Research Methodological Techniques as a Model for Quantitative Studies in Social Sciences

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Author's contribution

This whole work was carried out by the author AJB.

ABSTRACT

This paper attempts to present methodological techniques used in the study of the mediating role of psychological ownership on the relationship between servant leadership and organizational citizenship behaviors. Several relevant research methodology issues to help shed light on required research methods for major research such as Doctor of Philosophy (PhD) have been highlighted in this paper. Specifically, this paper discussed reasons behind adoption of certain methodological techniques including positivist philosophical orientation, descriptive and explanatory research designs that were employed in reviewed study. In addition, the paper quantitatively demonstrated how the sample for the affected study was derived using some important tools. The paper also discussed questionnaire design and distribution strategy, pilot study, measurement scales, and the use of Partial Least Squares method (PLS) in the analysis of data for the affected study. The paper highlighted the methodological implication of the use of Partial Least Squares Method (PLS) in the study of the relationships between servant leader behaviors, psychological ownership and organizational citizenship behaviors.

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1. INTRODUCTION

One of the important areas of concern among organizational theorists and practitioners is organizational citizenship behavior (OCB). Organizational citizenship behavior is a good mechanism for achieving organizational effectiveness [1]. Organizational citizenship behaviors (OCBs) are behaviors that are not mandatory on the employees to carry out, but are helpful to the organization's effectiveness and goal attainment [1]. In his words, [1,4] defines organizational citizenship behavior (OCB) as "behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate promotes the efficient functioning of the organization". Increasing number of research on OCB signifies the importance of the variable for the success of organizations. Organizational citizenship behaviors are usually performed by employees to support the interests of the organization even though they may not directly lead to employee benefits [2]. However, [1] acknowledges that OCB could have a beneficial cumulative effect for an individual employee and that the employee might be considering the long-term benefits.

Employee OCB benefits organizations directly or indirectly. Direct organizational benefits include volunteerism, assistance between co-workers, and unusual employee attendance to an important meeting, employee's punctuality and active participation in organizational affairs [3]. Indirect benefits, as [4] stressed, include lubricating the social machinery of the organization. Also [5] considered such discretionary behavior essential for strong organizational social systems. He posited that the organization gains a measure of systemic resiliency from the small, spontaneous acts of selfless sensitivity, cooperation and uncompensated contribution.

Servant leadership is a leadership style where a leader places interests of followers' over and above his/her own interests [6]. Servant leadership is motivating to followers/subordinates because it focuses on followers' development, community building, authentic leadership, and shared leadership [7,8]. The best indicator of servant leadership is that followers are more likely to become servants themselves. On the other hand, psychological ownership for the organization is a state of mind in which an employee develops possessive feelings for the organization [9]. Psychological ownership for the organization is found to be significantly related to positive employee outcomes especially organizational citizenship behaviors [10,11].

Performance of organizational citizenship behaviors by employees can be an important panacea for improving performance and effectiveness in the Nigeria's ailing public utility sector organizations. Literature has offered support to the role of OCB in improving effective functioning of organizations [1,12]. Research has also indicated that OCB and counterproductive work behaviors are significantly negatively correlated [13], suggesting that a person high on OCB scale will not likely exhibit signs of deviant behavior that can have negative effect on production, service delivery and industrial harmony. The ailing or rather ineffective Nigerian public utility sector organizations, specifically Power Holding Company of Nigeria (PHCN), Telecommunications Company Limited (NITEL) and Water Board (KSWB) are expected to improve OCB performance when their organizations practice the concept of servant leadership and motivate development of psychological ownership among their employees.

A PhD study was recently conducted on the impact of servant leadership on employee OCBs through the mechanism of psychological ownership. The study established that servant leadership and psychological ownership among employees have been identified as

important panacea for improving employee OCB, which may ultimately affect performance and effectiveness of the Nigeria's ailing public utility sector organizations, particularly Power Holding Company of Nigeria (PHCN), Telecommunications Company (NITEL) and Kano State Water Board (KSWB). Literature has offered support to the role of OCB in improving effective functioning of organizations [1,12]. Research has also indicated that OCB and counterproductive work behaviors are significantly negatively correlated [13], suggesting that a person high on OCB scale will not likely exhibit signs of deviant behavior that can have negative effect on production, service delivery and industrial harmony. The ailing or rather ineffective public utility sector organizations, specifically the Power Holding Company of Nigeria (PHCN), Telecommunications Company (NITEL) and Water Board (KSWB) are expected to improve their OCB performance when their organizations practice the concept of servant leadership and motivate development of psychological ownership among their employees.

