

Perceptions towards research data sharing: A qualitative study of Nigerian academics

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ABSTRACT

Open science provides transparency to research processes by means of open data as data sharing initiates. The need for data sharing among scholars and researchers was evident, the uptake however is slow due to the benefits and detriments of the practices. This paper explores the perceptions of Nigerian academics towards research data sharing practices. Participants from five universities in Nigeria were purposively sampled. Data were gathered through interviews with 22 participants. Their perception towards data sharing was reflected through their awareness, understanding and familiarity of the practice. Most of the participants perceived that data sharing would add value to their professional reputation and fast-track their research progression, however a few of them perceived data sharing as disquieting. The academics labelled data privacy and cultural orientation to be those risks associated with data sharing. The study provides deeper understanding of data sharing and the opportunity for academics to know diverse insights of data sharing practices that would guide scholars in intensifying a variety of data management services, which then can be personalized to their exclusive needs. Further investigation could be done through quantitative research approach to inform data sharing behavior in a larger scale in order to improve the current practices.

Keywords: Research data; Data sharing; Open data; Motivation and barriers; Perception studies.

INTRODUCTION

Data sharing is a valuable part of scientific activity that promotes data accountability, transparency and efficiency, and allows reproducibility of research. Data sharing practices in the context of open data resides under a bigger umbrella of open science, that aims to make data freely available to everyone to use without controls from copyright or patent restriction. It is a normal practice to disseminate and share research output through scientific publications such as journals or conference proceedings. However, research data is another form of research output which is valuable to the research work. Several funding bodies and other related institutions have now encouraged data sharing as it increases transparency and improves the accuracy of research (Dougherty, Slevc and Grand 2019; Olson and Downey 2016; Waithira, Mutinda, and Cheah 2019). For this, research data sharing has been considered as a vital instrument for the advancement of knowledge and preservation of research against misconduct (Kraemer et al. 2015).

Research communities have realized the importance of data sharing in which there are now encouraging and promoting such exercise among their community members due to the following benefits: it encourages invention and possible new data practices, allows inspection of results from a given study, and makes available of vital components for learning (Carroll 2015; Curty 2017). Other potential benefits may include possible opportunity of collaboration among researchers (Anggawira and Mayesti 2020; Chawinga and Zinn 2019; Kim 2016; Macmillan 2014; Ogungbeni et al. 2018; Zuiderwijk and Spiers, 2019), and better chances to access to other researchers' data and increased citations (Curty et al. 2017; Meyer 2018; Peters and Ho 2017). Despite these benefits, there are evidences that data sharing is neither freely available nor commonly practiced among researchers (Amann et al. 2019; Borgman 2012). Most academics were not receptive about data sharing practices for a number of reasons including possible risks, lack of incentives and unbalanced cost-effectiveness (Bartlett et al. 2018; Kim and Stanton 2016; Polanin and Terzian 2019). Sharing of research data also creates practical and ethical defies to the conduct of research particularly for research that involves human participants (Ross, Iguchi and Panicker 2018).

A few studies have reported on data sharing practices. However, most of the literature originates from the developed countries across Europe and America, few from Asia and very few from Africa. Despite the widespread recognition on the significance of research data sharing, little studies were undertaken on this topic among African researchers. In Nigeria, there is a growing concern regarding how research data are perceived and managed, and the problems it creates to researchers who commence the practice (Odigwe, Bassey and Owan 2020). The literature has not indicated any serious uptake of data sharing practices among academics in Nigeria. This has often been linked to the absence of appropriate platform for effective data sharing practices (Ogba 2014). Negative perception of data sharing among researchers also leads to sporadic implementation of the practices (Mueller-Langer and Andreoli-Versbach 2018). Except for researchers from a few selected disciplines such as genomics, who are receptive of and have embraced data sharing, many scholars from other fields attach negative views to data sharing and are not ready to share their data with others (Dreyfus and Sobel 2018; Elliott 2016; Madas and Schofield 2019; Mueller-Langer and Andreoli-Versbach 2018; Ross, Iguchi and Panicker 2018).

This paper is dedicated to gather deeper understanding on how academics in Nigeria view research data sharing and to gauge whether these perceptions in any way influence their research data sharing practices. Studies on how academics view the concept of research data sharing in Nigeria is timely, considering the requirement of policy makers, funding bodies, and scholarly publishers in transparency and openness that are considered to be part of science.

