



# **ENVIRONMENTAL FACTORS AS CORRELATES OF RESEARCH ATTITUDE AMONG POST-GRADUATE STUDENTS IN NIGERIA: A PATH MODEL APPROACH**

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## **ABSTRACT**

The study investigated the relationship among some environmental factors and research attitude of post-graduate students in Nigeria using a path model approach. The researchers were poised at filling the gap in the type of multivariate statistical tools that have hitherto been used in comparing these variables by authors in the research area. One research question was formulated to guide the study. Survey research design was adopted for the study. The study area, which was south-south Nigeria, is one of the geo-political zones in the country with six federal universities. The population of the study was made up of 1,299 post graduate students of education faculties in the six universities. A sample of 520 students (40% of the population) was selected for the study through stratified random sampling method. The study instrument was a questionnaire titled Environmental and Attitude variables Questionnaire (EAVQ) prepared by the researchers. Result of the study showed that 14 out of 15 pathways in the hypothesized model for the relationship between environmental variables and research attitude were significant and meaningful, with five direct and nine indirect pathways. Based on the finding, the study recommends an improvement in those environmental factors to bring about corresponding improvement in research attitude. The study suggests that a study of the relationship between other environmental variables not included in this study on graduate students' research attitude in federal universities in south-south Nigeria should be carried out by future researchers. Such research can be extended to cover more geo-political zones in the country.

**KEYWORDS:** Environmental factors, research attitude, post-graduate, path model.

## **INTRODUCTION**

Research attitude is the positive or negative disposition exhibited by an individual towards research practice. A positive or negative disposition a person exhibits towards an entity serve as an important indicator of the persons' attitude towards that entity, individual or activity.

According to Hogg and Vaughan (2005), attitude is a relatively enduring organization of beliefs, feelings, and behavioural tendencies towards socially significant objects, groups, events or symbols. Attitude is a learned tendency of a person to respond positively or negatively towards an object, situation, a concept, or a person. It is also regarded as a belief held by

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individuals that reflects their opinions and feelings and can be sometimes manifested in behaviour. As a psychological construct, attitude is an essential factor in students' educational preparation in general, and progress in research activity in particular. Hussain, Qayyum, Akhter, Abid and Sabir (2016) observe that "a positive attitude towards research is a key to success and progress in the knowledge-based societies." Similarly, Siddiqui and Ahmad (2015) observe that "knowledge gained through research is of the highest order as it is not based on assumptions, beliefs and untested generalizations" (p. 197). The study cautioned that to for seek such knowledge, the right attitude, accurate observation and integrity must be developed by the researcher.

Observably, most students who are carrying out research appear to be negatively disposed, as this is manifested in their being timid, nervous or apprehensive in the process. Such negative research attitude sometimes culminates in the abuse of research, which is generating a serious concern. Abuse of research has become a common practice, reason being that while some students conduct their studies in alignment with the principle of responsible conduct of research, a number of them operate on the contrary. For instance, some researchers present information and ideas from other researchers without citing or referencing them. It also appears that during data collection, some student-researchers merely mobilize their friends, colleagues and associates to respond to the questionnaire and other research instruments they employ for the study rather than contacting the actual respondents of the study for data collection. Worse still, a number of them seemingly sit back at home, generate data and carry out analysis which produce results and findings that are not of the real state of affairs in the study area.

Furthermore, the practice of recycling research or copying existing research work for presentation in the guise of carrying out fresh study is also common, and it represents outright violation of intellectual property rights of the original authors. Besides, other detrimental practices have gradually become recurring decimals. This is worrisome because applying such research findings in practice in the society can present inestimable harm to the public. Also, a good number of postgraduate students are serving academic staff in most tertiary institutions while most of the rest who are currently not in the system for want of opportunities are potential academics that have a high propensity to apply

such dispositions in their future research endeavours. Hence, addressing this problem holds promises of re-orienting them, repositioning research output, projecting the academic community for potential benefits from funding agencies and organizations, redeeming the seemingly impaired image and reputation of scholars in the academia, expanding the pool of knowledge on the problem as well as enhancing societal advancement. On the other hand, failure to address this problem might leave the nation's research enterprise in a perpetual state of disrepair.