Knowledge is fundamental to the establishment and ongoing vitality of any research program including the PhD. The mastering of research methodology aspect of a research program such as PhD and its practical application in PhD thesis is an essential element of success in its completion and meaningful contribution to the body of knowledge. The study being reported has used relatively newer, more efficient and effective methodological techniques including the PLS SEM and power analysis. Disseminating how these techniques and other related techniques were used in a research study is a worthwhile exercise because the knowledge could help future researchers to consider applying them in their various studies. However, this piece of writing could provide researchers the necessary training in treating research methodology aspects of their studies. Against this background, this paper is aimed at describing the methodologies adopted in a study conducted to find if there is significant relationship among servant leadership, psychological ownership and organizational citizenship behavior variables. The paper is organized into three sections. First section presents general introduction of the research topic. Second section presents methodological aspects used in the study being reported, and finally conclusion of the paper is presented in section three.

2. METHODOLOGY PERSPECTIVES

This section attempts to highlight all the methodological aspects used in the empirical study of the Nigerian utility organizations about relationships among servant leadership, psychological ownership, and organizational citizenship behaviors. Specifically, this section discusses the research philosophy, research approach, research design, and research strategy used for the study under consideration. The aim of this study is to provide methodological insight on how servant leadership, psychological ownership affect organizational citizenship behaviors.

2.1 Nature and Philosophy of the Study

Generally, researchers have their specific worldviews about the nature of particular social reality, or knowledge based on their own philosophical paradigm, thus, linking research and philosophical orientation helps to clarify a researcher's theoretical frameworks [14].

A research philosophy is defined as a belief about the method in which data about a particular phenomenon should be gathered, analyzed and used [15]. According to the Western tradition of science, two major research philosophies exist, namely positivist and

interpretivist [16]. Positivism, objectivism or realism advocates that research is expected to uncover an existing reality or truth in the social environment [15]. Additionally, positivist paradigm suggests that social phenomenon is to be treated as an entity, in as much as possible, same ways that natural scientists treat physical phenomenon [15]. This suggests that the researcher is expected to be independent of the research and thus, employ techniques that maximize objectivity and minimize the influence of the researcher in the research process.

As summarized by [15] and argued by different scholars [17,18], the positivists are of the view that: (1) empirical facts exist independently from personal views, ideas or emotions. The empirical facts are collected in a value free manner; (2) the analysis of social reality is statistical in nature; (3) empirical facts are governed by laws of cause and effect; (4) the adopted methodology is highly structured and, thus, allows for replication, whether by the same researcher, or others; (5) the social reality patterns are stable and, therefore, knowledge is additive. In simpler way, positivism believes that research can be conducted by using well developed hypotheses, which are derived from the literature or existing theory, and are tested and requiring large number of sample selected randomly [19,20], thus positivism focuses on quantifiable observation of phenomenon as well as generalizing about the phenomenon through statistical analysis.

On the contrary, interpretivists argue that it is only through the subjective interpretation of and intervention in reality by individuals can that reality be fully understood [15]. The central issue to the interpretivist philosophy is the study of phenomena in their natural environment, and the recognizing that researchers cannot avoid affecting those phenomena they study. Interpretivist philosophy further argues that there may be many interpretations of reality but that the interpretations are in themselves aspects of the scientific knowledge they are pursuing [15].

Because the purpose of the concerned study of which this paper reports was to develop hypotheses to investigate the impact of servant leadership and psychological ownership on OCBs, the underpinning philosophy for the study was positivism and the adopted approach was quantitative. Quantitative research is defined as a type of research in which phenomena are explained by collecting and analyzing numerical data using statistically based methods [15]. This study is consistent with requirements for quantitative research in which social reality is objectively determined using rigid guides in the process of data collection and analysis [15].

2.2 Research Approach of the Study

This section discusses the choice of research approach. Depending on the type of research philosophy, two types of research approaches exist, that is inductive and deductive. In the case of inductive approach, theory is based on specific observations of phenomenon or data findings, suggesting that a researcher is building theory [21,22]. In inductive approach, conclusion is drawn from particularistic observation of facts and the facts support the conclusion [23,24]. Conversely, deductive approach is a logical process of deriving a conclusion from logical generalization of known facts [25]. Therefore, deductive approach is development of a theory and hypotheses, as well as designing research strategy to test and validate those hypotheses [20]. Typically, unlike inductive approach, deductive approach moves from the general to the specific [26]. Thus, regarding to the reported study by this paper that investigated the impact of servant leadership, psychological ownership on employees' organizational citizenship behaviors, the deductive approach was applied. A

substantial body of knowledge in the area of servant leadership, psychological ownership, and organizational citizenship behaviors already exists. Additionally, the basis for the development of a theoretical framework and hypotheses were provided by the extant literature, thus making the deductive approach possible in the reported study.