LITERATURE REVIEW

Open data, open access, and open peer review are the current developments in scholarly communication that influence research activities with the prospect of accelerating research cycle due to the world becoming more data intensive. Academic institutions, government agencies and policy makers are embracing open science through these two pillars, open access and open data strategies (Paxton and Tullett 2019; Sui 2014; Zenk-Möltgen et al. 2018) - the latter pillar has recently gained relevancies in the academe, and the needs has been recently more emphasized around the scholarly world. This is to ensure research data can be validated, preserved in order to enable discoverability and

reused by other stakeholders such as researcher funders, other investigators and public in general. With the increase numbers of research data sharing advocators such as researcher funders, professionals' bodies and scholarly publishers, there are policies in place requiring or encouraging researchers or authors to share their data (Tannenbaum et al. 2018). The policies established by the research funders and publishers have shown a growing awareness of the importance of data sharing practices across academics.

Researchers who typically share their research output through scientific publications such as journals or conference proceedings could gain benefit from sharing their research data (Shen 2016). While data sharing has been well embraced by the academic communities with the conception that may enhance research quality, in reality the majority of researchers have a distinct viewpoint towards it. Researchers are still reluctant to share their data (Matacic 2019; Tenopir et al. 2011; Waithira et al. 2019). Although sharing research data is known to be beneficial, there are evidences that researchers withhold them, making it difficult for novice investigators to access data which they find useful (Lewandowsky 2018; Spallek et al. 2019; Zheutlin and Byrd 2018).

The developed countries such as the USA and Australia, together with the European Commission, launched Research Data Alliance (RDA) in March 2013, to enhance and promote sharing of research data (Kim and Stanton 2013). Despite this initiative, data sharing was still underrated by scholars. Earlier, Tenopir et al. (2011) in their survey reported only a small number of scientists were willing to share and make their data accessible to others. Enke et al. (2012) contrarily indicated that most of their respondents who were biodiversity researchers were willing to make their data freely available. Willingness to share research data depends on how individual perceive it, juggling between its benefits and risks. The importance of sharing research data cannot be over emphasised. Molloy (2011) reported on how data sharing could benefit both researchers and society including transparency and reproducibility of the research. A survey conducted in 2015 by Wiley Publishing Group (Bezuidenhout 2019) involving 2250 scientists from seven different countries had identified various reasons why researchers would or would not share their data. The motivations supporting data sharing included community norms, public benefit, facilitating research transparency and re-usability. More than half of the respondents also recognized that sharing data could increased the impact and visibility of their research. This includes higher citation rates for open access publications, improved visibility online and possibility of research collaborations.

Several investigations reveal that openness to research data has increased research progress as it simplifies the reproduction of study outcomes through the re-usability of data (Fecher, Friesike and Hebing 2015; Taichman et al. 2016). That is why the idea of research data sharing has received unanimous support among academic stakeholders. A specific example can be seen from the European Commission who has announced that contact to other academic data will improve Europe's novelty, to make this possible, data generated with funding from the European union should be publicly free from 2014.

A number of studies have discovered the importance and obstacles of data sharing, reporting on academics inclination towards data sharing practices (Groves 2018; Vickers 2011). The findings indicated data sharing practices are negligible, while the practices differ between diverse disciplines. Louis, Jones and Campbell (2002) discovered about one third of genetic scientists refused to share their data, before completion of research publication. Similarly, Piwowar (2011) reported less than one third articles deposited together with research datasets. Akers and Doty (2013) discovered several motives behind researchers'

data withholding that include: nature and the kind of the data (sensitive or personal); recognition of the researcher; and misuse and misinterpretation of data. Equally, Savage and Vickers (2009) showed that some researchers decided to withhold their data as a result of the effort involved in making such data available. In Africa, a study was conducted to deliberate concerns associated to data sharing within the West African region, and that adequate funds should be allocated for research data management. The study reported several issues on why scholars were unwilling to make their data available to others via online databases: concerns on the reliability of the platform; losing control over data; complexity of user interfaces; time consuming of data entry process (Janssen, Charalabidis and Zuiderwijk 2012). The above studies have shown the prevalence of data sharing and data withholding in academic communities varies in geographic areas and research field.