Worth mentioning is the fact that empirical studies on research attitude are surprisingly scanty in spite of the centrality of research to personal and national progress. This statistic overwhelmingly deteriorates when postgraduate research attitude is considered. However, in the few available studies, lack of research culture, outdated technologies, time constraints, excessive teaching load, poor libraries, pressures to publish, poor oversight of researchers, among others feature regularly and prominently as the factors that undermine research. Likewise, the impacts of the factors that predict postgraduate students' research attitude have been examined by previous researchers using univariate statistical tools. Others who apply multivariate statistical techniques hardly examine the direct and indirect effects of the variables studied. Findings from such efforts are bound to be highly limited in giving a true reflection of the real situation. This is because human behaviour is complex and subject to change in the face of varied circumstances. Hence, many factors directly or indirectly interact simultaneously to produce observed outcomes in our environments. Therefore, univariate or rudimentary multivariate statistical techniques may not suffice in the face of intervening variables. Rather, a sophisticated multivariate analysis involving path analytic technique stands a better chance. This present study is poised at filling these gaps. The researchers strongly believe that this attempt will provide in-depth and better understanding of the state of affairs and the direction to channel efforts towards remedying the situation, if the need arises. This study therefore involves a causal modeling of some environmental factors and research attitude of education post graduate students of Federal Universities in South-South, Nigeria. The environmental variables considered were research training, research infrastructures,

research data accessibility, research funding, and research publications accessibility.

Research training involves the organized learning experiences offered to students to equip them with relevant knowledge and skills for effective conduct of research. Such training may include; coursework on research methods, research seminars, workshops, conferences, peer review training, and statistical software training. "Strong research training environments are essential to developing students' sense of confidence in acquiring and using research and statistical-based skills. It also provides students with 'real world' understandings of how to use research and statistics skills, and they foster the critical thinking processes students will need within their chosen professional careers" (Burke, 2018, p.1). "Poor attitude of students towards research work may be linked to deficiency in students' research skills, which is traceable to the quality of research training the students receive" (Olibie, Agu, &Uzochina, 2015, p.157). Similarly, Ibrahim, Fetyani and Bashwari (2013) carried out a study to determine knowledge, attitude and practice of medical students and interns towards research, to identify factors affecting research knowledge and to improve research knowledge among a group of new graduates through a research methodology educational intervention course. The study revealed that study participants who received research training and conducted researches had significantly higher knowledge score compared to others, in addition to positive research attitude. Low knowledge, positive attitudes and fair practice prevailed from the cross-sectional part.

Apart from research training, researchers need ready access to a wide range of data that can promote the smooth conduct of their research. According to the Research Information network (2008) a successful research and innovation system is largely dependent on open exchange of ideas, information and knowledge. Similarly, the American Statistical Association (2008) observes that access to high quality data is not only essential to advancing science but also indispensable in improving the human conditions. Accordingly, robust new sources of data on human behavior allow researchers to ask and answer complex questions and hence guide policy decisions, and sophisticated electronic technologies have facilitated ready access of these data to the public.

Further emphasis of the important of research data accessibility to research progress was made by Varnai, Rentel, Simmonds, Sharp,

Mostert and deJongh (2014) who observed that enhanced access to data not only allows for more transparency in research, but can also drive generation of knowledge, allowing researchers to tackle new research questions, reduce duplication and optimize the design of trials, or increase the efficiency of the research process by linking data from multiple trials.

Umoru (2013) explored the impediments to the quality of business education research in Nigeria tertiary institutions. Business educators from Colleges of Education, Polytechnics and Universities in Nigeria were involved in the study, and revealed among other things that lack of access to quality journals and libraries constituted serious impediments to the research in Nigeria tertiary institutions. The study recommended that researchers in the field should ensure that only quality information is used in the research process so that research results would significantly influence changes in the desired directions. In line with this, Desmennu and Owoaje (2018) assessed the challenges of research conduct among postgraduate research students in an African University. The study concluded that research students at the University faced numerous barriers, and these hamper their ability to successfully conduct research. The study recommended that appropriate courses and training workshops should be organized to address the identified barriers. Also, financial and infrastructural support should be provided for postgraduate research.