Furthermore, the reported study may be considered as "theory testing" because it was based on pre-understanding of issues from the related theories and conceptual frameworks. The study used original field data regarding to the investigated variables including servant leadership, psychological ownership, and OCB to help illustrate and explain the mechanisms by which servant leader behaviors influence OCB. To achieve that the researcher used a random sample of 325 low and middle level employees of three key utility organizations in Nigeria – Power Holding Company of Nigeria (PHCN), Nigeria Telecommunications Limited (NITEL) and Kano State Water Board (KSWB) to test the validity and generalization of theories and some formulated hypotheses. The social exchange theory [27] and social learning theory [28] used in the theoretical framework of the study being reported were used in comparisons and general discussions of findings of the study.

2.3 Research Design

Research in social science can be categorized into three types of design including exploratory research, descriptive research and explanatory (causal) research [20,26]. An exploratory study is one aimed at gaining familiarity with the phenomenon under investigation before developing a suitable model and setting up a rigorous design for detailed investigation [25]. Exploratory research is supposed to be a first step of research conducted to gain preliminary knowledge with the expectation that future studies would be conducted to gain more and better conclusive evidence [24]. Different methods including literature review, discussing with experts, or focus group and case study could be used in conducting exploratory research.

Descriptive research is purposely employed to provide descriptions of phenomena, characteristics or estimates of population [23]. Descriptive research is structured and specifically designed to measure the characteristics described in research question [29]. Moreover, [20] argued that descriptive study should be guided by initial hypotheses, and that it may be an extension of exploratory research. Explanatory research, on the other hand is concerned with determining cause-and-effect relationships among variables [24]. It advances beyond mere description to a more powerful status of seeking to explain the patterns and trends associated with observed phenomena [30]. This type of design could be conducted through survey research, field and laboratory experiments.

Generally, the three research designs are not mutually exclusive; therefore, researchers could combine one design with another. In the present affected study, which attempted to investigate the relationship of servant leadership and OCB through the mechanism of psychological ownership, descriptive as well as explanatory designs were used. Descriptive analysis is often used to describe phenomena of interest [31]. Thus, in the reported study, descriptive analysis was applied mainly to describe the characteristics of the sample and all the constructs used in this study. Results from the tested hypotheses were analyzed and relationships described appropriately. Similarly, with the help of theory and existing frameworks, the study being reported has employed the explanatory design by way of discussing why the trends and patterns of the relationships happened.

2.4 Population of the Study

Population of the study refers to the entire group of people, events or things of interest that the researcher wishes to investigate [31]. The authors further stated that population of the study is the group of people, events or things of interest for which a researcher wants to make inferences based on a derived sample.

The study being reported focused on three important utility sector organizations. They are Power Holding Company of Nigeria (PHCN), Nigeria Telecommunications Limited (NITEL), and Kano State Water Board (KSWB) in Kano State north-western part of Nigeria. The Kano State of the North-west part of Nigeria was selected for this study because it is the most populated geo-political zone with estimated population of 10 million out of the total estimated Nigerian population of 140 million [32]. Hence, Kano State represents an important Nigeria's zone for efficient operation and sustainability of the three utility organizations under study. The State depends largely on the efficient functioning of the three utility organizations. Additionally, the State is very important for the three utility organizations in terms of their revenue generation and strategic planning. The three utility organizations have a total population of 1,169 employees dispersed in different stations and units across the 5 major local government areas of Kano. The population consists of all the employees of the three utility organizations under study. Specifically, the population comprises of 529 employees from PHCN PLC, 140 from NITEL PLC and 500 from Kano State Water Board.

Because the study being reported assessed the influence of supervisors/managers' servant leadership behaviors on their subordinates' OCB through psychological ownership for the organisation, the unit of analysis for this study was naturally individual employee. Therefore, middle and lower level employees were considered appropriate as the unit of analysis.

2.5 Sampling Design: Sample Size and Power Analysis

A sample is a set of individuals or participants selected from a larger population for the purpose of a survey [33]. An optimal sample is important for minimizing the cost of sampling error, thus indicating the need for selecting an appropriate sample size. Specifically, [34] emphasized that an appropriate sample size is necessary for any research because too small sample size is not a good representative of the population. Too small sample size may lead to committing Type I error, which is the probability of wrongly rejecting a particular finding when it in fact to be accepted [25]. Furthermore, [25] argued that too large sample size is not appropriate because of possible problem of type II error, which is accepting a particular finding when it is supposed to be rejected.