The perception of data sharing among scholars was reported in several research fields (Angraal et al. 2017; Beaulieu-Jones et al. 2019; Borgman 2012; Kim and Stanton 2012; Tenopir et al. 2011; Wallis, Rolando and Borgman 2013). Each field has different ways of handling data sharing, and these variations range from the methods, culture and purposes of sharing within disciplines which result in major obstacles for the practice. For example, the perceptions of those from the arts and humanities who mostly consider publishing works in monographs may differ from those in the social sciences that deal with journal data-sharing policies (Kim and Stanton 2013). Therefore, data sharing practices of each researcher depend on the way they perceive and attach value to sharing. Kim (2013) found that the policies and plans used by scholars for data sharing practices differ from one discipline to another. These variations related to the volumes of data produced, the importance of sharing and ethical constraints. For instance, the volume of data raises quicker than the monetary and practical means in some field more than the others (Kim and Stanton 2013). A research in the field of life sciences reported data were gathered from several sources and generated a massive amount of data. For example, in genomics, large-scale data sets are rapidly gathered (Stein 2008). These datasets generated by researchers pose a problem for being too large to share and poorly organized for effective use (King 2011).

The uptake of data sharing might be influenced by the increasing number of funding institutions, professional associations, and journal editors who required data to be freely available for use by others (Beaulieu-Jones et al. 2019; Feldman and Shaw 2019; Riccardi, Pantano and Potestio 2019). Data sharing was regarded as a mean that permits replication and reproduction of research, researchers however were concerned what can be garnered from those who conduct analyses on their data (Feldman and Shaw 2019; Meyer 2018; Tincani and Travers 2019). This issue was related to data citation matter. Reports from different disciplines indicated efforts to encourage data sharing was resolved by creating inclusive repositories but it suffers from practical challenges (Hesse 2018). Although research funders are promoting data sharing by providing funds to various disciplinary, however the funds allocated is only for minimum financial support (Higman and Pinfield 2015).

Advocates of openness have argued that data sharing may “broaden access to research”, this practice was accepted by many researchers as it comes with great benefits but data providers are facing challenges in the implementation (Mannheimer et al. 2019; Veletsianos 2015). While openness is perceived as needed, researchers often lack in-depth understandings of open practices (Banks et al. 2019; Merriam and Grenier 2019; Veletsianos 2015). In Nigeria, a survey was conducted among academic staffs indicated that lack of sharing has made academicians to rely heavily on the printing of information

sources (hard copy sources) for journals, conferences and abstracts (Salami and Suhaimi 2019). Perhaps the biggest obstacles in adopting data sharing within academics is the fear that journal publisher is holding a policy that decline credit for collaborative work from reproduceable data (Nosek et al. 2015); researchers were concerned of being misinterpreted (Longo and Drazen 2016; McKiernan et al. 2016); and research funders relegated data sharing to the wish-list category of unfunded mandates (Hesse 2018). In addition, a number of researchers were against openness to data due to potential risk of trial patient confidentiality (Bauchner, Golub and Fontanarosa 2016; Ebrahim et al. 2014); wrong dredging of data sets, and causing in counterfeit conclusions (Doshi, Jefferson and Del Mar 2012).

OBJECTIVE AND METHOD

The objective of this study is to understand how Nigerian academics perceive research data sharing and whether these perceptions in any way influence their research data sharing practices. Based on this research objective, this paper attempts to answer the following research questions:

- a) How does the Nigerian academic community perceive data sharing?
- b) What are the motivations of research data sharing to academics?
- c) What are the hindrances to research data sharing perceived by academics?

This is an exploratory study using qualitative data gathering method by means of interview. A semi-structured interview approach was chosen because it affords considerable freedom to the interviewer to deviate, change the order of the questions, and pursue themes that arise during the interview (Bryman and Bell 2015). The participants were selected among five out of six federal universities founded in the Northeast Nigeria, one university was excluded based on safety reasons as the area was in a military conflict. The participants were selected using purposive sampling approach that includes the following criteria: they have a certain level of knowledge and skills about, as well as experiences in research data sharing; they are established researchers as they presumably obtain more knowledge on research and data sharing mirroring the research interest; and they hold research management position at the institutional level that might contribute to the uptake of open data/data sharing practices. A total of twenty-two (22) senior level academicians with each representing a faculty were purposively selected as information-rich participants, and were interviewed between January to February 2017. However, due to the unpredictable nature of qualitative data feeding the iterative process, unexpected information that emerges during data collection were used to better capture and explore further insights, requiring more time to analyze before concluding the findings in August 2018.