Under-funding is a major problem confronting the universities in Nigeria and in most of the countries in Africa. For instance, the Nigerian government is gradually failing in its duties to provide finances to the Universities, due to dwindling national financial resources. As a way forward, the government has mandated each of the federal universities to internally source for 10% of its annual funds. Ebadi and Schiffauerova (2016) analyzed the impact of several influencing factors on scientific production of researchers, and confirm a positive impact of funding on the quantity and quality of the publications. A similar study by Okoduwa, Abe, Samuel, Chris, Oladimeji, Idowu and Okoduwa (2018) on attitudes, perceptions and barriers to research and publishing among academic staff in Nigerian institute of leather and science technology, (NILEST) Zaria, recommended that provision of research grants/funds (92.62%), internet facilities (95.10%), appropriate mentorship (34.43%) and mandatory publication (26.23%) were the way

forward for enhancement of good research attitude by Nigerian students.

The problem of this study hinges in the fact that observation has shown that a good number of students appear to be negligent in their research practice, as most of them who lack the right research attitude turn out to be nervous, intimidated, indolent and reluctant to devote valuable time, energy and resources in the collection and study of a variety of evidence to reach conclusions about the phenomenon. This negative research attitude which often culminates in the abuse of research which is currently generating serious concern raises critical questions about the credibility and competence of the academia in discharging her core duty as an enterprise for raising human resources for dependable knowledge creation and dissemination.

Furthermore, the paucity of empirical studies on postgraduate research attitude in calls for urgent concern. Past efforts by scholars identified lack of a research culture, outdated technologies, time constraints, pressures to publish, poor oversight of researchers, among others, as the associated factors. These present researchers felt a strong need to attempt to provide an answer to the question: "What is the most significant and meaningful causal model for the effects of environmental variables on research attitude of education graduate students across Federal Universities in South-South, Nigeria? This attempt was made using path analytic technique.

## METHODOLOGY

This research article was the result of a pilot study to a dissertation. The design adopted for the study was survey justified by the fact that the researchers studied a fragment of the population and generalized the findings on the entire population. The study area was South-South, Nigeria which is one of the geopolitical zones of Nigeria. The zone is made up of six states, namely; Akwalbom, Bayelsa, Cross River, Delta, Edo and Rivers. These states are popularly known as the 'Niger Delta States.' There are six Federal Universities in this zone, namely; University of Calabar in Cross River State, University of Uyo in Akwalbom State, University of Port-Harcourt in Rivers State, University of Benin in Edo State, Federal University, Otuoke in Bayelsa State and Federal University of Petroleum Resources Effurun in Delta State. The

zone is richly endowed with crude oil in commercial quantity. Hence, the states under this zone are referred to as the oil producing states. Apart from oil, the people of the area are involved in farming, fishing, trading and civil service. A good number of them are educated up to university level.

The population of the study comprised all the postgraduate students in Faculties of Education (Master's and Doctorate degrees) for the 2017/2018 session in federal Universities in South-South, Nigeria. This is made up of 1,299 students (Information received from Faculty Officers of the Universities). This is excluding students of the National Open University of Nigeria (NOUN). The Federal University Otuoke and Federal University of Petroleum Resources Effurun, Delta State, had no postgraduate students at the time of this research.

The proportionate stratified random sampling technique was adopted in selecting a sample of 520 for the study. First, the proportionate stratified random sampling technique was adopted to select 40 percent of the total population of the study. The stratification, which was on based on universities gave rise to four strata, with the University of Benin as stratum one, University of Calabar as stratum two, University of Port Harcourt as stratum three and University of Uyo as stratum four. From each stratum students for the study were selected through simple random method.

The instrument for the study was a close-ended questionnaire titled 'Research Environment and attitude Variables Questionnaire' (REAQ) on a 2-point scale of 'Yes' or 'No' was used for data collection. To determine the reliability of the instrument, a trial test involving 50 respondents was conducted by the researcher. These respondents were graduate students conducting research in the Cross River University of Technology (CRUTECH). The Kuder-Richardson 20 (K-R20) *reliability* method was used to analyze the binary data obtained from the questionnaires administered. The *reliability coefficients* for the sub-scales ranged between 0.70 and 0.84. Two research assistants were trained to assist in the distribution and collection of the questionnaire. After due consultation with appropriate authorities at each location, and permission obtained to conduct the research in their institutions the questionnaires were administered to the students and retrieved after

the responses were duly made. Data from retrieved questionnaires were coded accordingly and subjected to analysis.

**THE RESEARCH QUESTION**

What is the most significant and meaningful causal model for the effects of environmental variables on research attitude of education graduate students across Federal Universities in South-South, Nigeria?