The [30] have pointed the importance of determining an absolute sample size that is independent of the study population, thus indicating the need for method of determining a sample size such as statistical power test. Specifically, [35] stressed that sample size should be determined using a suitable power of statistical test. Therefore, in deciding about sample size for the study being reported, power of a test becomes a viable option. The power of a statistical test is defined as the probability of rejecting a null hypothesis or rejecting a specific effect size of a particular sample size at a particular alpha level [36]. The test has the capacity to detect a difference if it truly exists in the wider population. In addition, even if sample size to be used in a particular study has been determined through other methods, it is still appropriate and worthy to use power analysis so that the probability of detecting the effects of different sample sizes is explicitly known [37].

Using the G*Power 3.1 software, sample size is computed as a function of user-specified values for the to-be detected population effect size (f^2), required significance level (α), the desired statistical power (1-β) and total number of predictors in the research model [38]. Hence, to determine the sample size for this study, an a priori power analysis was conducted using the software package G*Power 3.1 [38]. Six predictor variable equations were used for determining the sample size for this study. Moreover, consistent with [35] recommendations, the following standards were used in calculating the sample size used for this study: effect size ($f^2 = 0.15$); significance alpha level (α= 0.05); desired statistical power (1-β = 0.95) and total number of 6 predictors (EH, CVC, CS, HSGS, PSF and PO).

As shown in Figs. 1 and 2 results of the statistical test revealed that for a multiple regression based statistical analysis, a sample size of 146 is appropriate for this study. The results also revealed the statistical power for detecting effect sizes for this study was determined at a recommended value of 0 .95 [35].
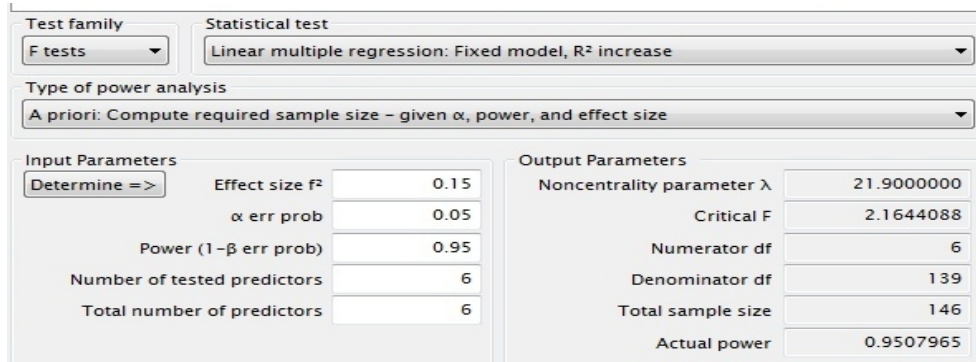
Test family	Statistical test		
F tests	Linear multiple regression: Fixed model, R² increase		

Type of power analysis

A priori: Compute required sample size – given α, power, and effect size

Input Parameters		Output Parameters	
Determine => Effect size f²	0.15	Noncentrality parameter λ	21.9000000
α err prob	0.05	Critical F	2.1644088
Power (1–β err prob)	0.95	Numerator df	6
Number of tested predictors	6	Denominator df	139
Total number of predictors	6	Total sample size	146
		Actual power	0.9507965

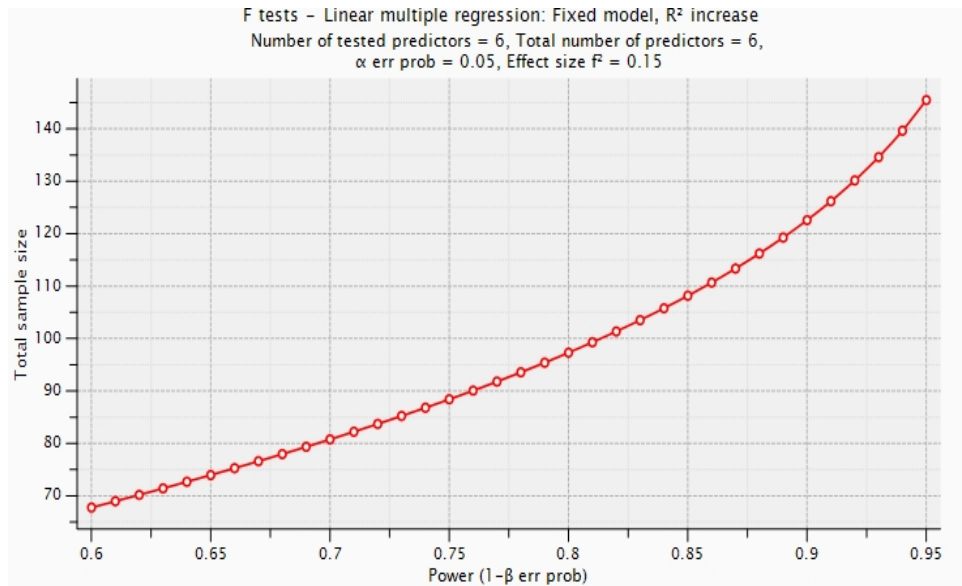**Fig. 1. Power analysis for medium effect**

