016; Isah, Mutshewa, Serema & Bwalya, 2014; Rafiq & Ameen, 2013; Okoye & Ejikeme, 2011), there is little or no available literature on the impact of digitization on research productivity of librarians. This study tends to cover this gap in knowledge by investigating the perceived impact of digitization on the research productivity of Nigerian librarians.

Objectives

The general objective is to establish the impact of digitization on the research productivity of librarians in Nigeria. The specific objectives are:

1. To identify the types of information resources that have been digitized by the libraries.
2. To explore the opportunities presented by digitization that impact the research productivity of librarians in Nigeria.
3. To establish the perceived impact of digitization on the research productivity of librarians in Nigeria
4. To identify the challenges hindering the effective utilization of the library's digitized materials for research activities by librarians.

Research questions

1. What are the types of information resources that have been digitized by the libraries under study?
2. What are the opportunities presented by digitization that impact the research productivity of librarians in Nigeria?
3. What are the perceived impacts of digitization on the research productivity of librarians in Nigeria?
4. What are the challenges hindering the effective utilization of the library's digitized materials for research activities by librarians?

Review of related Literature

The adoption of digital technologies in the production of goods and services generally has had tremendous positive impacts on their output levels. Digitization, as a process, has generally affected most aspects of how people live and work. According to Hammer (2019), digitization

brings about digital transformation, which is "the use of technology to radically improve performance. It automates the product and process, as a result of which both quality and production increase (Maiti & Kayal, 2017).

Digitization of library resources has become a major focus of libraries globally in recent years because of the avalanche of benefits associated with it, which range from wider access to research outputs to the visibility of one's scholarly output. Brunetti, et-al. (2022) affirmed that digitization has enabled researchers to produce and disseminate their work more rapidly, contributing to higher publication rates. They acknowledged that the integration of digital tools and platforms has facilitated a more efficient publication process while also broadening the scope of research topics and collaboration opportunities. This means that digitization has significantly transformed the landscape of research publications, enhancing both the frequency and quality of scholarly outputs.

Mayol-Martinez (2019) buttressed that digitizing research outputs and making them available to users has improved the visibility of research, allowing for broader dissemination and engagement with diverse audiences. The study also revealed that digitization has significantly increased the frequency of research publications, particularly in biomedicine, with articles rising from 59,063 in 1988 to 415,355 in 2018. This is supported by the outcome of a study carried out by Samuel (2021), which revealed that digitalization enhances the frequency and quality of research publications by facilitating faster dissemination, improving accessibility, and enabling broader collaboration among researchers, ultimately leading to increased visibility and impact of scholarly work in various fields. Other authors with similar research findings detailing the opportunities provided by digitization include Vasilescu, et-al. (2020), Sarango-Lalangui (2023), Chem (2023), and Judijanto, et-al. (2024).

Castillo and Arza (2021), in their study further revealed that digitization has increased the frequency and quality of research publications by enhancing academic impact through more citations, fostering collaboration with more co-authors, and promoting internationalization, leading to greater visibility and potentially higher quality of research outputs in Latin America.

Lindner (2023) affirmed that digital platforms facilitate the collection and analysis of vast amounts of data, enabling researchers to access relevant information quickly and efficiently.

On the impact of digitization on research productivity, Wartini-Twardowska and Twardowska's (2023) findings indicated that digitization has significantly enhanced the frequency and quality of research publications by facilitating access to information, improving collaboration among researchers, and enabling the use of advanced ICT tools for data analysis and dissemination. This result also corroborates the result of the study carried out by Nurohman (2022). In another study carried out by Judijanto, Uhai, and Pratiwi (2024) the result shows that digitization has significantly increased the frequency of academic publications in the digital economy, particularly in the last decade, enhancing research quality by fostering technological advancements and encouraging comprehensive analyses of market dynamics and policy implications.

A related study carried out in Nigeria by Nwaobi (2019) established that with digitization, collaboration is made much easier, the sharing of research knowledge is instant and the resultant synergies yield huge advances in research productivity and innovation. Similarly, the study by Adeyeye and Oladokun (2023) revealed that digitization offers significant opportunities for librarians, such as improved access to information, enhanced research support, and the ability to streamline the research process.

Despite the positive impacts of digitization on research outcomes documented in the collection of literature reviewed above, researchers are still confronted with factors that impede their effective utilization of digitized resources. Some of these impediments documented in existing literature include; scholars' limited awareness of these tools (Brunetti, et.al, 2022), the digital divide (Castillo and Arza, 2021), inadequate infrastructure, and lack of training [Adeyeye and Oladokun, (2023); and Igbo et al, (2022)].

Research Method

The descriptive survey research design was adopted for the study while the purposive sampling technique was employed in selecting 20 libraries that have digitized their information resources.

The total number/population of academic librarians in the twenty libraries used for this study was 285. Ten librarians, each from the universities were randomly selected for the study, making the sample size to be 200. A sample of only ten academic librarians from each of the universities was deemed appropriate because information generated from their websites indicated that they each had between ten and twenty-three academic librarians at the time of data collection for this study. The researchers also believed that the views of ten academic librarians from a particular library would reflect the actual situation regarding the subject under discussion. The list of the 20 universities with the population of their academic librarians is provided in Table 1. An online questionnaire was designed to collect data using SurveyMonkey software. The link to the questionnaire on SurveyMonkey was forwarded to the email addresses of these academic librarians working in the selected institutions. Their email addresses were accessed from their various institutions' websites. The study restricted the data collection to only academic librarians who have published articles in peer-reviewed journals. The respondents were sent reminders twice to respond to the survey in their email box. Data collected was analyzed using percentages, simple mean scores, and presented tables. The questionnaire items were presented on a five-point Likert scale with average mean scores of 5-4.51 as Strongly Agree, 4.5-3.51 as Agree, 3.5-2.51 as Neutral, 2.5-1.51 as Disagree, and 1.5-1.0 as Strongly Disagree.

Table 1: Names of the 20 university libraries selected and the population of academic librarians in them

S/N	NAME OF THE UNIVERSITY	POPULATION	SAMPLE
1	University of Ibadan, Ibadan	23	10
2	University of Lagos, Lagos	16	10
3	University of Nigeria, Nsukka	26	10
4	Covenant University, Ota	21	10
5	University of Portharcourt	14	10
6	Federal University, Lokoja	13	10
7	Federal University of Technology, Minna	12	10
8	University of Ilorin, Ilorin	11	10
9	University of Abuja, Abuja	14	10
10	University of Benin, Benin	13	10
11	University of Jos	17	10
12	Delta State University, Abraka	11	10
13	Federal University of Agriculture, Abeokuta	14	10
14	Ambrose Alli University, Ekpoma	12	10

15	Federal university of Technology, Owerri	12	10
16	Osun State University, Oshogbo	10	10
17	Rivers State University	10	10
18	Olabisi Onabanjo University, Ago-Iwoye	13	10
19	Benue State University, Makurdi	11	10
20	Landmark University	12	10
	Total	**285**	**200**

Results

Questionnaire administration

A total of 200 questionnaires were administered, with 185 (92.5%) returned while 15 (7.5%) were not returned. The 92.5% was taken to be reasonable and considered adequate for the study by the researchers.

Table 2: Information resources digitized

Digitized materials	**Yes (%)**	**No (%)**
Theses and dissertation	185 (100)	- (0)
Articles published in local journals	185 (100)	- (0)
Inaugural lectures	185(100)	- (0)
Papers presented at conferences	166 (89.7)	19 (10.3)
Past question papers	56 (30.3)	129 (69.7)
Lecture materials	48 (25.9)	137 (74.1)
Manuscript	42 (22.7)	143 (77.3)
Information bulletin	23 (12.4)	162 (87.6)
Images	21 (11.4)	164 (88.6)

The result in Table 1 shows the specific types of information materials digitized by the libraries. The respondents indicated that all their theses and dissertations, articles published in local journals, and inaugural lectures were digitized (100%). This is followed by papers presented at conferences which received 89.7% acceptance. The result also revealed that images (11.4%),

information bulletins (12.3%), manuscripts (22.7%), and lecture materials (25.9%) were barely digitized by most of the libraries.

Table 3: Opportunities presented by digitization that impact research productivity

Opportunities presented by digitization	**Mean**	**Standard deviation**	**Decision**
Easy and free access to existing scholarly works	4.51	0.83	Strongly Agree
Visibility of one's research outcome to a global audience	4.43	0.89	Strongly Agree
Facilitates access to a wider range of materials for research	4.38	0.98	Strongly Agree
Provides an opportunity for open archiving of research outcomes	4.02	1.12	Strongly Agree
Gives room for high citation impact	3.88	1.08	Agree
Provides a platform for one to have a central archive works	3.78	0.89	Agree
Reduces duplication of research	3.78	1.02	Agree
Widens the circulation and discoverability of research outputs	3.76	0.97	Agree
Provides an opportunity for multi-disciplinary research	3.58	0.94	Agree
Exposes one to the knowledge of other researchers in my areas of interest for collaboration purposes	3.56	0.95	Agree
Provides an opportunity for one to keep track of and analyze research performances	3.51	0.92	Agree
Exposes one to grant and scholarship opportunities	3.21	1.30	Neutral
Helps in curbing plagiarism	3.14	1.21	Neutral

The responses from the respondents in Table 2 revealed that easy and free access to existing scholarly works was strongly agreed by the respondents ($\overline{X}$ =4.51, SD=0.83), visibility of one's

research outcome to a global audience ($\overline{X}$ =4.43, SD=0.89), facilitates access to a wider range of materials for research ($\overline{X}$ =4.38, SD=0.98), provides the opportunity for open archiving of research outcomes ($\overline{X}$ =4.02, SD=1.12), were strongly agreed by the respondents as opportunities provided by digitization that enhanced the research productivity of librarians in Nigeria. Other opportunities agreed upon by the respondents include; giving room for high citation impact ($\overline{X}$ =3.88, SD=1.08), providing an opportunity for open archiving of research outcomes ($\overline{X}$ =3.78, SD=0.89), reducing duplication of research ($\overline{X}$ =3.78, SD=1.02), widening the circulation and discoverability of research outputs ($\overline{X}$ =3.76, SD=0.97), providing an opportunity for multi-disciplinary research ($\overline{X}$ =3.58, SD=0.94), etc.

Table 4: Perceived impact of digitization on research productivity of librarians

Perceived impact of digitization on research productivity	**Mean**	**Standard deviation**	**Decision**
Motivation to work harder as a result of the global visibility that it gives to my works	4.23	0.89	Strongly Agree
Feedback and comments I get from users help me to improve on subsequent research	4.11	0.85	Strongly Agree
Enhanced research output	4.10	0.97	Strongly Agree
Access to digitized materials makes literature reviewing and the entire research process easy for me	4.08	0.93	Strongly Agree
This has enabled me to have a high citation impact	3.88	1.08	Agree
Access to digitized materials has helped in avoiding duplicative research	3.76	0.94	Agree
It has paved the way for me to be involved in national and international research collaboration	3.64	1.12	Agree
Access to digitized resources has helped to enhance my research capabilities	3.26	1.06	Neutral
It has paved the way for my participation in multi-disciplinary research	3.01	0.91	Neutral

Table 3 above, presents the strongly agreed impacts of digitization on their research productivity as follows: motivation to work harder as a result of the global visibility that it gives to their works ($\overline{X}$ =4.23, SD=0.89), feedback and comments that I get from users have helped me to improve on subsequent research ($\overline{X}$ =4.11, SD=0.85), enhanced research output ($\overline{X}$ =4.10, SD=0.97), and access to digitized materials makes literature reviewing and the entire research process easy for me ($\overline{X}$ =4.08, SD=0.93). Other statements that the respondents agreed on include: this has enabled me to have a high citation impact ($\overline{X}$ =3.88, SD=1.08), access to digitized materials has helped in avoiding duplicative research ($\overline{X}$ =3.76, SD=0.94), and that, it has paved the way for me to be involved in national and international research collaboration ($\overline{X}$ =3.64, SD=1.12).

Table 5. Challenges hindering the effective utilization of the library's digitized materials for research activities.

Challenges	**Mean**	**Standard deviation**	**Decision**
Internet connection	4.08	0.93	Strongly Agree
Limited awareness of the existence of these resources	3.60	0.87	Agree
Infrastructure limitation	3.23	1.21	Neutral
Erratic power supply	3.02	0.94	Neutral
Inadequate technical skills required to effectively access and utilize these resources	2.41	1.28	Disagree
Unfriendly interface platform	2.38	1.27	Disagree

The result presented in Table 4 on the challenges hindering the effective utilization of digitized materials revealed that Internet connectivity is the highest impediment, having a mean score of 4.08, which shows that the majority of the respondents strongly agreed with it. This is followed by limited awareness of the existence of these resources ($\overline{X}$ =3.60, SD=0.87) and infrastructure limitation ($\overline{X}$ =3.23, SD=1.21). on the other hand, inadequate technical skills required to

effectively access and utilize these resources ($\overline{X}$ =2.41, SD=1.28) and unfriendly interface platforms ($\overline{X}$ =2.38, SD=1.27) received a low acceptance rate.

Discussion of findings

This study generally aimed to investigate the impact of digitization on the research productivity of librarians in Nigeria. The result on the specific types of information materials digitized by the libraries revealed that all their theses and dissertations, articles published in local journals, and inaugural lectures were digitized. This is expected because libraries usually prioritize this set of collections during their digitization programme. Conversely, the study also found that images, information bulletins, manuscripts, and lecture materials were barely digitized by most of the libraries. The likely reasons for very low digitization acceptance for these materials especially, images and manuscripts could be hinged on intellectual property rights as the originators might not have given the libraries the right to digitize them. Similarly, the issues with past question papers could be that lecturers intentionally refused to submit them for digitization considering that they sometimes repeat examination questions while low-rate digitization of lecture materials could be caused by the fact that lecturers give electronic study materials to the students.

The result on the opportunities presented by digitization that impact the research productivity of librarians affirms other researchers' findings in the literature, [Vasilescu, et.al (2020), Sarango-Lalangui (2023), Chem (2023), and Judijanto, et.al (2024)] which include: easy and free access to existing scholarly works, visibility of one's research outcome to a global audience, providing the opportunity for open archiving of research outcomes, giving room for high citation impact, and providing an opportunity for multi-disciplinary research. The outcome was anticipated as digitization has paved the way for open access to library resources that ordinarily would have been difficult to access. This result implies that digitization is not only transforming the way libraries function but is also actively improving research processes by making its accomplishment easy, and its output more accessible, usable, and reuseable.

The perceived impact of digitization on the research productivity of librarians established in this study includes: motivation to work harder as a result of the global visibility that it gives to their works, feedback and comments received on their works have helped them to improve on subsequent research, enhanced research output, high citation impact, and provided opportunity for national and international research collaboration. This result validates the outcome of studies carried out by Castillo and Arza (2021), Adeyeye and Oladokun (2023), and Igbo, et.al (2023) which also found that digitization has significantly enhanced the frequency and quality of research publications by facilitating access to information, improving collaboration among researchers, etc. With this development, it is not surprising that digitization is impacting every aspect of research starting from the planning, conduct, reporting, and communication of its outcome.

The challenges established in this study that hinder the effective utilization of digitized materials are synonymous with those indicated in literature by Brunetti, et.al, (2022), Castillo and Arza (2021), Adeyeye and Oladokun, (2023); and Igbo, et al, (2022)]. The study identified internet connectivity as the highest challenge followed by limited awareness of the existence of these resources, and infrastructure limitations. The implication of limited awareness of the existence of these resources is that the librarians working in the libraries studied seem not to carry out extensive awareness programmes to inform their community of users of their availability. The infrastructure limitation problem could be caused by funding constraints for the acquisition of the facilities (computing tools) required for accessing the digitized resources. The low rate of acceptance of inadequate technical skills required to effectively access and utilize these resources and unfriendly interface platforms implies that they do not constitute impediments to the effective utilization of digitized resources. This is expected because, as part of their professional duties, librarians are required to possess a reasonable level of technical skills to effectively navigate today’s information landscape.

Conclusion

The findings of the study indicate that the opportunities provided by digitization that enhance librarians' research productivity include easy and free access to a wider range of materials for their research works, giving visibility of their research outcomes to a global audience, providing opportunities for multi-disciplinary research engagement for them, exposing them to the knowledge of other researchers in their areas of interest for collaboration purposes, and exposing them to grant and scholarship opportunities. Furthermore, the perceived impacts on their research productivity include: motivation to work harder as a result of the global visibility that it gives them, improvement in their subsequent research works as a result of the feedback and comments received on their previously digitized works, enhanced research output, easy conduct of literature reviewing and the entire research process, having high citation impact, and paving the way for their participation in multi-disciplinary research, among others. With the above, it can then be concluded that digitization has a positive impact on the research productivity of Librarians in Nigeria.

Recommendation

Given the outcome of this study, the following recommendations are made:

1. The university management and other funding bodies for the university libraries should make adequate funding available for their internet subscriptions and the acquisition of computing facilities required to access the library resources.
2. The librarians working in the libraries should create awareness of the existence of these resources for their users' community, and also train them on access and use through the conduct of information literacy training.

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