



EXPLORING THE MOTIVES BEHIND RESEARCH DATA SHARING: NIGERIAN SCHOLARS' PERSPECTIVE

BY

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ABSTRACT

This study investigated the factors associated with academics in Nigeria in their effort to share and make data freely accessible. Knowing vividly that Nigeria does not have any model governing data sharing practices, understanding the motivations and inspirations of Nigerian academics would definitely offer and encourage quite a number of those with negative thoughts to get involved in such practices. The study used a quantitative survey method by analyzing responses from 57 Nigerian academics studying in Malaysia universities drawn from diverse disciplines. The findings were analyzed and revealed that academics are more willing to share and make their data publicly available. Factors such as policy/guidelines, organizational structure, organizational culture, anticipated benefits, altruism and conditions for data sharing were found to be motivational concepts that inspire academics to share data. The study further revealed that despite tremendous benefits attached to data sharing, the practices seems not to be welcomed by majority of Nigerian academics.

Introduction

Collaboration and interaction and sharing are essential to modern research practice, quite a number of research has been conducted on many aspects of information and knowledge sharing and there are insufficient research surrounding research data sharing among scholars. Sharing across diverse disciplines particularly with the application of information technology have contributed greatly to the data intensive nature of academic research. For long researchers have learned to share their papers, so it necessary for them to learn how to share their data as well (Shen, 2016). There is some proof that articles with open access gain more citations, especially when related data is also published openly (Toelch & Ostwald, 2018). Research data sharing is an effort aiming to remove the barriers for sharing any kind of data and other research output at any stage of the research process.



The aim of this research is to find out why researchers must make their research data freely available to other investigators as it is important output of the scholarly research process across all disciplines. The need for academics to share their research results has been recently more emphasized as it minimized re-collection of data for further research. The concept of data sharing has been defined as “the release of research data for use by others” (Borgman, 2012). While other study describes data sharing as “encompassing activities such as attaching data sets to scholarly articles, depositing data sets in repositories, or saving data on a personal computer or local server”(Wallis, Rolando, & Borgman, 2013).

Data sharing have long strengthened the cycle of discovering and are the foremost means by which scholars earn credit for their work. It allows verification of results for more transparency and collaboration in academic research Institutions. It has been argued that making data publicly available facilitates easy reproduction of research and supports influence investments in research data thus, eventually promoting both research and innovation. However, seamless data sharing is not properly practiced among academics and one of the barrier to data sharing by academics was a lack of institutional guidance and support (Tenopir, Carol, Allard, Suzie, Douglass, Kimberly, Aydinoglu, Arsev Umur, Wu, Lei, Read, Eleanor, . . . Frame, Mike. 2011).

As far as the researcher is concern, no any framework for data sharing in Nigeria and no university has yet formulated a prescribed policy on data management and sharing. Similarly, major research funders in Nigeria such as petroleum technology development fund (PTDF) and Tertiary Education Trust Fund (Tetfund) have not yet implemented any data management and sharing initiatives thus, studies have hardly investigated Nigeria researchers’ perceptions of data sharing and the reasons why they should share their research data. Certainly, the nonexistence of practical and theoretical discussions about data sharing in Nigeria proves that research in this area is necessary. In the field of librarianship, understanding the data sharing behaviour of researchers assists academic librarians deliver better support for research in their various institutions as outlined that assessing the faculty’s need for data sharing is a significant outreach service that academic librarians can implement to upsurge their role in research data management (Kim, 2013). This paper investigated the reasons why Nigerian researchers must allow data publicly accessible by identifying the factors that motivate them to share data. Therefore, this research examined the following research question; what factors encourage Nigerian academics to make data freely accessible?

Review of Related Literature

There are series of studies that investigated researcher’s awareness of sharing data and the reasons for actual data sharing behaviour or the purpose to participate in such practice. These reasons are mostly the perceived benefits expected by the academics that would motivate data sharing (Borgman, 2012) sharing data among academics can also been encouraged if certain conditions could be met, for instance by placing conditions on access to data or requiring approval from data providers (Sayogo & Pardo, 2013). Perceived benefits as well as conditions related to data sharing have been investigated at different levels ranging from individual level by investigating scholars’ perceptions of data sharing practices that lead to institutional factors being suggested



together with individual factors including funding agencies, requirement from the journal, organizational policies (Herold, 2015; Piwowar, Becich, Bilofsky, & Crowley, 2008).