Fig. 2. X-Y Plot for medium effect power analysis

The determined sample size of 146 for a wider population of 1,169 is seems to be inadequate. Hence, the need to explore a different technique for sample size determination becomes important. Consequently, [39] generalized scientific guideline was used for determining the sample size for this study. As a result a total of 291 employees were indicated to be adequate for the population of 1,169 subjects.

The determined sample of this study was also appropriate going by the rule of thumb. [40] states that for most research, a sample bigger than 30 and less than 500 is appropriate. In addition, [41] state that for a multivariate research, the sample size should be several times (preferably 10 or more times) larger than the number of the research variables. In the present study, there are eight variables and the required sample should, therefore, be 80 or more. In order to avoid incorrect sample size and ensure accuracy in the process of determining a representative sample size for this study, a more rigorous method, which was suggested by [42] was used. Thus, given the population size of 1,169, the sample size was computed using the below formula:

$$n = \frac{(N)(p)(1-p)}{(N-1)(\frac{B}{C})^2 + (p)(1-p)}$$

Where n is the computed sample size needed for the desired level of precision; N is the population size; p is the proportion of population expected to choose; B is acceptable amount of sampling error, or precision; and finally C is Z statistic associated with the confidence level which is 1.96 that corresponds to the 95% level. B can be set at .1, .05, or .03, which are ± 10, 5, or 3% of the true population value, respectively. In this study, the acceptable amount of sampling error or precision is set at .05 or 5%. Confidence level of 1.96 corresponds to the 95% level.

Before collecting the data for this study, the proportion of participants who would respond "favourably" or unfavourably was not known, therefore, consistent with [42], the proportion of .05 was used instead of .03 for a more homogenous sample. Using .05 will lead to a greater sample size than using .03; however, it always provides an adequate sample size for a smaller or greater population [43].

Where N = 1,169, p = 0.5, B = 0.05, C = 1.96

$$n = \frac{(1,169)(0.5)(1-0.5)}{(1,169-1)\left(\frac{0.05}{1.96}\right)^2 + (0.5)(1-0.5)}$$

$$n = \frac{(1,169)(0.5)(0.5)}{1,168 * 0.000651 + (0.5)(0.5)}$$

$$n = \frac{292.25}{0.760 + 0.25}$$

$$n = \frac{292.25}{1.01}$$

$$n = 289.36 \simeq 290$$

Based on the results of sample size computation, this study needed 290 participants to complete the survey. As expressed in the formula, the sample was within the sample frame of +5% margin errors. As can be observed there is no significant difference between the determined sample size of 291 using the [39] scientific guideline and 290 determined using the method suggested by [42]. Because the aim is to have a larger sample size that would be more representative of the study population, the determined sample size of 291 obtained using the [39] scientific guideline has been adopted.

2.6 Estimating Expected Response Rate

For this study, 570 questionnaires instead of 291 were distributed among lower and middle level employees of the participated organizations as stated in Table 1. The oversampling is to help in making up the possible loss as a result of non-cooperative subjects and damages [34]. Additionally, the oversampling was meant to ensure that the non-response bias and non-response rate will not affect the results, for example [44,45]. Consistent with [46] argument that 50% response rate is regarded as an acceptable rate in social research surveys; this research is set out to achieve just that.

Table 1. Disproportionate stratified random sampling

Name of organizations	Population	Sample Frame	Sample size
PHCN PLC	529	460	251
NITEL PLC	140	122	72
Kano State Water Board	500	435	247
Total	**1169**	**1017**	**570**

Source: Researcher

2.7 Sampling Techniques

Probability sampling technique was used in this research. The technique provides every individual an equal opportunity/chance of being selected as the sample object [25]. One of the major benefits of this sampling technique is that there is no bias of the researcher against the choice of sample objects [47]. The technique is also regarded for high generalizability [48].

The study being reported drew samples from three various utility organizations, hence, the need for stratified random sampling. Stratified random sampling as the name implies, involves classifying sample elements into strata followed by selecting the elements from each stratum using simple random sampling procedure [25]. Stratified random sampling involves categorizing research subjects into strata and selecting from each stratum using a simple random sampling procedure [25]. Simple random sampling entails selecting a sample at random by the researcher from the sampling frame [20]. The random selection is achieved manually using random number table, or by computer, or through online number generator. Stratified random sampling can either be proportionate or disproportionate. It is proportionate when the subjects are drawn from each stratum according to a specific percentage. It is disproportionate when the subjects are drawn from each stratum without regard to any specific percentage but number of the elements contained in each stratum. This study adopted the disproportionate sampling procedure.