**THE HYPOTHESIZED MODEL USING REGRESSION ANALYSIS**

The prediction of the graduate students' research attitude using the selected environmental variables were carried out using the Statistical Package for Social Sciences (SPSS) version 23 for multiple regression statistics. The general form of the multiple regression equation was as shown below:

$$Y = a_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5$$

Where:

- Y = Research attitude (dependent variable)
- a<sub>0</sub> = constant
- X<sub>1</sub>-----X<sub>5</sub> = environmental factors (independent variable)
- β<sub>1</sub>-----β<sub>8</sub> = standardized multiple regression coefficients (beta weights)

- X<sub>1</sub> = Research infrastructures (RI)
- X<sub>2</sub> = Research training (RT)
- X<sub>3</sub> = Research data accessibility (RDA)
- X<sub>4</sub> = Research funding (RF)
- X<sub>5</sub> = Research publications accessibility (RPA)
- X<sub>6</sub> = Research attitude (RA)

Based on the regression equation the following hypothesized path diagram was constructed to guide the construction of the most meaningful causal model:

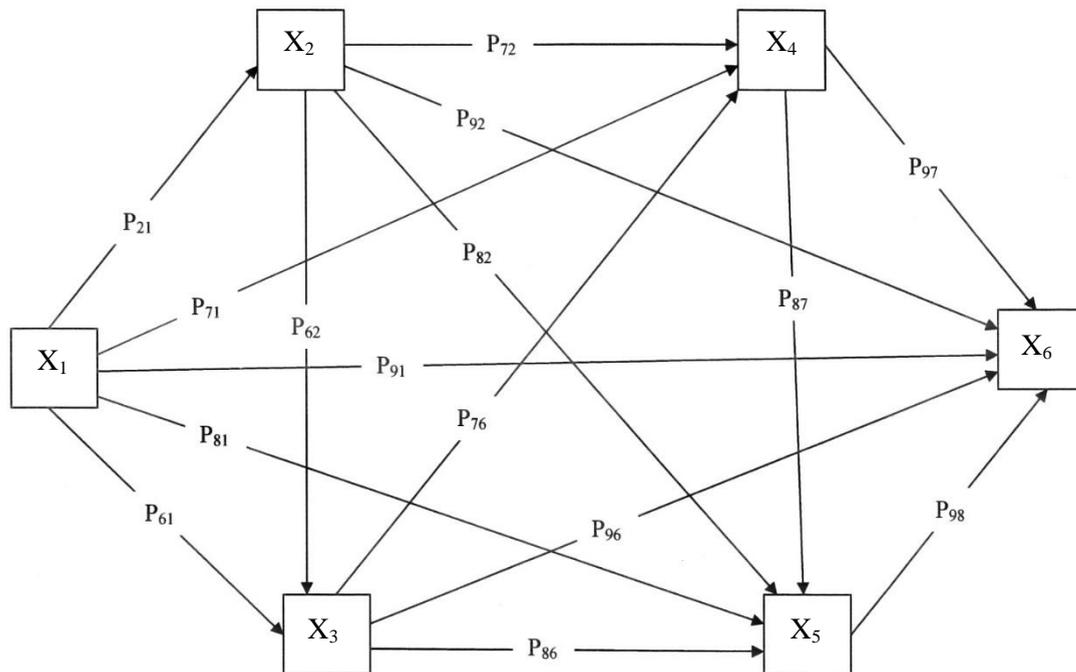


FIG1: Casual flow showing relationship between X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, X<sub>4</sub>, X<sub>5</sub> and X<sub>6</sub>

## RESULTS

What is the most significant, meaningful causal model for the effects of environmental variables on research attitude of education graduate students across Federal Universities in South-South, Nigeria? To answer this research

question, the data collected were analysed to obtain the original correlation coefficients of the study variables and the path coefficients for each hypothesized pathway in the hypothesized model. The result is presented in Table 1 and Figure 2.