Since this research is about why the researchers must involve in data sharing activity, this study focused on the individual factors and institutional factors that influence data sharing practices among academics in Nigeria. The individual factors include anticipated benefits, conditions for data sharing and altruism while institutional factors involve organizational structure, organizational culture and policy/guidelines. Meanwhile, some factors were identified based on the review of previous studies. Researchers are motivated by the kind of benefits they are expecting as a result of sharing their data to other. This has been observed by many scholars, professional recognition (Kim, 2007), institutional recognition (Kankanhalli, Tan, & Wei, 2005) and academic reward (Kling, Spector, & Andersen, 2003) all influence research data sharing. Rewards can be realized through citations or even acknowledgements and sometime authorship.

Researchers view data sharing as providing opportunities for academic compensations by way of citation and or authorship that can develop their academic career (Kim, 2015). Studies have shown that expected rewards of any kind in organizations affect positively the attitudes and intention to share data or knowledge. Whenever there is low or sometime no rewards, researchers are unlikely to share their data with colleagues. The ability to periodically receive commendations via email or social networks on the data shared by researchers also influence positively the attitudes of such researchers regarding their data sharing behaviours (Ziefle, Halbey, & Kowalewski, 2016).

Researchers are also encouraged by altruism, this further enhance cooperation among the parties involved, and is a self-fulfillment attitude where by one is not forced to engage rather a voluntary exercise and a right thing to do. With the aim to find solutions to existing challenges, an individual can provide help and share data with others (Shang, Wu, & Li, 2017). Researchers are usually motivated in academic environment because they enjoy helping others, voluntary participation leads to successful data sharing. Although researchers are willing, in principle, to share their data, they enumerated certain conditions to be met if they are to really share data (Wallis et al., 2013). This again motivated researchers to share data, they feel there are certain situations that may warrant them to share data without tricky hence placed some conditions among which are: rights to publish results or proper attribution to the data source.

In an academic circle, researchers are expected to share data among them, this sharing is guided by various regulatory controls such as policies and guidelines. These are mostly designed by the university authority, with the aim of strengthening and sanitizing data sharing processes. Thus, there are numerous data sharing policies/guidelines that academics must be aware of as they move onward. For instance, NIH established data sharing policy which stated that data must be shared in a “de-identified” format (Health, 2015). The data sharer is expected to exclude information for which may lead to determine the identity of the subjects. Many researchers demanded for policies that can guide the data sharing practices as they claimed that the sensitivity of their datasets and the nonexistence of policies/guidelines to offer unarguable privacy guarantees are enough to opt out of data sharing (Malin, Karp, & Scheuermann, 2010). The policy is particularly applying to all researchers that receive public funding for their research.

This study developed a model combining both institutional and individual factors that influence researchers' data sharing practices, presented in Figure 1. The model includes a dependent variable that indicates the intention of the researchers to share data.

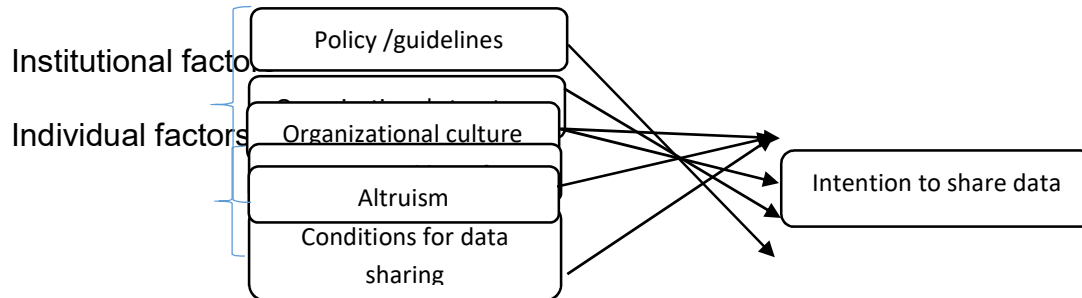


Figure 1: Research Model

Six independent variables were identified with three representing institutional factors, two factors representing individual factors and one (conditions for data sharing) that are assumed to be associated with the dependent variables made academics to share their research data. These factors are hypothesized to be positively associated with the intention to share data, which is consistent with the previous literature.

Methodology

This study employed survey research method through the use of questionnaire. The survey was conducted in Malaysia but all the survey participants are Nigerians researchers. The data was collected from an online questionnaire distributed to a random sample of Nigerian researchers studying in various Malaysia universities who are either (PTDF) or (Tetfund) beneficiaries in 2017 and 2018. Since PTDF and Tetfund are the main government body responsible for funding scholars in Nigeria, the beneficiaries are in a better position to share quality data and would have interest in data sharing practices. The target population are those Nigerian scholars studying in Malaysia that received PTDF and Tetfund funding during 2017-2018. Consequently, the final population comprised of 57 scholars, constituted by 18 sciences, 15 social sciences, 9 from education, 9 in Engineering and 3 each from agriculture and medicine.

Considering the total population, no sample was selected. Survey Monkey was utilized to conduct the online survey from March 12 to April 2 with an email that included the link to the questionnaire sent to each person in the survey population, as well as a single follow-up email. The questionnaire was adapted based on previous studies on institutional and individual influences on Scientists' data sharing behaviour which equally used a survey methodology. The questionnaire include seven different areas as follows; (1) demographics (2) anticipated benefits (3) altruism (4) conditions for data sharing (5) policy/guidelines (6) organizational structure and (7) organizational culture. This study analysed all the responses and answered using a 5-point Likert scale and the model variables measured using these questions.

For the dependent variable, intention to share research data was measured based on four survey items as indicated in Table 1 below. Those shown the frequency at which the survey respondents participate and make their data readily available to other



investigators. Cronbach's alpha was reported as 0.86, which shows that the survey items had a high level of internal consistency with which to gauge their reliability.



Table 1: Dependent variable

Dependent variables	Survey Item	Cronbach's alpha
Data sharing practices	<i>In the last twelve (12) months, how frequently have you....</i> Deposited your data with a specialist data centre, data archive or data bank Submitted your data to a journal to support a publication made your data available online via an institutional/ project website made your data available informally between researchers on a peer basis	0.86

Looking at the model in (Figure 1), some independent variables were also identified. These variable are associated with policy/guidelines, organizational structure, organizational culture, anticipated benefits, altruism and conditions for data sharing were measured based on four to seven survey items. Cronbach's alpha was also produced for all the survey items as indicated in Table 2 below.

Table 2: Organizational Structure, Organizational Culture, Policy/Guidelines, Anticipated Benefits, Altruism and Conditions for Data Sharing

Independent variables	Survey items	Cronbach's alpha
Organizational structure	The organizational structures create barriers in data sharing The organizational structures facilitate data sharing process The organizational structures facilitate data sharing process The organization I work with stresses extent of rules / regulations/ standard procedure for data sharing	0.85
Organizational culture	The management expects researchers to actively contribute in data sharing The management stresses the importance of data sharing to the development of Organization The culture of the organization encourages data sharing	0.82
Policy/guidelines	<i>The organization/research project I work with :</i> has a flexible policy towards data sharing has an established policy/guideline on the data copyright/intellectual property rights has an established policy on the access control of shared data	0.81

Anticipated Benefits	Data sharing would enhance academic recognition	0.91
	Data sharing would improve my status in a research community	
	Sharing Research data increases the impact and visibility of research	
Altruism	I would share research data to encourage the improvement and validation of research methods	0.92
	I would share research data to enable scrutiny of research findings	
	I would share research data to provide important resources for education and training	
Conditions for data sharing	I would be more likely to make my data available if I could place conditions on access	0.86
	It is important that my data are cited when used by other Researchers	

Characteristics of the Respondents

The demographic characteristics of the 57 survey respondents were analysed with respect to gender, age, faculty, highest qualification and years of experience. Among the survey respondents, 48 (84.22%) were male while 9 (15.78%) were female. Concerning their age, 3 were between 21-25yrs (5.26%), 9 from 26- 30yrs (15.78%), 27 were between 31-35yrs (47.57%) and 18 were > = 40yrs (31.57%). Pertaining their faculty, 18 (31.57%) were from sciences, 15 (26.31%) from social science, 9 (15.78%) from education and engineering respectively, while 3 (5.26%) from agriculture science and other disciplines respectively. Regarding their highest qualification, 12 (21.05%) were having BSc, 9 (15.78%) with M.Ed., 27 (47.36%) have M.Sc., with 3 (5.26%) having PhD and 6 (10.52%) were under others. About year of experience, 9 of them were less than have years <=5yrs (15.78%), 18 (31.57%) fall between 6-10years, 15(26.31%) have 11-15yrs of experience, while 16-20yrs & >= 25yrs have 9 (15.78%) and 6 (10.52%) respectively.