The utility organizations were categorized into three strata: (1) electricity represented by PHCN PLC with a sample of 460 subjects; (2) telecommunication represented by NITEL

PLC with a sample of 122 subjects; and (3) water represented by KSWB with a sample of 435 subjects. Information about the population elements, sampling frame and the actual sample (subjects) used in this study was provided in Table 1.

The lists of the population elements for the three utility organizations were obtained from the payroll offices of the respective organizations after approval was given from some top management officials. The population elements for PHCN, NITEL and KSWB were 529, 140 and 500 respectively totalling 1,169 employees. After collecting the list of the population elements, the prospective respondents (i.e., sampling frames), based on their levels or designations, were fished out and listed down in separate places. The selection of the prospective respondents from the population frame was carefully done to ensure that only the targeted individuals were selected. To confirm correctness of the selection, lists of the sampling frame were verified by some officials from the personnel and payroll units of the participated organizations. After the lists were verified, simple random sampling was used for distribution of questionnaires to the actual subjects (sample). Random numbers were generated using the computer system Specifically.

The adopted sampling technique (i.e. stratified random sampling) is the best technique for the present study because the aim of this study is to have samples drawn from the three public utility organizations, namely, PHCN, NITEL and KSWB. Stratified random sampling is appropriate for a study when a researcher is having a subdivided population that demands treating each subdivision as a stratum in order to obtain estimates of known precision [25,43]. Furthermore, disproportionate stratified random sampling was used in this study because the technique is more suitable for situations where unequal variability is expected from some strata; where a stratum or some strata appear to be too small or too large [48]. It is observable from Table 1 that unequal variability is expected from PHCN, NITEL and KSWB looking at their respective sample size of 251, 72 and 247.

2.8 Research Strategy: Design of Data Collection Technique

Selection of strategies of inquiry depends on the type of research design. Research strategy is defined as the procedure used to meet research objectives and to answer the set research questions [20]. There are different types or alternative strategies of inquiry: experimental design, non-experimental design (e.g. surveys), case study or ethnography [49]. In the study being reported, a survey strategy was used. Survey method is quicker, efficient and comparatively more accurate means of assessing information about population elements [25]. Secondly, survey is appropriate in situations where there is dearth of secondary data.

Questionnaire was used as the main data collection technique for this study. Questionnaire technique, which involves asking individuals specific behaviors, is commonly used in social science research [31]. The researcher travelled from Malaysia to Nigeria to collect data from the three key public utility sector organizations: Power Holding Company of Nigeria (PHCN), Nigeria Telecommunications Limited (NITEL) and Kano State Water Board (KSWB). Specifically, lower and middle level employees of the selected organizations were considered the unit of analysis of this study because the study focuses on how servant leader behaviours influence employee OCBs. Because of the adopted survey strategy, questionnaires were used to investigate and describe responses of the sample regarding relationships among the investigated variables.

Structured self-administered questionnaire consisting of 54 closed ended multiple choice-questions was employed for the study being reported. The instrument comprises 49

questions related to the three main constructs of the study and 5 questions related to demographic variables. All the questions were prepared in the English language. English language was a medium of communication in the instrument because it is an official language in Nigeria. The main constructs include servant leadership, psychological ownership and organizational citizenship. Two constructs (servant leadership and OCB) were multi-dimensional while psychological ownership was uni-dimensional. Accordingly, the questionnaire instrument was made up of four sections. Section 1 consisted of 5 demographic questions designed to obtain information regarding the participants' age, gender, highest level of education, years of experience and employee status. Section 2 consisted of 26 questions to measure supervisors' servant leadership qualities. Section 3 consisted of 7 questions to measure employees' psychological ownership. Finally, section 4 consisted of 14 questions to measure the employees' OCB.

The questionnaire was designed in a booklet format with graphic designed front cover page. It is argued that questionnaire format, physical arrangement of items on the pages and general appearance are important in attracting respondents and success of the study [49]. Moreover, a well designed and carefully constructed questionnaire facilitates the collation and analysis of the data collected as well as increasing the response rate [50,51]. Additionally, in order to increase the response rate, clear and brief instructional information, coherent arrangement of questionnaire items, transitional phrases and an aesthetic arrangement of questions appear to be rewarding [52].