The interview was used to gather deeper understanding on how the academics perceive the concept “data sharing” and to also comprehend how this scholarly community share data with colleagues, as well as investigating the influence of such sharing among themselves. The interview sessions were conducted on one-to-one basis and lasted for approximately 20-30 minutes for each session. The interviews were audio-recorded with the consent from all participants. Participants were given a consent letter prior to the interview session to help them confirm and understand their involvement in the study so they could determine if they wished to participate. Table 1 presents the main interview questions used for this study based on the research questions posed.

Table 1: The Research and Interview Questions

Research Questions	Interview Questions
1. How does the Nigerian academic community perceive data sharing?	i) What do you understand about research data sharing? ii) What make you aware about research data sharing? iii) What are the platform you use for data sharing?
2. What are the motivations of research data sharing to academics?	i) Why do you share data with others? ii) What do you gain when you share your research data?
3. What are the hindrances to research data sharing perceived by academics?	i) What are the barriers you face in sharing research data? ii) How do you consider sharing research data - as a risk or opportunity? iii) Why do you withhold your data?

The interview data were manually transcribed and then returned to the participants to ensure the conversations were correctly recorded. Data were coded manually, and thematic analysis was conducted to generate themes. To ensure the anonymity of the responses the participants were coded based on their broad subject fields i.e. Science or Non-science. The data were analyzed using open coding and categorized using thematic analysis, the latter to identify information from words drawn from the participants.

There is no specific theoretical framework used to analyze the results. However, for the purpose of this analysis, perception is defined as awareness, understanding and familiarity of something (Merriam-Webster n.d.), and in the context of the study is with research data sharing. The concept of awareness is described as the ability to know, perceive, feel, and to be conscious of events or activity (Zhao 2017; Eastwood and Smilek 2005). The term understanding is described as an individual's ability to use and attach meaning to the concept of data sharing (Mason et al. 2020). Familiarity is defined as the aptitude of a researcher to become close acquaintance with data sharing practices (Bezuidenhout and Chakauya 2018). Motivation is referring to extrinsic and intrinsic stimulates in accomplishing goals based on Locke and Schattke (2018) definition. Hindrances is described as perceived risk in data sharing revolves around an individual's perception of how personal information could be misused in general (James et al. 2017). To ensure validity and reliability of the results, member checking was conducted. Interview transcripts were returned to the participants to validate the content. Codes and themes that emerged from the data were validated independently by two academic members from the department who acted as inter-coders.

RESULTS

Participants of the Study

A total of twenty-two (22) academics from five federal universities in Nigeria participated in the study, consisting of 18 males and 4 females, with age ranging from 41 to 57 years. There are more males in the sample, reflecting male predominance in academia in Nigeria that has been reported (Nwagwu 1994). The participants, coming from diverse field of studies were broadly coded as science (S, n=14) and non-science (NS, n=8) followed by the participant code number (S1 to S14 for sciences; NS1 to NS8 for non sciences). Table 2 details the participants' demographics.

Table 2: Demographics of the Interview Participants

Participant code	Academic Position	Age	Academic Field	Gender	Experience in Academia (years)
NS1	Professor	56	Education	M	32
NS2	Lecturer	48	Accounting	F	22
NS3	Professor	48	Education	M	21
NS4	Associate Professor	42	Sociology	M	21
NS5	Professor	49	Education	M	23
NS6	Professor	43	Banking and Finance	F	20
NS7	Associate Professor	52	Political science	M	26
NS8	Professor	41	Sociology	M	19
S1	Professor	52	Geology	M	27
S2	Associate Professor	54	Engineering	M	28
S3	Professor	57	Agriculture	M	30
S4	Professor	44	Agriculture	M	19
S5	Associate Professor	41	Medicine	M	17
S6	Professor	50	Physics	F	23
S7	Professor	52	Engineering	M	24
S8	Lecturer	43	Agriculture	M	16
S9	Professor	50	Biology	M	24
S10	Professor	50	Biology	M	25
S11	Associate Professor	48	Engineering	M	15
S12	Lecturer	49	Mathematics	M	19
S13	Professor	51	Engineering	M	23
S14	Professor	52	Computer science	F	24

Perception Towards Research Data Sharing

For the purpose of analysis, the authors gauge the participants' perception towards research data sharing based on the three themes that emerged from the interview findings, i.e. awareness, understanding and familiarity of this scientific activity (Table 3). The sub-themes are also described, with the participants excerpts and verbatims reflecting participants' conception of research data sharing.

