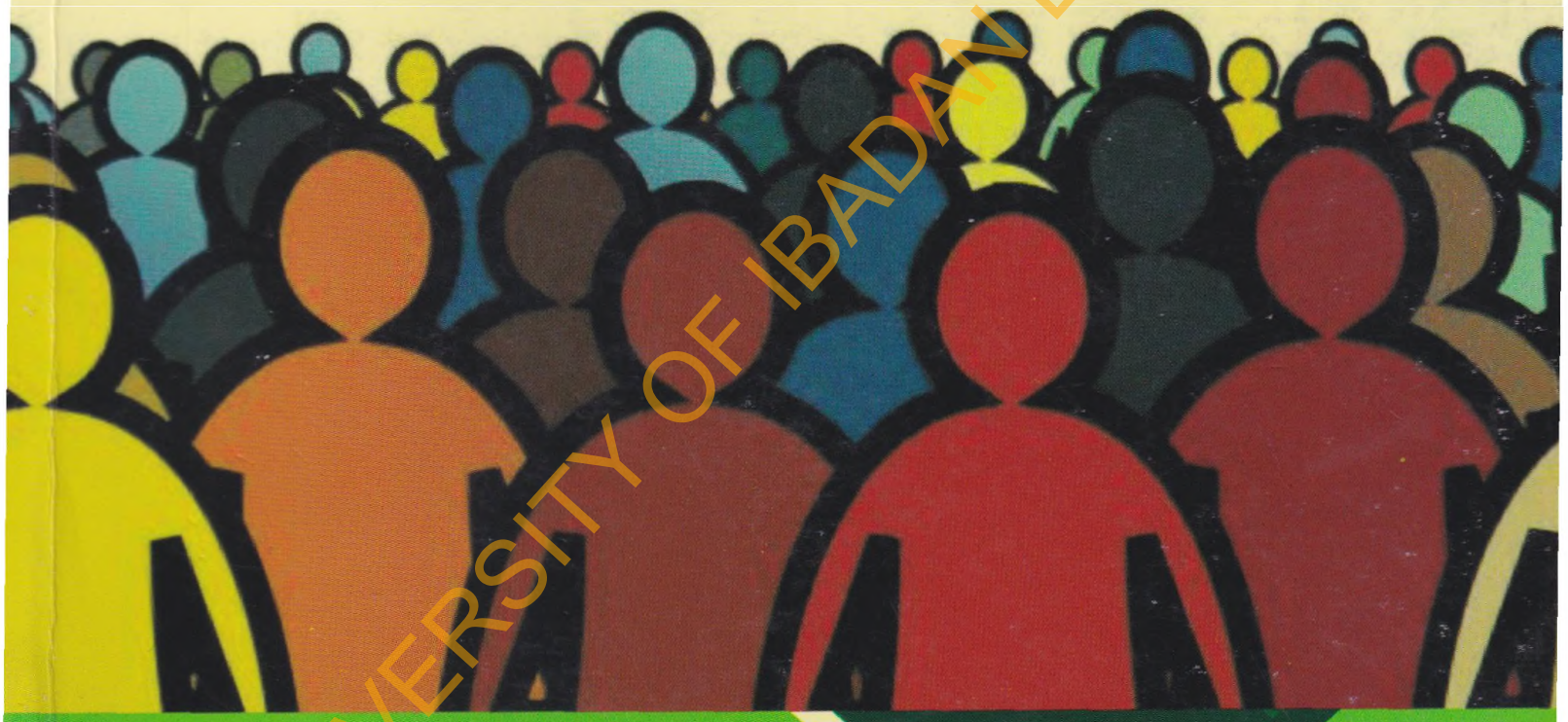
CONTEMPORARY ISSUES IN SOCIAL RESEARCH



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10 Study Population in Social Research

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Introduction

Research implies an orderly, systematically consistent, organized patterns of thought that usually drives the directions and structures to a researcher's knowledge or understanding of facts and methods (Bryman 2015; Bhattacherjee 2012; Riazi 2010). The research follows a procedure that helps streamline intuitive initiative, creativity, and originality by applying some acceptable systematic and scientific tools (Rossi, Wright, and Anderson 2013). Research process most often, if handled correctly can be exciting if the researcher clearly understands the best approaches to the methods and applications (Czarniawska 2014). All research questions are set out to address particular issues which are of high relevance to specific section(s) of the society. De Vaus (2013) argued that since research is a method of thinking in an orderly sequence, it often starts with the mind of the researcher with a question of why, what, where, which, how, etc. of a particular social problem that has agitated the mind of a researcher. Stacey (2013) also opined that research usually starts with the recognition of a unique problem. However, having identified the problem; a review of the background of theories and conceptual models follows (Weaver et al. 2014; Babbie 2013; Cavallo 2012; Weaver et al. 2014). The stage that comes after this involves the formulation of verifiable hypotheses; this is followed by the selection of research design that best suits the problem under investigation (Berg 2004; Glesne and Peshkin 1992). The fifth stage is that which involves the development and execution of data collection; it is in this stage that the chapter's interest lies. The sixth stage incorporates the selection of appropriate statistical tools to organize the data collection at the final stage, terminated at the level of interpretation and the discussion of findings of the study (Bryman 2015; Tashakkori and Teddlie 2010).