Before setting out for data collection a letter of introduction was collected from the Othman Yeop Abdullah Graduate School of Business, Universiti Utara Malaysia. The letter requested for assistance from the participating organizations (PHCN, NITEL and KWB) regarding the conduct of this study. The letter helped greatly in facilitating the conduct of this study by building confidence and trust in the minds of human resource managers that gave permission for distribution of the questionnaires. The General Managers of the participated organizations directed some personnel managers to assist along with the researcher and two research assistants in distribution to and collection of the questionnaires from the employees.

The major problem encountered during the course of data collection was the slowness experienced in collecting back the completed questionnaires. At the beginning the perception of the researcher was that in one month the collections would come to an end because the respondents promised to return completed questionnaire within a maximum of one week. Therefore, phone calls and frequent visits to the participated organizations at least twice in a week were made up to the end of the data collection. Eventually, the distributions and collections lasted for 14 weeks.

Important to mention was the use of research assistant and incentive for quicker response. Therefore, the reported study used research assistants to help distribute questionnaires to selected sample. Follow-ups using physical contacts and telephone calls were employed to ensure timely completion and collection of distributed questionnaires. As an inducement for quick response each respondent was given a simple ordinary pen. Some theories indicate that giving an incentive to prospective respondents up front can be effective. Specifically, the norm of reciprocity states that individuals should respond positively to individuals who have helped them [53]. Similarly, cognitive dissonance theory states that an individual who receives a gift may experience dissonance if at the end could not return the favor [54]. Importantly, it has been argued that it is not worrisome for researchers to induce reciprocity by providing an incentive (i.e. gift card, pen etc.) to every potential participant regardless of

actual participation [55]. Thus, suggesting that it may be unethical if the researcher distribute gifts to only those who have guaranteed response. In the case of this study, it could be said that the gift (i.e. pen) has worked well looking at the interest and appreciation shown by the prospective respondents during the questionnaire distribution.

2.9 Time Dimension

In research time dimension is either a cross-sectional or longitudinal study. Cross-sectional study involves gathering the data for a particular study only once or at one point in time to meet the research objectives [48]. On the other hand, longitudinal study is defined as a study design, which involves collection of data at different points of time [26]. Cross-sectional survey method was chosen for the study being reported to avoid the long-time consumption that characterizes longitudinal research [31]. Moreover, because there is a time constraint in PhD study of which this paper is reporting the methodological issues involved, a cross-sectional study is considered to be more appropriate than longitudinal one. Importantly, there was no attempt to manipulate any of the research constructs.

2.10 Pilot Study

A pilot study is a small scale preliminary investigation conducted in order to evaluate feasibility, time and cost in order to predict an appropriate sample size and improve upon the study design prior to actual conduct of a full-scale study [56]. A pilot study is important because it can unveil shortcomings in the design of a proposed survey or procedure that can be addressed before time and resources are committed on large scale study [57]. The pilot study was conducted in month of November, 2011 and the process lasted for two weeks. Test of internal consistency reliability of Cronbach's alpha coefficient [31] was employed. The results demonstrated that all measures attained high reliability coefficient, ranging from .711 to .838. Research gurus consider a reliability coefficient of .60 as average reliability, and a coefficient of .70 and above as high reliability [31,58,59].

2.11 Measurement Scale and Research Variables

It may be worthy to provide analysis of the measurement scale vis-à-vis the type of research variables used in the concerned study. Scale is defined as a tool used in distinguishing individuals regarding how they are different from each other using some selected variables [48]. Four major scales have been identified and are widely used in research; they are nominal, ordinal, interval and ratio. The [48] have defined and presented each one of them individually in order of their sophistication.

First, nominal scale is defined as a measurement tool which allows researchers to categorize subjects into certain groups. For example, gender of respondents can be categorized into male and female. Second, ordinal scale, which is a scale that, in addition to categorizing subjects into certain groups, defines or rank-orders the subjects' categories in some meaningful ways. For example, a researcher may ask respondents to select by ranking the importance they place on five different characteristics of their jobs. Third is interval scale, which is defined as a scale that allows researchers to perform some statistical operations on collected data. For example, it allows researchers to measure the distance between any two points on a particular scale. Thus, interval scale not only categorize subjects into certain groups and rank-order them, but in addition, it measures the extent of the differences in the preferences among research subjects. Fourth and final is ratio scale,

which not only measures the extent or magnitude of the differences between points on a scale, it also measures to what extent are the differences. Thus, it is considered the most powerful among all the scales because it has a unique zero origin as against the arbitrary point found in the interval scale.

As exhibited in Table 2. the eight variables of the present study including emotional healing, creating value for the community, conceptual skills, putting subordinates first, helping subordinates grow and succeed, psychological ownership, OCB-I and OCB-O were measured using the interval scale. It is important to note that [48] strongly argued that in business research the interval scale has been the conventional scale used in responding to questionnaires. However, regarding the five demographic variables used in this study, with exception of age, which was measured with the ratio scale, the remaining four were measured with the nominal scale.

Table 2. Descriptive analysis of data type

Variables	Type of Scale
Emotional healing	Interval
Creating value for the community	Interval
Conceptual skills	Interval
Putting subordinates first	Interval
Helping subordinates grow and succeed	Interval
Psychological ownership	Interval
OCB-I	Interval
OCB-O	Interval
Gender	Nominal
Age	Ratio
Position of responsibility	Nominal
Experience	Nominal
Educational Qualification	Nominal

Source: The Researcher

2.12 Techniques of Data Analysis

This section illustrated the analytical instruments used in the analysis of the data collected for the reported study. The analytical instrument is to help convert data into information needed to make decisions. The data was first analyzed by using statistical software program called Statistical Package for Social Science (SPSS). Importantly, SmartPLS path modelling was used to establish measurement and structural models. Measurement model was used to explain or assess constructs' reliability and validity of the current study. Secondly, structural model was used to conduct bivariate correlation analysis and simultaneous regressions analyses to establish correlations, and relationship effects among constructs under investigation. Specifically, two major PLS SEM software applications including SmartPLS [60] and PLS-Graph [61] were used in the analysis of the mediating effects of psychological ownership (mediator) on the relationship between servant leadership, organizational citizenship behaviors (OCBs).

PLS SEM technique is called a second generation structural equation modeling [62]. The relatively new technique works well with structural equation models that contain latent variables and a series of cause-and-effect relationships [63]. The PLS SEM approach is a good and flexible tool for statistical model building as well as prediction [64]. Specifically, the PLS technique was used for this study because of the following reasons. Firstly, structural equations models have been demonstrated to be superior models that perform estimations better than regressions for assessing mediation [65,66]. It has been reported that PLS SEM accounts for measurement error and can provide more accurate estimates of mediating effects [67].

Secondly, PLS path modeling becomes more appropriate for real world applications and more advantageous to use when models are complex [68,69]. The soft modeling assumptions of PLS technique (i.e., ability to flexibly develop and validate complex models) gives it the advantage of estimating large complex models [70]. The current study examined relationships among eight models (i.e. EH, CVC, CS, HSGS, PSF, PO, OCB-I and OCB-O) within the structural model and hence employing the use of PLS SEM techniques was appropriate for better prediction. Thirdly, in most social science studies, data tend to have normality problem [71] and PLS path modelling does not necessarily require data to be normal [72]. In other words, PLS treats non-normal data relatively well.

By and large, PLS path modeling was selected for this study to help avoid any normality problem that might arise in the course of data analysis for the current study. Fourthly, PLS SEM offers more meaningful and valid results, while other methods of analysis such as software package used for statistical analysis (SPSS) often result in less clear conclusions and would require several separate analyses [73]. PLS SEM allows examining of relationships among many variables simultaneously. Multivariate analysis including the in-built PLS factor analysis and structural equation modeling were used in the study being reported. The use of PLS SEM allows for examination of series of relationships simultaneously [41,74].

3. CONCLUSION

This paper presented details about the methodological aspects used in the author's PhD program and justifications for each. Major areas covered in the paper include nature and philosophy of the study, research approach, research design, population of the study, sample size and power analysis, estimating expected response rate, sampling techniques, research strategy, pilot study, measurement scale and research variables. Fundamental to this paper is that some relatively new methodological tools of analysis were employed in the author's work. These relatively new methodological tools of analysis are the PLS SEM and power analysis, and have produced significantly good results for the study. Hence, the present study's use of this relatively new tool of analysis has some important methodological implications. First, by using servant leadership-OCB model in the current study, the PLS tool provides a new framework for comparisons of results obtained from previous studies that used different tools of analysis. Second, PLS principal component analysis was used to refine and fit the data for this study, thus providing new knowledge about the effects of PLS PCA on servant leadership, psychological ownership and OCB constructs. After PLS confirmatory factor analysis (CFA), the multi-dimensionality of servant leadership [75] and two OCB dimensions [76] were retained. Similarly, the unidimensionality of psychological ownership construct [10] was also retained after the PLS CFA. Although the multidimensionality of servant leadership construct was retained, only five dimensions emerged against the adopted seven by [75]. The PLS confirmatory and validation processes

for the three measurements for this study represent methodological contributions to the literature of servant leadership, psychological ownership and OCB by providing additional validation about the constructs in a new methodological perspective.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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