Awareness

The findings indicated that in general participants were aware about research data sharing through three aspects: their discipline receptiveness, funding agencies and journal publishers. A number of the respondents (n=8) informed that their awareness was developed through the interest of their research fields concerning research data sharing. A participant remarked: "...our field encourages data sharing hence, we all have prior knowledge about it" (S2). Some disciplines even encourage data sharing more than others as NS7 reported "I was actually informed about data sharing through a colleague from the same discipline".

The awareness also was triggered by funding agencies where some of the respondents (n=5) showed various funding agencies encourage to make research data visible and available to others as exemplified from the following statements: "Nowadays, most of the funding agencies required researchers to make their data publicly accessible as a condition for providing grants" (NS8); and "I was personally directed to fill out an agreement form showing my readiness to share data" (S11).

The respondents (n=5) also mentioned that journal publishers contributed to make them aware of data sharing preceding to publication. This is evident from the following verbatim statements:

"A lot of publishers ask researchers to deposit datasets in public platforms before considering their articles for publication" (S11).

"I was once informed by journal publishers about sharing my research data prior to publication" (S12).

"Publishers inform scholars about the idea of sharing data prior to publication" (S13).

Understanding

The findings indicated that participants understood that research data sharing practices entail assisting other researchers (n=7), especially younger ones, in writing good research report with minimal effort of gathering data as stated by NS1. It is also supported by the following verbatim: *"The ability of the earlier researchers to aid the younger ones in conducting their research with relevant data"* (S3). The participants also reflected the understanding that data sharing practices could also lead to research collaboration (n=5) by means of data re-use to ease the challenging tasks in data collection process as mentioned by these participants: *"Bringing scholars to work together to ease difficulties faced in the process of undertaking research"* (S12) and *"Research data service provides sanity in research where cooperation and team work prevailed"* (S13).

However, a few participants were not willing to share data with others due to plagiarism issue and insufficient acknowledgement of the data owner. This is reflected in their understanding of data sharing that highlighted unfavourable opinion of the practices due to the cost and time needed to do it. For example NS6 said, *"time and cost taken may not allow me to share my research data"* (NS6). This is corroborated with findings from Pitt and Tang (2013) who reported several academic scholars found it difficult to share their dataset publicly as a result of individual cost which include time, money, reputation and chance of data being misused by other fellow researchers.

Familiarity

Familiarity of participants towards research data sharing was observed from the type of platform they used for the sharing process. The findings indicated that the participants have been using different type of platforms such as cloud repository (n=14), publisher's website (n=9), personal website (n=17) and institutional data repository (n=12) for sharing and making their data available to others. For instance, two participants (S2 and S4) were using cloud repository such as *GIFT-Cloud* to share images data from their studies. Both respondents described *GIFT-Cloud* as a platform which they thought is secure, easy to use and most appropriate particularly for image data. Another two participants mentioned Figshare, a type of data repository, that illustrated their familiarity with data sharing practices:

"I simply use Figshare to share data and other academic research outputs as it is a cost-effective software" (NS5).

'Using Figshare platform to share my data allows me to retain full control of data, including when to share what' (S13).

Participants were comfortable to upload their data to the publishers' platform when they published their articles (*"I normally use data sharing platform with automated annotation as provided by the journal publisher"* (NS5)) or archive data in an institutional repository (*"I do not use any platform in sharing data rather I deposit the little I have in the university data repository"* (S11)) or upload their data in their personal website (*"I normally use my*

personal website to make research data readily available’ (NS1)). There is only one case where a participant mentioned he only share his data through his e-mail when there is a need or request as he stated “I only share data when it is required, it generally happens through my e-mail “(S12).