Table 1: Summary of the result of the most significant and meaningful causal model for the effects of the environmental variables on research attitude of education graduate students of federal universities in South-South, Nigeria

Path	Path coefficient	Directions	p-value
P <sub>21</sub>	.286**	Indirect	.000
P <sub>31</sub>	.219**	Indirect	.000
P <sub>32</sub>	.254**	Indirect	.000
P <sub>41</sub>	.069*	Indirect	.120
P <sub>42</sub>	.287**	Indirect	.000
P <sub>51</sub>	.193**	Indirect	.000
P <sub>52</sub>	.218**	Indirect	.000
P <sub>53</sub>	.117**	Indirect	.007
P <sub>54</sub>	.094**	Indirect	.027
P <sub>61</sub>	.171**	Direct	.000
P <sub>62</sub>	.285**	Direct	.000
P <sub>63</sub>	.090**	Direct	.017
P <sub>64</sub>	.200**	Direct	.000
P <sub>65</sub>	.222**	Direct	.000

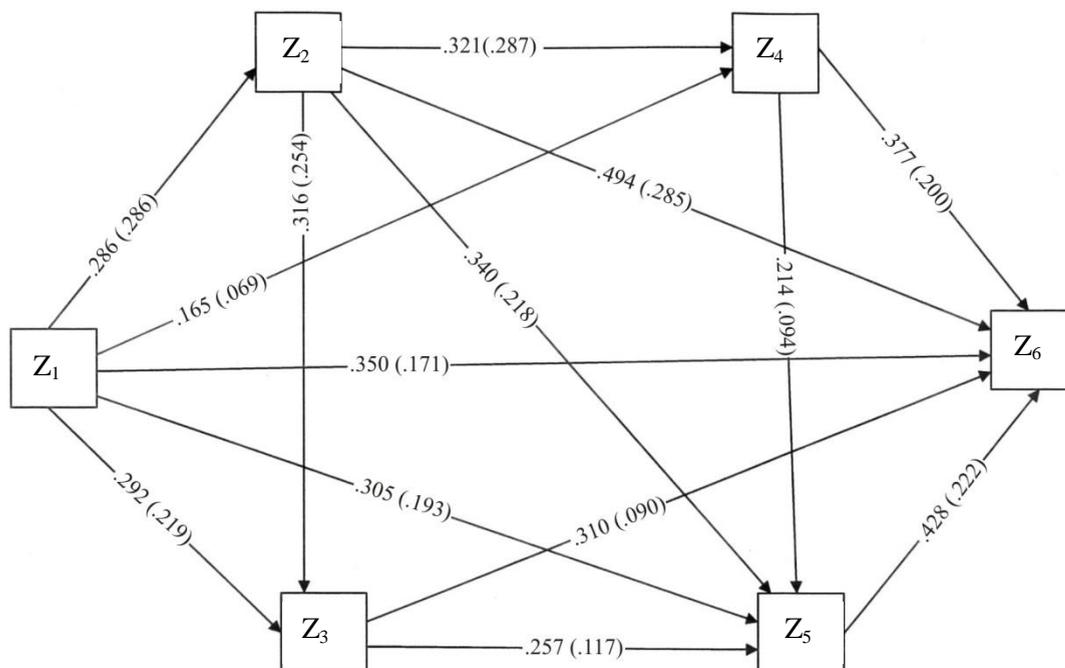


Figure 2: Parsimonious model for the effects of the environmental variables on research attitude of education graduate students across federal universities in South-South, Nigeria.

Where:

$Z_1$  = Research infrastructures (RI)

$Z_2$  = Research training (RT)

$Z_3$  = Research data accessibility (RDA)

$Z_4$  = Research funding (RF)

$Z_5$  = Research publications accessibility (RPA)

$Z_6$  = Research attitude (RA)

Results presented in Table 1 which was also illustrated in Figure 2 indicate that out of the 15 pathways in the hypothesized model, 14 paths met the criteria for significance and meaningfulness. Any path with a p-level less than .05 is said to be statistically significant while any path whose beta weight is .05 and above was considered strong enough to be retained as meaningful path way. Figure 2 shows the parsimonious model involving the 14 surviving paths for the effects of the environmental variables on research attitude of education graduate students. This shows that after trimming using significance and meaningfulness of the paths, 14 out of the 15 hypothesized paths were retained. The numbers on each pathway indicates the original correlation coefficients and the beta weight ( $\beta$ ) in brackets. It was also indicated that out of the 14 remaining pathways, five pathways were direct while nine were indirect. A direct path to research attitude (RA) was found to exist from each of research infrastructures (RI), research training (RT), research data accessibility (RDA), research funding (RF), and research publications accessibility (RPA), respectively. This implies that these variables have direct effect on research attitude (RA). On the other hand, indirect paths to research attitude (RA) was found to exist from research infrastructures (RI) through research training (RT), research infrastructures (RI) through research data accessibility (RDA), research training (RT) through research data accessibility (RDA), research infrastructures (RI) through research funding (RF), research training (RT) through research funding (RF), research infrastructures (RI) through research publications accessibility (RPA), research training (RT) through research publications accessibility (RPA), research data accessibility (RDA) through research publications accessibility (RPA), research funding (RF) through research publications accessibility (RPA), respectively. This implies that these variables have indirect effect on research attitude (RA). For instance, indirect paths to research attitude (RA) from research infrastructures (RI) through research training (RT)