The Environment of Research: When are Samples Required?

The environment of research describes the location or place where data is collected (Keith 1988). The environment is very critical to the overall output of the empirical research (Johnson and Onwuegbuzie 2004; Douglas 1976). Bailey (2008) argued further that the environment may be identical or may not be identical depending on goals/objective set by the researcher. Most studies (see for example; Bickman and Rog 2008; Kothari 2004; Wasserman and Galaskiewicz 1994) in the social sciences have argued that research often starts with the definition and specification of the population under investigation. The population may not necessarily represent the census of a particular location. Rather it could be a collection of all the available elements that have one attribute or more in common; it

could also be homogenous or heterogeneous depending on the units of elements within the population (Weber 2015).

In some instances, sample selection is the vital course of action (Kent 2007). A cook is not likely to eat all of the food because he is going to taste the level of the salt and other condiments. In a survey study, it may be theoretically feasible to contact every subject in a population which may consist of millions of subjects, for most studies, taking a sample (Population of Study) would help the researcher optimize the resources available to it and manage the time that may be allotted to the survey. A subset of the population that is selected, investigated by the researcher for the purpose of generalizing and making reasonable conclusions about the finding on the entire population, is known as ***a sample*** (O'Leary 2004).

The descriptive survey method attempts to observe the elements within a particular population with immense accuracy (Kelley 2007; Kothari 2004; Lee and Baskerville 2003; Traub 1994; Akinboye 1978). To achieve the goal, a researcher needs to be sure that a particular population has been isolated and has been carefully defined, such that it leaves no ambiguity in its choice of respondents (Vogt and Johnson 2011; Black 1999; Manski 1995). Blanche, Durrheim, Painter (2006); Guest, Bunce and Johnson (2006); Guadagnoli and Velicer (1988) argued that no matter the method to be used by a researcher, one of the main components of a research design is sampling; sampling formulation is the third step involved in the research process. Every research effort's primary objective is to collect information about the parameters or standard set of features/characteristics of a population under consideration (Button et al. 2013; Ritchie, Lewis, Nicholls and Ormston 2013). A ***population*** is 'the aggregate of all the elements that share a common set of features which comprises of the universe for the purpose of the research problem' (McMurray, Pace and Scott 2004). Typically, population parameters are numbers, such as the aggregate number of people living with HIV/AIDS.

Defining the Population of Study: Sample or Census

All research questions are formulated to address issues that are of relevance to the group of individuals under study; these sets of people are also known as study populations (Baskerville and Wood-Harper 2016; Bless, Higson-Smith and Kagee 2006). Frankfort-Nachmias and Nachmias (2007) submitted that study population can be described as an extensive collection of individuals or entity that is the focus of a scientific query, which shares the same characteristics and is being studied in the process of undertaking a research study. The study population may be an object, a person, an organization, a situation, a survey respondent, a group of people, an event or a geographical area (Berg 2004). Stake (1978) argued that researchers will always be concerned with a set of the population where the entities that are the attention of the study are of a particular type, share the same feature(s) that is or are of interest to the research

being undertaken. Example: 'mothers with babies aged 1-6 years, or female, internally displaced victims who are aged 18-45 years.

The objective of most research projects is to obtain information about the characteristics or parameters of a population (De Vaus 2013; Lamont and Molnar 2002). A ***population*** for the purpose of this chapter will be defined as the 'total number of the entire subjects or elements that share or have some common set of features or characteristics and are made up of the totality of the subjects of interest suitable or capable of providing insights to the purposes for which the research problem is set up (Unden and Orth-Gomer 1989). Typically, numbers form the basis for population parameters; it is determined most often by the proportion of the population who share similar characteristics i.e. drug addicts; mothers with babies aged 01-06, etc. Basic knowledge about the parameters of the population is usually collected by taking a census of the population or by taking a sample (Stake 1978). ***Census*** as defined by Kestenbaum (1992) ***comprises*** of a complete listing of all the elements of a particular population. After the census is enumerated, population parameters may then be calculated directly in a very simple manner. Kish (1965), Babbie (1990), Moser and Khalton (1997), Neuman (1994), