INFLUENCE OF COLLABORATION PATTERN ON RESEARCH PRODUCTIVITY OF ACADEMIC LIBRARIANS IN SOUTH-WEST NIGERIA

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Abstract
This study investigated the influence of Collaboration Pattern on Research Productivity of Academic Librarians in South-West Nigeria. This underscores the importance of collaboration in research productivity. The research adopted survey research design. The population comprised 326 academic librarians from university libraries in South-West, Nigeria. Total enumeration was used for the study. A self-structured questionnaire was also used to collect data. The study achieved a response rate of 84.7%. Data collected were analysed using descriptive and inferential (multiple regression) statistics. The results revealed that collaboration had a significant and positive influence on research productivity of academic librarians in South-West, Nigeria ($R^2 = 0.240$, $\beta = 0.490$, $t(325) = 10.108$; $p < 0.05$). Career stage (Beta= -0.255, $t(322) = -4.175$, $p<0.05$) and spatial proximity (Beta = -.112, $t(322 = -2.767$, $p<0.05$) had significant influences on the research productivity of academic librarians in South-West, Nigeria. The research recommends fostering a collaborative culture among academic librarians in their early, mid and late career stages. It also recommended setting up shared workplaces or collaborative zones where librarians can work in close proximity to one another.

Keywords: Collaboration, Research, Research Productivity, Academic Librarians

Introduction
Research is a systematic analysis to uncover new facts or to gain further information needed to explain and resolve a specific problem. It is investigation undertaken for the creation and advancement of knowledge using verifiable facts, it is the engine that fuels development. Changes that led to civilization in different areas of human existence have been propelled by curiosity of avid and inquisitive scholars who dared to conduct research. It is critical in promoting prosperity and well-being of citizens in communities and the world at large. Research productivity (RP) is the measure of an academics' achievement, mostly in terms of the quantity and quality of publications over a given period. To put it simply,

research productivity is the number of publications per researcher over a given period. Research productivity is a production process involving physical, tangible, intangible resource processes. The output of research production may be both tangible and intangible.

Typically, the main goal of research is creation of new knowledge and or insight which can be applied. Research productivity therefore, is a robust measure of academic achievement and recognition among peers. Globally, research productivity is very significant for universities, it is a central task and a key feature of universities. It is the next most valued aspect of academic tasks after teaching (Acord & Harley, 2013). It is one of the main objectives of universities, which reflects their competitive edge and prestige. It also represents a major indicator used to place institutions on the ivy-league table of world ranking universities. There has been increasing emphasis on research productivity around the globe and across various academic disciplines and institutions.

Noting the important role research productivity plays in the academia, the need to highlight metrics for its measurement becomes germane. Research productivity can be measured in various ways ranging from the quantity, quality and a combination of both. Each measure has its benefit and drawback. Measuring quantity entails counting the sum of research output such as journal articles, conference papers, number of edited works, patents, books and book chapters, etc. produced over a stipulated time frame. It used to be the most popular approach for measuring research productivity of researchers. However, academic librarians like other academics, are increasingly required to show their productivity in terms of quality (Schimanski, & Alperin, 2018). The quality of a research publication can be measured in many ways, some of which includes a consideration of the impact factor of the journal where a publication appears. The journals are often categorized into quality quartiles for instance Q1, Q2, Q3, Q4 journals and many more (Kaba, 2020). Also, quality can be established by considering the author/article impact factor which can be measured using various indicators like h-Index, g-Index, i10-index, age-weighted citation ratio and many more (Ssembatya, 2015). The increasing pressure on academics to be productive in research or face stagnation is prompting the need for collaboration which entails team or group approach to research. Collaboration involves researchers working together to advance scientific knowledge.

Collaboration has a long history and tradition in the experimental sciences but has also emerged in the social sciences and humanities. Co-authorship has been justified in literature as a viable means for measuring research collaboration. This is based on the premise that it is the most verifiable form of research

collaboration (Kumar, 2018). Collaborative research has advantages and is believed to enhance research productivity. Conducting research as a team involves division of labour, which leads to multiplication of efforts and creation of more time for engaging in more researches and by implication, increased productivity/ output at a faster rate. It also fosters flexibility such that a researcher may belong to various research clusters/collaboration teams at the same time. Collaboration is expected to result in the accomplishment of higher number of research publications (quantity) and also better quality. This is corroborated by the studies from Hector, James, Nathalıe, Erika, and Francisco (2016), in Kumar (2018). These autors tracked and studied scientists who were not part of a research group and discovered that the average production from each researcher per year was a mean of 1.48 documents in a Knowledge Management Journal, while the average output per researcher per year who belong to a research group in the same journal was 3.47 articles. This reflects an increase of 133 percent in their research productivity. Many universities are encouraging faculty to increase their research collaboration as it also has the potential to increase publication output and even citations (Blom, Lan & Adil, 2015).

For collaborations to be successful, there should be some level of diversity among the authors. A diverse collaboration involves mixed authors; it is one in which the members, by virtue of their different academic qualifications, career stage, disciplines and physical proximity, can share and exchange innovative ideas, variety of perspectives and approaches leading to greater creativity and productivity. While there are arguments that homogenous (similar) coauthors are effective because of their shared similarities, there are yet those from the diversity school of thought who argue that a certain degree of heterogeneity is required for better productivity. For instance, García-Suaza, Otero and Winkelmann (2020) found that collaborating with researchers who have higher academic qualification e.g. Ph.D., enhances the possibilities of producing quality research. They attributed this to the research rigours involved in obtaining a Ph.D. which can train a person for better research productivity compared to the person who has no advanced degree. Furthermore, career stage of academic librarians can affect their level of research productivity (Breeze & Taylor, 2020). Individuals in different career stages bring different perspectives, knowledge, skills and abilities into a collaboration. These stages include early career stage, mid-career stage and late career stage (Thomas, Trucks & Kouns, 2017). Co-authorship has been justified in literature as a viable means for measuring research collaboration.

It is pertinent to balance membership of a collaboration team across the different career stages as every stage has its own constraints and opportunities which could hinder or enhance research productivity. Those at the late career

stage are often expected to be persons who have attained higher professional rank (there could be exceptions), having climbed the professional ladder over time and have garnered more experience and expertise which could influence research productivity. Collaborating with such experienced professionals may help young researchers to improve the quality of their manuscripts prior to submission thereby improving chances of acceptance by journal outlets. Conversely, it is also worth noting that senior team members may have less time for research as they are usually preoccupied by administrative and other duties. They may also tend to be less innovative and less willing to adapt to evolving demands, pressures and ultimatums that come with research collaboration (Mishra & Smyth, 2013). Also, senior academics particularly those nearing retirement, may not be interested in research productivity given the lesser impact it bears on their waning prospects.

Research Questions

The followings are the research questions of this study;

1. What is the level of research productivity of academic librarians in South-West Nigeria?
2. What is the pattern of research collaboration by academic librarians in South-West, Nigeria?

Hypotheses

The following null hypotheses are formulated and tested at 0.05 level of significance:

Ho1. Collaboration has no significant influence on research productivity of academic librarians in South-West Nigeria;

Literature Review

Research collaboration is not a new concept. It was first reported among researchers in the life sciences. It later emerged in social sciences and humanities (Müller, 2012). Collaboration as a trend of authorship has witnessed a steady increase notably since the 1970s in academic library literature (Norelli & Harper, 2013). Sonnenwald (2007) observed that in academia, pursuit of scientific knowledge has fundamentally shifted from the traditional single scholar or researcher frequently described. The second half of the 20th century signaled a big change in the reorganization and conduct of researches. Research projects that range from individuals or small groups have grown into large research teams utilizing large numbers of researchers. Team-based collaborations have become the standard rather than the exception, and that is no truer than in large research organizations including universities. Lai (2011) proposed that many terms are synonymous with research collaboration (RC). Such terms include, co-authorship,

research partnership, research networking, joint research, team science, participatory research.
Also, Jung (2014) carried out a survey of 900 faculties from universities in Korea. The study revealed that faculty members in their mid-career stage i.e. 6–10 years of at the career were the most research productive. The study also revealed those faculties at the late career stage had less current publications. The study recommended that university management and policy-makers should develop policies according to career stages of the researchers.

Podsakoff, Podsakoff, Mishra and Escue (2018) using bibliometric technique, searched through 33 journals of management using the Web of Science (WoS). They streamlined for only articles with 1,000 citations and above. Their study report that more than 50% authors of high-impact articles were mostly those in their career earlier stages. The study confirms that research productivity can be increased by co-authoring with early career authors and not just by coauthoring exclusively with senior faculty members. In a bid to ascertain the extent to which academic librarians collaborate with LIS faculty, White and Cossham (2017) carried out a bibliometric analysis on 4313 research articles in forty-seven LIS journal titles on the Scopus database for the years 2013 to 2015. The study found that only 6% of academic librarians collaborated with LIS faculty. The study further recommended that academic librarians should engage in more research partnerships as this is necessary their survival in the profession.
Similarly, with the use of bibliometric analysis, Chang (2017) analyzed 2241 articles published in six English language journals covering LIS, education, and sociology disciplines in the years 1995–2014. They reported that most co-authored publications included partnerships of the same sort of authors, e.g. among academic librarians as well as among LIS educators. The result shows that authors were more involved in homogenous collaboration i.e. collaborating with authors bearing similar characteristics. Articles co-authored by academic librarian and LIS faculty accounted for only 10% of the articles.

In line with previous findings, Higgins and DeVito (2017) conducted a bibliometric analysis of 157 articles published in 13 peer-reviewed journals between 2005 and 2014. They considered only articles co-authored by the STEM faculty, the medical science faculty and librarians. They used publisher's page and sometimes author’s institution web site to collect information such as author names (s), name of author(s), affiliation of author; and departments. They reported that collaboration exist between librarians and non-librarians but added that such collaboration was most common at doctoral granting institutions. They also showed that the health sciences faculty that collaborated together was 238 to 193, over and above librarian authors. The study recommended that professional

organizations should identify potential grounds for innovative research collaboration with non-LIS faculty and create training opportunities.

Al-Ahmad and Yousef (2016) carried out a survey using semi-structured interview and questionnaire which was distributed to six public university libraries in Jordan. The population of the study constituted of 345 librarians, out of which 155 representing 45% responded. The study found an overall positive attitude toward collaboration with the librarians and the author interpreted this as willingness by non-LIS faculty to collaborate with librarians. They recommended that university management should show support to academic librarians by establishing relevant collaboration workshops and programs.

Also, Adegbaye, Okunlaya, Funom, and Amalahu, (2017) employed a survey to investigate the pattern of research collaboration of academic librarians in Nigeria. The authors carried out a multistage sampling which helped them to select one university from the six geopolitical zones in Nigeria. In all, 146 librarians were selected for the study. Their study revealed that collaborative research dominates single-authorship. The result found that co-authorship with colleagues within the same library was high with 624 co-authored publications from within the same library, 342 publications as products of sole authorship, 177 publications co-authored with librarians outside the respondents' institutions, 31 co-authored with international colleagues and 74 publications accounted for co-authorship with academic supervisors. The study recommended librarians should endeavor to collaborate more with colleagues outside their immediate domain. The librarians were also urged to harness the advantages of ICT tools for international collaboration so as to increase their research productivity and visibility. They also recommended that librarians should attend international conferences as this would also expand their collaboration network.

With collaboration, there is great possibility that one or more of the collaborators will have the knowledge, skills and techniques required for ultimately minimizing the resources and time that could have been spent to learn or acquire the requisite skills. Scholarly writing tends to be reclusive and so, many researchers are collaborating because it affords them an opportunity to work with researchers of like minds, persons with whom they could rub minds together. (Melin, 2000; Siemens & Burr, 2013). Collaboration creates opportunities for mentorship. Senior librarians can serve as mentors and nurture junior librarians (Ackerman, Hunter & Wilkinson, 2018; Bradley, 2008). Likewise junior researchers can also seek co-authorship opportunities with senior and experienced researchers. Such collaborative researchers' opportunities with other more experienced researchers who are versatile, leads to the creation of high quality

and impactful publications that are extremely valuable and beneficial to the early career researcher (Gilmore, Vieyra, Timmerman, Feldon & Maher, 2015).

Various scholars have reported that most funded research publications are often as a result of collaborative research (Asubiaro, 2019; Sibbald, Tetroe, & Graham, 2014). Findings from the research by Wang and Shapira (2015) reveal a high correlation between collaboration and research funding.

For researchers in English speaking countries, English language fluency is often regarded as a universal skill. Whereas, for researchers whose first language is not English, writing correctly in English (which is necessary for literature review, analysis and every stage in research) may be regarded as a special and sometimes herculean task (Brant & Rassouli, 2018; Duracinsky, Lalanne, Rous, Dara, Baudoin, Pellet, & Chassany, 2017; Tang, 2010). Therefore, collaborating with researchers whose first language is English would help to resolve the barriers of language and reduce the chances of manuscript rejection that poor language skills may have caused. Some scholars have reported that collaboration increases authors' chances of gaining wider recognition, popularity, and visibility (Boyer-Kassem & Imbert, 2015; Gazni et al. 2011). In many fields and even librarianship, the cost and rigours of conducting quality research has jumped in a geometric progression.

Listing the advantages of collaboration, Katz and Martin (1997) suggest that collaboration enables researchers to pool resources together to meet financial obligations of a research; it also helps to reduce expenses and logistics involved in travelling to different places especially with the breakthroughs in the use of ICT which has led to ease of communication. Collaborating with the right ICT tools ensures that the barrier of distance no longer stands in the way of researchers.

Research collaboration can take different forms. To understand the patterns of research collaboration, it is ideal to know how collaborations are formed i.e. the composition. Research collaboration is a function of group/ team approach. However, it is individual characteristics of team members that will determine the differentiation of the type of collaboration (Templar, 2011). Individuals have a variety of skills, knowledge, abilities and experiences that their membership will add to team performance. Therefore the advantages that individual characteristic bears contributes to the success/ value of the collaboration (Othman, Hamzah, & Nor, 2018). In order words, a research collaboration can be categorized based on the individuals that make up the collaboration team. Collaborative research teams could be homogenous (similar) or heterogeneous (diverse) and both types have their strength and weaknesses

(Hall et al. 2018). Even though there other factors, team composition to a large extent determines the overall performance of the team (Senior, 1997; Belbin, 2002). Asides other factors, the right team member composition enables the research collaboration teams to be successful, and enhances research outcomes (Hall et al. 2018).

Successful research collaboration has the potential to promote creativity, knowledge flow, facilitate cross-fertilization which will lead to higher productivity. Many studies have documented how collaborative research affects productivity of many disciplines e.g. business and education. Research collaboration can help academic librarians to improve their research outcomes. While some may dismiss it as a nebulous concept that does not have many tangible benefits, many more studies are showing evidence that working together makes for improved productivity. For instance, Breeze and Taylor (2020) reported that through collaboration, individual researchers can expand their outputs. They aver that when academic librarians collaborate in effective teams, they leverage the knowledge, skills, abilities and experiences of team members to accomplish things that could not be achieved while working individually and this leads to higher performance and productivity.

Even though collaboration is central to research productivity, it requires strategies. The need to know who to collaborate with. Hu, Chen & Liu (2014) opine that collaborators' characteristics play a major role on the overall research productivity. Cheruvelil et al. (2014) warns that it is important to understand the likely opportunities and constraints that may arise by reason of collaborating with academics at different career-stages. The career stage of team members involved in a collaboration can have effects on the overall level of research productivity. It is expected that the older an individual gets within a profession, the more experience would have been gathered and the more the professional expertise. Following the submissions of Yoshikane, Nozawa and Tsuji (2006), it can be deduced that while researchers at the later stage, are usually too busy for research rigours, early career researchers and mid-career researchers' often consent to collaborations for many reasons.

This in line with the analysis of Costas and Van Leeuwen (2010) which suggest that the research productivity of early career scientists' is higher as aging decreases productivity (Bonaccorsi & Daraio 2003). Breeze & Taylor, 2020). Different schloars have divided career stages into various categories. Some have grouped the stages based on age, rank years of job experience (Shin 2011; Teichler 2011). Some others categorized it into five stages i.e. exploration stage, establishment stage, advancement stage, maintenance stage and decline stage

(Super & Hall, 1978). Similarly, Baldwin and Simmons (2011) divided career stages into: 1 year and below as survival stage, 1 year as safety stage , 1–2years as belonging stage, 2–4 years as self-esteem stage, and 5 years as self-actualizing stage. Thomas, Trucks and Kouns (2017) posit that academic librarians or researchers have different career stages and grouped them into 0-7years as early stage, 7-16 years as mid-career stage and 16 years and above as late career stage. Librarians at different career stages have gained skills perspectives which will impact any research collaboration team they belong to. Jones and Weinberg (2011) proffer that early-career academics are those within the age range of 20 to 34 years, 35 to 50 years for the mid-career, and 50 to 65 years for the late-career.

Ducharme (1996) reported that high ranking faculty were more active in research as compared to lower ranking researchers. This is contrasted by Leahey (2006) who aserts that as rank increased, productivity decreased for most senior faculty members as they are no longer motivated to publish like they used to be when they were pursuing rank and rewards. In fact, at this stage many of them are distracted and saddled with increased management and administrative responsibilities Long and Sheehan (2015). Stvilia et al. (2011) observed that oftentimes, researchers on the same rank collaborated more as compared to researchers of different ranks. They revealed that since there was little or no competition in the collaborations between junior and very senior faculty nearing retirement, such collaborations were more open, desirable and have less conflicts collaborations among researchers on the same rank. Workers at their different career stages can form coherent and viable corporate culture and complement each other in order to achieve better performance.

García-Suaza, Otero and Winkelmann (2020) studied academics from the field of economics and reported that those academics who are without a Ph.D. engaged less in research activities. Similar opinion was expressed by Fox and Milbourne (1999). According to them, the Ph.D. degrees offers academics the advantage of gaining more research skills, making them more productive than those without PhD degree. Same views was shared by Rodgers and Neri (2007) who report that five years post Ph.D conferment is the most productive period for researchers. This was further corroborated by Frantaz et al (2010) who reveal that research productivity of academics with PhD qualification was higher compared to master degree holders. According to them, a credential for undertaking advanced scholarly research is a doctorate, usually a PhD. During a doctoral training program, the scholars are supervised by qualified researchers and they have opportunities to participate in core research activities such as discussions, research seminars, and workshops. All of these activities gradually improves their research skills. The process helps the scholar to receive comprehensive training,

mentorship, and support from their supervisors, opportunities for networking with student peers, and even academics in the school where they are studying. These findings show that additional qualifications can improve research productivity of researchers. Empirical investigations by Chepkorir (2018) show that academic qualification has a positive and significant relationship with research productivity.

Collaboration can happen between academic librarians and faculty of other disciplines in the institution. Supporting faculty researches has always been listed as part of the mission of academic libraries in higher institutions, and Librarians are often considered support personnel rather than primary collaborators. Brandenburg (2017) observed that there is an increasing emphasis on librarians to redefine and transform their role from supporters to partners (Shumaker, 2012; Fonseca &Viator, 2009). However, Romanowski (2015) claim that the library profession is too insular and that most academic librarians who have faculty status are service-oriented and unprepared for the rigours of research. Tomaszewski, Sonia and Karen (2013) reported that non-LIS faculty were not aware of the level of research by librarians. A phenomenon that Cubberley (1996) blamed on the type of education the librarian received, an education which emphasizes service provision and isolation work style and collaboration pattern which involved mostly researchers with LIS background.

All that notwithstanding, the academic librarians and other faculty have professional relationships that connects them especially as regards teaching, liaison and reference services. These connections provides ample opportunity for them to collaborate. Brandenburg (2017) advised librarians to increase their professional relationships with department faculty by leveraging their professional relationships to establish successful research collaborations. Due to the complexities and challenges of integrating different disciplines to produce one cohesive research, many researchers avoid this form of collaboration. However, Interdisciplinary research fosters innovation and addresses important questions facing society, integrate perspectives different disciplines and is being promoted by various funding agencies.

Marx (2013) opines that the proximity of collaborators could have negative or positive effects on the research productivity of researchers. Kadushin (2012) suggests that there is a link between spatial proximity and social proximity and that spatial proximity can create social proximity and as a result of low social transaction, researchers who are located in close proximity to each other, are more likely to develop friendship which automatically creates platform for collaborations. Jacob and Meeks (2013) reveal that nowadays, research collaboration requires ability to use e-communication platforms, according to

them, many researchers who are co-located still engage in virtual collaboration. However, Cantner, et al. (2010) argue that close physical proximity generate more informal communications which also increases chances of more collaborations. Jacob and Meeks (2013) advocates that crossing geographical and institutional boundaries, for research collaboration purposes, irrespective of the mode of communication; provides numerous advantages to the researcher e.g. access to required expertise, access to tools and instrumentation, quality knowledge production, shared tackling of issues of global relevance, datasets etc. but they also warned about possible communication and coordination challenges that may arise as a result of this type of collaboration.

Signs of increased collaboration among librarians in the same institution are readily apparent. This is expected as colleagues within the same department or discipline are familiar with the critical issues of their field and have a common theory, methodology, and nomenclature for collaboration to take place (Chang, 2015; Finlay, Ni, Tsou & Sugimoto, *2013;* Walters & Wilder, 2015). Research collaboration can occur between academic librarians and students. This can be possible through a variety of settings. For instance, where librarians have responsibility to teach students who are part of research methodology courses, where librarians have responsibility to teach students who are part of university wide library related courses, where the university has an LIS department and librarians are assigned courses at the department, as a component of a mentoring relationship.

Academic librarians can also collaborate with LIS Faculty. This type of collaboration fosters improved practices and discipline development and ensures the production of qualitative research White and Cossham (2017) revealed that such collaboration is not as common as collaboration within each group. Lack of collaboration between academic librarians and LIS faculty have led to a situation described as research-practice divide (Chang, 2016; Pham &Tanner, 2014). This phenomenon has been blamed on the differences in the factors motivating the LIS faculty and academic librarian. According to them, academic librarians face more barriers especially as regards time and paucity of incentives when compared to their LIS faculty counterparts (Galbraith, Garrison & Hales, 2014; Sassen & Wahl, 2014). Ponti (2012) suggests that this type of research collaboration is usually effective and beneficial to the profession but (chnag, 2016) *posits that very few studies have been carried out to study the pattern or level of research among practitioners and LIS faculty.*

International research collaboration involves co-publications between authors from different nationalities. Internationalization of academic research is

on the rise Sassen & Wahl, 2014). Researchers are reaching out to colleagues around the world in order to gain access to specialized equipment, new perspectives / ideas, and tap into new sources of funding, and their work is oftentimes better for it (Pham, 2016). There is a cliché that says that "ideas transcend borders, no country controls the marketplace of ideas." New ideas emerge when people from different backgrounds interact. Various people think about things in different ways, resulting in insight that one person may have never considered before.

It has also become an increasingly prominent feature of academic research both in the pure sciences and social sciences. Weller, Hurd and Wiberley (2014) submit that collaboration across borders have become more important now than ever, they also reported that international collaboration is positively related to a researcher's future research productivity. Likewise, Adams (2013) encouraged researchers' to engage in international collaborations as this likely result in the production of high quality research that would enjoy more visibility and citations than research articles produced domestically or within a nation.

Methodology

Quantitative and survey research design was adopted for this study. The population for this study included all 326 academic librarians working with Nigerian universities in the South-West. For this study, total enumeration was used for sample selection. This is because the researcher believed the population is manageable. A questionnaire that was constructed was used to collect data. Self- developed questionnaire was utilized for data collection. Descriptive statistic and simple linear regression was used for data analysis.

Results and Discussion

This section presents results of the data collected through questionnaire. The section applied appropriate techniques for the analysis of the formulated research questions and hypotheses that guide this study. The section also discussed the responses generated from the collected data. The descriptive statistics were also analyzed in line with the specific objectives of the study. This chapter presents results of the data analysis to each research question and research hypotheses in the order they were listed previously.

S/N	Please indicate the level of your research productivity	**7 & above**	**5-6**	**3-4**	**1-2**	**0**	**Mean**	**SD**
		VH	**H**	**AV**	**L**	**VL**		
1	The total number of all types of publications (conference papers, book chapters) within the last three years (i.e. the total output within three years)	76(23.3)	41(12.6)	96(29.4)	86(26.4)	27(8.3)	**3.16**	**1.28**
2	My annual research publications	34(10.4)	41(12.6)	126(38.7)	104(31.8)	21(6.4)	**2.88**	**1.05**
3	number of peer-reviewed journals publications	100(30.7)	47(14.4)	101(31.0)	46(14.1)	32(9.8)	**3.42**	**1.32**

4	number of my peer-reviewed conferences proceedings	8(2.5)	24(7.4)	76(23.3)	112(34.4)	106(32.5)	**2.13**	**1.02**
5	number of my peer-reviewed conferences proceedings	15(4.6)	14(4.3)	57(17.5)	124(38.0)	166(35.6)	**2.04**	**1.05**
6	number of peer-reviewed textbooks published	9 (2.8)	5 (1.5)	48 (14.7)	51 (15.6)	213 (65.3)	**1.61**	**0.98**
Average Mean							**2.54**	

Research Question 1: What is the level of research productivity of academic librarians in South-West Nigeria?
Table 1 Level of Research Productivity

VH= Very High; H = High; AV = Average; L = Low; VL = Very Low.
Source: Field survey, 2021

Table 1 shows that research productivity of academic librarians in terms of quantity of publication is low judging by the overall mean score of 2.54 on the scale of 5. This implies that the respondents are not productive in their research endeavours. This implies that the respondents may experience career stagnation due to inadequate number of publications which may be required for promotion. The total number of all types of publications by academic librarians is on the average judging by the mean score of 3.16 and standard deviation of 1.28. The librarians' annual publication is also on the average as indicated by the mean score of 2.88 and standard deviation of 1.05

Research Question 2: What is the pattern of research collaboration by academic librarians in South-West, Nigeria?

Table 2

Collaboration and Research Productivity of Academic Librarians

S/N	Which of the following best describes your research collaboration pattern in terms of	V F N%	F N%	O N%	R N%	N N%	**Mean**	**SD**
	Academic Qualification							
1	I co-authored with researchers who have a master's degree.	123(37.)	123(37.7)	44(13.5)	25(7.7)	11(3.4)	3.98	**1.07**
2	I co-authored with researchers who have a PhD	91(27.9)	111(34.0)	72(22.1)	38(11.7)	14(4.3)	3.69	**1.12**
3	I co-authored with researchers who have both PhD and master's degrees	100(30.)	121(37.1)	43(13.2)	47(14.4)	15(4.6)	3.74	**1.19**
	Average 3.80							Mean
	Career Stage							
4	I co-authored with researchers in their early career stage	53(16.3)	98(30.1)	104(31.9)	55(16.9)	16(4.9)	3.36	**1.20**
5	I co-authored with researchers in their mid-career stage	57(17.5)	124(38.0)	95(29.1)	33(10.1)	17(5.2)	3.52	**1.08**
6	I co-authored co-author with researchers in their late-career stage (near retirement)	31(9.5)	86(26.4)	77(23.6)	82(25.2)	50(15.3)	2.89	**1.22**

7	I co-authored with researchers in their early and mid-career stage	41(12.6)	132(40.5)	72(22.1)	52(16.0)	29(8.9)	3.32	**1.15**
8	I co-authored with researchers in their mid-career and late-care	40(12.3)	98(30.1)	73(22.4)	73(22.4)	42(12.9)	3.06	**1.22**
9	I co-authored with researchers in their early and late-career stage	27(8.3)	95(29.1)	75(23.0)	84(25.8)	45(13.8)	2.92	**1.20**
10	I co-authored with researchers in all the career stage	36(11.0)	98(30.1)	63(19.3)	92(28.2)	37(11.3)	3.01	**1.19**
	Average Mean						**3.15**	
	Discipline							
11	I co-authored with only researchers from LIS and LIS related disciplines.	156(47.)	109(33.4)	25(7.7)	14(4.3)	22(6.7)	4.11	**1.15**
12	I co-authored with researchers from other disciplines, not LIS related.	29(8.9)	55(16.9)	64(19.6)	80(24.5)	98(30.1)	2.50	**1.31**
13	I co-authored with researchers from a mixture of the two above.	28(8.6)	73(22.4)	39(12.0)	103(31.)	83(25.5)	2.57	**1.31**
	Average Mean						**3.06**	
	Spatial Proximity/ Location							
14	I co-authored with researchers	150(40)	116(35.6)	32(9.8)	14(4.3)	14(4.3)	4.15	**1.05**

	within the library							
15	I co-authored with researchers outside the library but within my university.	34(10.4)	72(22.1)	65(19.9)	98(30.1)	57(17.5)	2.77	**1.25**
16	I co-authored with researchers from other universities in Nigeria.	69(20.6)	107(32.8)	80(24.5)	46(14.1)	26(8.0)	3.44	**1.19**
17	I co-authored co-author with researchers from other types of libraries apart from academic libraries.	28(8.6)	56(17.2)	73(22.4)	94(28.8)	75(23.0)	2.58	**1.24**
18	I co-authored with researchers from outside Nigeria but in Africa.	23(7.0)	44(13.5)	34(10.4)	52(16.0)	173(53.1)	2.03	**1.31**
19	I co-authored with researchers outside Africa	23(7.0)	33(10.1)	32(9.8)	35(10.7)	203(62.3)	1.83	**1.27**
20	I co-authored with researchers from all the categories above	26(8.0)	40(12.3)	40(12.3)	100(30.7)	120(36.8)	2.21	**1.26**
	Average Mean						**2.72**	

VF= Very frequently; F = Frequently; O = Occasionally; R = Rarely; N = Never.
Source: Field survey, 2021

Table 2 shows that the respondents occasionally collaborated based on career stage, academic qualification, spatial proximity/ location and discipline, judging by the overall mean score of 3.18 on the scale of 5. The responses show that academic librarians pattern of collaboration was homogenous in nature. The respondents collaborated with people who have similar demographic characteristic with them. The result reveal that majority of the respondents' frequently collaborated across with researchers who possess both masters and

PhD judging by the sub group mean score of 3.80. However, majority of research collaboration was carried out with researchers who possess master degree (3.98, Std. Dev. = 1.07).

Findings on the co-authored with researchers within the library varied for measuring the extent of research collaboration by career stage reveal that majority of the respondents occasionally collaborated with researchers in different career stages judging by the sub group mean of 3.15. The results indicated that the respondents frequently collaborated with a mean score of 3.52 and a standard deviation of 1.08. The result also shows that the respondents frequently co-authored with researchers in their early career stage with a mean score of 3.36 and standard deviation of 1.20. However, co-authorship with researchers in their late-career stage was done occasionally as indicated by the mean score of 2.89 and standard deviation of 1.22.

In terms of collaboration based on discipline, the results show that majority of the respondents occasionally collaborated across disciplines judging by the subgroup mean of 3.06. However, most of the respondents frequently collaborated with colleagues from LIS and LIS related disciplines (mean = 4.11, Std. Dev. =15). In terms of the pattern of collaboration by spatial proximity/location, it was discovered that majority of the respondents occasionally collaborated across the different locations as indicated in the study based on the sub group mean of 2.72.

The respondents also indicated that they occasionally collaborated with researchers from other types of libraries apart from academic libraries judging by the mean score of 2.58 and standard deviation of 1.24. This implies that academic librarians occasionally coauthored with librarians who are not in the academia. Collaboration with researchers from outside Nigeria but in Africa was rare as shown by the mean score of 2.03 and standard deviation of 1.31. This means that the respondents rarely collaborated with other researchers from Africa. The responses show that collaboration with researchers outside Africa is rare as indicated by the mean score of 1.83 and standard deviation of 1.27.

This research found that the pattern of academic librarians' research collaboration was homogeneity in career stage among co-authors because it enhances the synergy and effectiveness of research collaborations. It provides a foundation of shared experiences and understanding that can lead to productive and meaningful contributions to the research endeavor. Majority of the respondents in this study were in their middle ages and also in their mid-career stage as shown in the demographic results and these persons have indicated that

they collaborate more with people like them who are also in their mid-career stages. This correlates the findings by Marcella, Lockerbie, Bloice, Hood and Barton (2018) who reported that while researchers at the later stage, are usually too busy for research rigours, early career researchers and mid-career researchers often consent to productive collaborations. This finding also corroborates the findings of Podsakoff, Podsakoff, Mishra and Escue (2018), Sabharwal (2013) whose studies indicated that research productivity is higher at mid-career and early career stages. It is however at variance with the findings of Shin, Jung and Kim (2014) whose studies found that mid-career academics in Korea collaborated more with academics in their late career stage.

Hypotheses Testing and Interpretation

Hypothesis One:

Collaboration has no significant influence on the research productivity of Academic Librarians in South-West, Nigeria.

Test of hypothesis one focused on the influence of collaboration on research productivity. To find out whether collaboration has a significant influence on the productivity of Academic Librarians in the selected institutions, a linear regression analysis was computed as depicted in Table 1

Table 1: Simple linear regression analysis of collaboration and research productivity

Model	Coefficients			t	Sig.				
	Unstandardized Coefficients		Standardized Coefficients						
	B	Std. Error	Beta			R^2	Adj. R^2	F	ANOVA (Sig.)
(Constant)	5.554	.196		28.396	.000	0.240	0.237	102.169	.000[b]
collaboration	.609	.060	.490	10.108	.000				

a. Dependent Variable: Research Productivity
b. Predictor: Collaboration

Table 1 shows the simple linear regression analysis result for testing of hypothesis one. The independent variable (collaboration) was regressed against the dependent variable (research productivity). The result shows that collaboration (Beta =0.490, t = 10.108, $p < 0.05$) had a significant and positive influence on research productivity of academic librarians in South-West, Nigeria. Therefore, the null hypothesis (H_{01}) was rejected. The R^2 (0.240) of the regression model

indicate that 24.0% of the change in research productivity is explained by collaboration. The F (1, 325) = 102.169, $p < 0.05$ shows that the regression model can be used in predicting research productivity of academic librarians in South-West, Nigeria. This result suggests that when academic libraries in South-West Nigerian University provide an enabling environment where collaboration of staff is nurtured, the research productivity of academic librarians will improve.

Conclusion

The findings of this study shed light on the research productivity and collaboration patterns among academic librarians. The results indicate that, on average, academic librarians exhibit low research productivity, suggesting that there may be challenges in meeting the publication requirements for career advancement and promotion. The data also shows that while the total number of publications is relatively moderate, the frequency of annual publications is somewhat below average. The results further reveal interesting insights into the collaboration practices of academic librarians. The respondents tend to collaborate occasionally, and their patterns of collaboration are largely homogenous. This means that they often collaborate with peers who share similar demographic characteristics, academic qualifications, spatial proximity, and discipline. Notably, there is a preference for collaborating with researchers holding master's degrees. In summary, the study underscores the importance of recognizing the collaborative patterns and productivity levels among academic librarians. It emphasizes the potential benefits of fostering collaborations within similar career stages. These insights can inform strategies to enhance research output and collaboration effectiveness within the academic library community.

Recommendations

According to the findings of this research study, academic stage and spatial proximity emerge as the most relevant patterns of research collaboration for academic librarians. The consequences of these patterns have significant practical implications for developing efficient collaboration within the academic library community. As a result, the following proposals are made to improve research collaboration among academic librarians:

Emphasis should be placed on how researchers at various stages of their careers might collaborate: early-career librarians, for example, are more likely to actively seek out opportunities to collaborate and so academic librarian should prioritize the development of platforms and opportunities that promote networking and collaboration among early-career librarians. These may include specialized joint research initiatives, mentoring programs, or research workshops.

Collaboration provides a foundation of shared experiences and understanding that can lead to productive and meaningful contributions to the research endeavor. Librarians who actively participate in research collaborations should be recognized and rewarded by libraries. This can be accomplished through recognizing collaborative work in performance assessments, offering incentives for collaborative projects, and creating chances for collaborative research findings acknowledgment and dissemination

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