Table 3: Perceptions Towards Research Data Sharing

Themes	Sub-themes	Participant Code (Total Responses)
Awareness: The ability to rightly know and perceive, to sense, to be mindful of research data sharing	Discipline Receptiveness	NS1, NS7, S2, S3, S6, S11, S12, S13 (8)
	Funding Agencies	NS8, S8, S11, S12, S13 (5)
	Journal Publishers	NS5, S9, S11, S12, S13 (5)
Understanding: The ability to comprehend research data sharing as a practice	Helping Others	NS1, NS3, S2, S3, S8, S9, S11 (7)
	Collaboration	NS8, S8, S11, S12, S13 (5)
Familiarity: Having close acquaintance with data sharing platform	Cloud Repository	NS4, NS5, NS7, NS8, S2, S4, S6 S7, S8, S9, S10, S11, S12, S13 (14)
	Publisher’s Platform	NS5, NS7, S3, S7, S8, S9, S10, S12, S13 (9)
	Personal Website	NS1, NS3, NS4, NS5, NS7, S2, S3, S4, S6, S7, S8 S9, S10, S11, S12, S13, S14 (17)
	Institutional Repository	NS1, NS5, NS6, NS7, S2, S3, S4, S5, S7, S8, S11, S12 (12)

Motivations for Research Data Sharing

Motivation to share research data arises from either internal or external reasons known as extrinsic and intrinsic motivation respectively. While both motivational stances are essential, they have diverse effects on data sharing behaviors and how the academics pursue goals. Table 4 shows both intrinsic and extrinsic motivations that emerged from the interview findings.

Intrinsic Motivation

It is indicated from the interview findings that data sharing was internally motivated by getting more citations (n=19): “...expecting more citation inspire my data sharing practices” (S6) and “tangible rewards such as referencing motivate me to open up my data for the wider community” (S8); for academic promotion (n=13): “.. acknowledging my data by those that used it can heighten by academic career via promotion” (S4) and “University that fashioned data sharing can upgrade their researchers that comply with such practices” (S10); and recognition (n=18): “... I need to share data to become renowned in the academic world” (NS5) and “I normally share data if it pays in the form of reputation” (NS7).

Extrinsic Motivation

Extrinsic is motivated by external desires or outside encouragement or rewards that earned as a result of sharing research data. Participants are sharing their research data due to monetary incentives (n=8) as one of the participants mentioned “... *increased demand to access my data attracts financial incentive* (NS7)”. The findings also indicated exchange (n=8) as motivation and incentive for research data sharing. This is due to the practice that researchers are sharing their data to get other researchers’ data as an exchange. This has been pointed out by some of the participants “*Benefiting from other scholars’ data move me to share my own data*” (NS5) and “*My data can only be exchanged with other scholars else, I wouldn’t share*” (S7).

Protection of data against misconduct have influenced many of the participants’ (n=15) data sharing practices as stated by the the following participants: “*Research data sharing promotes open discussions which in turn avert research data from transgression*” (S3) and “*..by making data open to public, scholars may not misbehave research data since is always accessible*” (S11).

Table 4: Motivations for Research Data Sharing

Motivation	Sub-themes	Participant Code (Total Responses)
Intrinsic motivation arises from inside the individual	More citations	NS1, NS2, NS3, NS4, NS5, NS6, NS7, S2, S3, S4, S6, S7, S8, S9, S10, S11, S12, S13, S14 (19)
	Academic promotion	NS1, NS4, NS5, NS7, NS8, S3, S4, S8, S10, S11, S12, S13 S14 (13)
	Recognition	NS1, NS4, NS5, NS7, NS8, S1, S2, S3, S4, S5, S6, S7, S9, S10, S11, S12, S13,S14 (18)
Extrinsic motivation arises from outside the individual	Monetary incentives	NS4, NS7, S2, S3, S4 S8, S9, S14 (8)
	Exchange	NS3, NS5, S3, S6, S7, S9, S10, S13 (8)
	Protection of data against misconduct	NS1, NS5, NS7, S2, S3, S4, S6, S7, S8, S9, S10, S11, S12, S13, S14 (15)

Hindrances to Research Data Sharing

Hindrances to data sharing mainly come from potential risk perceived by the academics. The findings reported two main risks related to research data sharing namely data privacy and cultural orientation (Table 5).

Data Privacy

The findings revealed that participants emphasized basically on three issues that hinder them from practicing data sharing. Majority of the participants mentioned confidentiality (n=20) as one of the issues as remarked by these participants “*I can share data when principles guiding data sharing are adhering*” (S2), and “*I don’t want the secret behind my research to be revealed*” (S7). In other words, data privacy emerges as a hindrance because concern on data privacy is used as an indicator to examine why people should or should not participate in data sharing as described in Chen et al. (2015).

The other two issues are related to data misuse (n=16) as described by S8 *“the fear that others may be using illegal way to monetize my data affect how I respond to data sharing”* and mistrust (n=9) as the respondents indicated *“I’m afraid that some users may misread my data and change the original meaning”* (NS1) and *“some researchers may end up exposing my research weakness”* (S6).

Cultural Orientation

Cultural orientation refers to the inclination of people to think, feel or act in a way that is culturally determined. The following three sub-themes emerged as hindrances in respect to cultural orientation: community belief, culture, and infrastructure.

Community belief is the view or conviction that people hold to be true within a particular society. Community belief is certainly affecting the nature of data sharing within the academics in this study (n=12). Discussions regarding responsible academics data sharing still often center around their belief in regards to ethical issues such as the consent, privacy, and confidentiality of individuals, families, and community on what could be shared. This issues were remarked by the following participants: *“I have the belief that sharing my research data can halt my academic growth”* (S11). Likewise *“our community is discouraging sharing of personal belongings including research data* (S9).

Culture is described as the ideas, customs, and social behavior of a particular people or society. It has severe consequences on how academics share their data. This study was not given an exception as some respondents (n=9) clearly indicated similar opinions: *“the nature of our culture in this community prevents us from sharing valuable things including research data”* (NS1). Another respondent lamented that *“in our culture, sharing data is not a common practice, including in my [education] field.”* (NS5).

Fund and maintenance of infrastructure for data sharing, training, and support are needed once a researcher has decided to share their data. This aspect is not a major issue as very few (n=3) indicated that lack of adequate infrastructure as a problem to academics’ data sharing. The challenges they faced are exemplified in the following verbatims: *“Lack of sufficient infrastructures frustrate my data sharing practices”* (S3) and *“My organization has no better resources for training researchers on data sharing”* (S9). Also *“My institution is not willing to provide the necessary platforms to support data sharing”* (NS6).

Table 5: The Hindrances to Research Data Sharing Practices

Themes	Sub-themes	Participant Code (Total Responses)
Data privacy: data security concerned with the proper handling of data.	Confidentiality	NS1, NS4, NS5, NS6, NS7, NS8, S1, S2, S3, S4, S6, S7, S8, S9, S10, S11, S12, S13, S14 (20)
	Misuse	NS1, NS4, NS5, NS6, NS7, NS8, S2, S4, S6, S7, S8, S10, S11, S12, S13, S14 (16)
	Mistrust	NS1, S2, S4, S5, S6, S8, S9, S10, S12 (9)
Cultural orientation: inclination to think, feel or act in a way that is culturally determined	Community Belief	NS1, NS3, NS5, NS7, NS8, S2, S4, S6, S9, S11, S12, S13 (12)
	Culture	NS1, NS2, NS5, NS6, S2, S3, S6, S9, S12 (9)
	Infrastructure	NS6, S3, S9 (3)

DISCUSSION

This study reports how research data sharing was perceived by 22 academic scholars from five universities in Nigeria. The participants in general were optimistic about research data sharing practices. They believed that data sharing if properly practiced, can confidently change the nature of research activities in academia, although very few participants were yet to see the good of it. The finding has shown that most of the academics are generally aware of the emerging practices and familiar with the concept of data sharing. Some participants look at data sharing as assisting other scholars, this is consistent with the finding that pointed out pleasure in helping others is a key for data sharing behavior (Kim, Lee and Elias 2015). Others view it as a tool for collaboration with various researchers that corroborated with findings from previous studies (Callahan et al. 2017; Knoppers et al. 2011; Reichman, Jones and Schildhauer 2011; Van den Eynden et al. 2011). They also perceive data sharing as a practice that can safeguard data from misconduct.

Participants in this study realized that they must make their data accessible in order to attain research progression although, it should be done carefully. Findings from this study showed that academics understood data sharing differently with majority supported it and a few disregarded the practice. This is in line with Linek et al. (2017) who stated data sharing is widely acknowledged, but the practice is rather limited among academics. Pitt and Tang (2013) also reported that academic scholars found it difficult to share their dataset publicly as a result of individual cost which include time, money, reputation and chance of data being misuse by other fellow researchers.

Based on the findings, extrinsic (i.e. expected organizational rewards and reciprocal benefits) and intrinsic (i.e. self-efficacy or inner belief in his or her capacity to execute behaviors necessary to produce specific performance attainments) motivators are perceived to have influences on Nigerian academics research data sharing practices and intentions. The main intrinsic motivator of data sharing practices is its advantages to gather more citations of the main research work, which leads to gaining academic promotion and recognition. This corroborates with other finding reported by Piwowar, Day and Fridsma (2007) that data sharing would increase the researcher citation rate. Expectation of high citation rate, pave the way for collaboration and recognition among others, which supports previous findings of Bierer, Crosas and Pierce (2017), Sturges et al. (2015), Vanlommel et al. (2017) and Williamson et al. (2016).

Concerning perceived risks of data sharing, the findings reiterate the findings of earlier studies (Borgman 2012; Kim and Stanton 2012; O'hara 2019; Riggs et al., 2019; Tenopir et al., 2011) that indicated researchers were reluctant to share their research data with their colleagues. Data sharing practices are prone to problems and constrained by confidentiality, ethical and privacy, misuse of data, economic and legal barriers, as well as data culture (van Panhuis et al. 2014). While sharing is deemed useful, some researchers are reluctant to do it. Research data sharing is gaining increased acceptance among scholars due to the numerous advantages obtained from sharing with other researchers, such as better access to other researchers' data and increased citations. However, not all data can be easily shared and made available or accessible as some may contain personal information and have the potential risk of exposing the privacy of the respondents. In such cases, an agreement for data sharing use that defines the objectives and use of the data should be specified and agreed upon. All this can be regulated through policies or guidelines directing the exercise. However, this study has revealed the hesitation of some academics in sharing their data due to data privacy.

There were arguments that culture plays an important role in developing privacy rules (Chen et al. 2015). James et al. (2017) propose that culture is an important environmental element that could influence privacy. Miltgen and Peyrat-Guillard (2014) reported findings from seven countries on the incorporation of culture into the examinations of privacy and risk in digital environments. The finding from this study has demonstrated culture orientation as a unique hindrance of data sharing when compared to other findings especially from Europe and other developed countries. This is reasonable with Nigerians who are very attached with culture which influence almost all their day to day information sharing practices. Due to this, resource sharing among academics in Nigerian is facing several challenges such as lack of ICT skills and inadequate suitable platforms (Ogba 2014), which this study identified as not a major issue. Despite that, data sharing was opined to be advantageous considering the numerous benefits and motivations that can be obtained when it is properly practiced. Sharing research data promotes innovations and potential data re-use, enables scrutiny of research findings and offers momentous components for learning (Van den Eynden et al. 2011).

CONCLUSION

This study is significant due to the present lack of in-depth research study on the academics' perception and practices of research data sharing in Nigeria. There is deficiency in the literature regarding data sharing among academics in Nigeria as the literature reviewed mostly focused on knowledge sharing and/or resource sharing in Nigerian universities (Ogba 2014). Because of first author's close involvement in the research setting, the study has gained an insider's view of the topic, which allows the researchers to find issues in data sharing that are often missed by the more positivistic enquiries conducted through questionnaires. This study however is limited by a small sample size thus provides potential limitations concerning the representativeness of the sample and generalization of the findings. Thus, the findings should be treated with caution. Future studies should include a larger sample across the continent for more vigorous results. A mixed method approach could be employed in further investigation through focus groups, followed by a survey to gather more information and obtain a better understanding of research data sharing practices within the academics in Nigeria, or in other periphery countries using clustered and stratified sampling approach of different disciplines, gender and research experience. Conclusively, the academics should use the findings as a guidepost to comprehend the needs for research data sharing in academic communities and find ways to improve the practices.

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