indicate that research infrastructures (RI) influence research training (RT) which in turns influence research attitude (RA).

## DISCUSSION

The finding from the test of hypothesis one revealed that there are significant composite and relative predictive effects of the environmental variables (research training, research infrastructures, research data accessibility, research funding and research publications accessibility) on research attitude of education graduate students. The implication of this result is that an improvement in the environmental variables will bring about a corresponding improvement in the research attitude of education graduate students across federal universities in South-South, Nigeria, and vice versa. In terms of magnitude of the prediction of the environmental variables in the model, research training had the greatest predictive effect on graduate students' research attitude, followed by research publications accessibility, research funding, research infrastructures and research data accessibility, respectively. With regards to the nature or direction of the paths, the parsimonious causal model showed that the environmental variables directly and indirectly affect research attitude. A direct path to research attitude (RA) exist from each research infrastructure (RI), research training (RT), research data accessibility (RDA), research funding (RF), and research publications accessibility (RPA). This implies that these variables have direct effect on research attitude (RA). The finding of this study is in line with the finding of Okendo (2018) who conducted a study of resource constraints, institutional constraints, cultural constraints that influence research productivity in Mwenge Catholic University, Tanzania, and concluded that resource constraints, institutional constrains and cultural constraints have a considerable influence on the research productivity.

This is also in consonance with the finding of Almansour (2016) who examined the factors that account for the "falling standards in scientific research in Arab universities Sana" and the lack

of global recognition of the universities in the study area, and reported that research infrastructures directly and indirectly influenced research practice, as lack of research infrastructure and absence of conducive training environment and resources were found to be the prime causes of the problem. Besides, the finding of this study is also in agreement with the finding of Umoru (2013) who explored the impediments to the quality of business education research in Nigeria tertiary institutions, and found that lack of new technologies as well as limited access to libraries negatively affected research outcome in the institutions.

Secondly, the parsimonious causal model indicated that a significant direct and indirect pathway to research attitude (RA) exist from research training (RT). This implies that research training (RT) directly and indirectly affect research attitude (RA). The direct effect of research training (RT) on research attitude (RA) may be ascribed to the fact students who are adequately equipped with the requisite experiential research knowledge and skills through conscientious research training are better disposed to applying these competencies in solving problems in practical research situations. On the other hand, the indirect effect of research training (RT) on research attitude (RA) existed through research data accessibility (RDA) and research publications accessibility (RPA). It is true that availability of the supportive structures and framework that promote effective research training guarantees easy and ready research data and publications accessibility by the students. The finding of the study supports the finding by Ibrahim, Fetyani and Bashwari (2013) who carried out a study to determine knowledge, attitude and practice of medical students and interns towards research, and concluded that study participants who received research training and conducted researches had significantly higher knowledge score and positive research attitude, compared to others who did not receive research training. The finding of this study also corroborates the finding by Manongsong and Panopio (2018) that examined the competencies and attitude towards research engagement of the faculty members of College of Dentistry, and found that their attitude towards research was positive due to research being a part of their job requirement.

Thirdly, the parsimonious causal model indicated that a significant direct and indirect path to research attitude (RA) exist from research data accessibility (RDA). The direct effect of research

data accessibility (RDA) on research attitude (RA) may be due to the fact that students and researchers who gain ready access to the data they require for their study face minimal distractions, spend little or none of their time worrying about uncertainties that could make them resort to illicit research practices in a bid to completing their studies in record time. The indirect pathway to research attitude (RA) from research data accessibility (RDA) through research publications accessibility (RPA) is well expected. A good number of students and researchers will embrace research practice with enthusiasm and optimism if they can easily access the research data and publications that are required for effective conduct of their research. The finding of this study is parallel to the finding by Varnai, Rentel, Simmonds, Sharp, Mostert and deJongh (2014) who assessed the research potential of access to clinical trial data, and reported that access to the data of the research participants greatly influence the direction and practice of research as limited access to data constitute a severe barrier to sincere research practice. The finding of this study is also similar to the finding of Oware (2010) who studied "graduate students' views and experiences of information literacy of students of Digital Library Learning (DILL) of the European Union Erasmus Mundus Master's programmes of Oslo University College (Norway), Tallinn University (Estonia), and the University of Parma (Italy)", and concluded that increasing the accessibility to data to researchers eliminates difficulties and motivates them to deal fairly with the information they consider useful for their researches.

Fourthly, the parsimonious causal model indicated that a significant direct and indirect path to research attitude (RA) exist from research funding (RF). This implies that research funding (RF) directly and indirectly influence research attitude (RA). This direct effect of research funding (RF) on research attitude (RA) may be due to the fact that if adequate funds are made available for researchers, this motivates them to go extra miles to carry out intensive researches that honestly and accurately unravel the truths surrounding the research problem under consideration. Today, most postgraduate students hardly have dependable means of income. Hence, as they experience hardship in funding their research work from personal sources, a number of them may resort to practices that represent negative research attitude. This finding is in line with the finding of

Ebadi and Schiffauerova (2016) who analyzed the impact of several influencing factors on scientific production of researchers, and reported that adequate research funding positively impacts research outcome as the researchers with industrial affiliation were more positively disposed in the research process and recorded higher quality of research work, while their counterparts who were academic researchers only produced higher quantity of papers.

The indirect influence of research funding (RF) on research attitude (RA) which was found to exist through research publications accessibility (RPA) is understandable. Adequate funding of research by the government and relevant agencies promotes the acquisition and installation of cutting-edge infrastructures that facilitates easy and ready access to research publications in information databases at bearable time frames and costs. This in turn makes the conduct of the research exciting and promotes positive attitude towards research. This finding is in support of the finding of Desmennu and Owoaje (2018) who assessed the “challenges of research conduct among postgraduate research students in an African University”, and found that lack of research funding, irregular power (electricity) supply, and lack of ready access to research materials were serious barriers to postgraduates research, and hampered their ability to conduct their research effectively. This finding also correspond with the finding of Almansour (2016) who examined the factors that account for the falling standards in scientific research and the lack of global recognition of the Arab universities Sana, reported that lack of research funding, research infrastructure, and access to research resources or material were the prime causes of the problem.

Fifthly, the parsimonious causal model indicated that a significant direct path to research attitude (RA) exist from research publications accessibility (RPA). This implies that research publications accessibility (RPA) directly influences research attitude (RA). This direct effect of research publications accessibility (RPA) on research attitude (RA) is crystal clear. Students and researchers who have ready access to quality research publications find it easier to identify gaps in extant literature, avoid needless duplication of efforts, integrate good quality information and research findings in their study, draw meaningful conclusions that are traceable to credible sources and therefore accepted as valid. This finding affirms the finding of Umoru (2013) who explored the impediments

to the quality of business education research in Nigeria tertiary institutions, and found that lack of access to quality research journals articles and libraries compelled researchers to use poor quality information in the research process, and this negative attitude lead to a fall in the research quality in the institutions. This finding also upholds the finding of Burke (2010) who examined research productivity, visibility, accessibility and scholarly communication in Southern African Universities, and concluded that poor research accessibility across the institutions directly limits the flow of knowledge and novel ideas across the scientific community and culminate in low research impact, which make researchers poorly disposed to research activities.

## CONCLUSION AND RECOMMENDATIONS

This study involved the determination of a causalmodel for the prediction of research attitude among education graduate students by environmental factors in Federal Universities in South-South, Nigeria. The study concludes that environmental variables (research training, research infrastructures, research data accessibility, research funding and research publications accessibility directly and indirectly affect research attitude of students in the area. An improvement in the environmental factors will likely bring about a corresponding improvement in research attitude, and vice versa. Based on this, improvement in the quality of the environmental factors incorporated in this study is recommended. Relevant authorities and stakeholders should make conscious effort to improve the quality of those factors since the variables directly and indirectly affect research attitude of the students.

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