Table 3: Demographic Characteristics of the Respondents

Profile group		No. of Respondents	Percentage
Faculty:	Science	18	31.57%
	Social Science	15	26.31%
	Education	9	15.78% ³
	Engineering	9	15.78%
	Agriculture Sc.	3	5.26%
	Others	3	5.26%
Gender:	Male	48	84.22%
	Female	9	15.78%



Age:	21-25yrs	3	5.26%
	26-30yrs	9	15.78%
	31-35yrs	27	47.36%
	>= 40yrs	18	31.57%
Highest Qualification:	B.Sc.	12	21.05%
	M. Ed.	9	15.78%
	M.Sc.	27	47.36%
	Ph.D.	3	5.26%
	Others	6	10.52%
Year of experience: <=5yrs		9	15.78%
	6-10yrs	18	31.57%
	11-15yrs	15	26.31%
	16-20yrs	9	15.78%
	>=25yrs	6	10.52%
Total:		57	100%

Discussion of the Findings

Altruism was recognized to be more significant factors that motivate scholars to share research data in this study. A strong desire to help others is a significant factor influencing researchers' data sharing practices, altruism transpires only when researchers are ready to provide aids to others without expecting any future rewards, it is a decent free gift (Clavien & Chapuisat, 2013). Similar to other findings obtained from previous studies that altruism can motivate data sharing. There are certain although few studies that demonstrated links between altruism and research data sharing and finally discovered that it is a highly significant factor influencing data sharing exercises within the researchers (Fecher, Friesike, & Hebing, 2015).

Another important factor recognized in this study to have been motivating scholars in sharing data is the anticipated benefits which in line with other research findings. Considering the finding, it is the second most significant factor after altruism with Cronbach's alpha 0.91. This is a process where the researcher feels that data sharing could provide rewards like reputation and recognition. This has been observed by many scholars, professional recognition (Kim, 2007), institutional recognition (Kankanhalli et al., 2005) and academic reward (Kling et al., 2003) all influence research data sharing of academics. Rewards can be realized through citations or even acknowledgements and sometime authorship. Researchers view data sharing as providing opportunities for academic compensations by way of citation and or authorship that can develop their academic career (Kim, 2015). Studies have shown that expected rewards of any kind in organizations affect positively the attitudes and intention to share data or knowledge. Whenever there is low or sometime no rewards, researchers are unlikely to share their data with colleagues.

Another identified factor that motivate scholars in sharing data is placing conditions for data sharing. Although researchers are willing, in principle, to share their data, they enumerated certain conditions to be met if they are to really share data (Wallis et al., 2013). Researchers feel there are certain situations that may warrant them to share data without tricky hence placed some conditions among which are: rights to publish results,



proper attribution to the data source, familiarity between sharer and recipient, funding agency expectations, and the amount of effort required to share among others (Wallis et al., 2013). Organizational structure has also been recognized to be a strong factor for data sharing between Nigerian scholars which is in line with other research findings. The concept of organizational structure has been defined “as the sum total of the ways in which it divides its labour into distinct tasks and then achieves coordination among them” (Van der Werf, 2020). The top management decision in any organization influences the practices of data sharing. The impact of organizational structure on research data sharing depends on the kind of structural mechanisms used by such an organization towards sharing or withholding their research data.

Culture of organization motivates data sharing, the way in which organization share and cogitate data sharing influence its practices among the stakeholders. Despite the fact that culture differences occur between several academic organizations, they all necessitate more access to data and more transparency (Elman & Kapiszewski, 2013). Hence, the fast progression in data sharing offers new opportunities across various communities to develop and expand their research. In the modern society where accountability and transparency are more pronounced, every community for their best interest must involve in data sharing practices and seize the opportunities afforded by making experimental data more widely available. The culture of sharing data in some disciplines such as genomics, physics and other related fields have resulted in fruitful evolution of approaches in handling research data and driven discoveries in these disciplines (Callahan et al., 2017).

Conclusion

From the findings of this study, it was realized that there are certain factors that motivate faculty member to share research data with colleagues. The availability and accessibility of data among researchers holds great potential for research progression. It safeguards against misconduct related to data fabrication and falsification, allows the verification of study results and the reuse of data in new contexts, making data available minimized recollection of data and retain data integrity amount others. Despite this advantages, sharing data among scholars are not always common practices. With this study, having explained the various motivational factors towards data sharing, it is expected that the mind of our scholars would change positively concerning data sharing practices.

Recommendations

With this study, having explained the various motivational factors towards data sharing, it is expected that the mind of our scholars would change positively concerning data sharing. The following serve as the recommendations based on the findings:

1. The findings of this study show more of the survey participants are male who are more willing to share their data than their female counterparts, thus, female participants are encouraged to involve in sharing their research data. Although this may be connected to the total number of the female participants.
2. Findings revealed that scientists are more enthusiastic to sharing their research data than participants from other disciplines. Author recommends that participants



from other field of studies should emulate those from sciences to enable open access to publications which encourage collaboration.

3. All levels of participants should also be fortified to share their research data this will allow everyone to have access to their data without difficulty. Findings of this study showed certain categories of academics share their data more often.

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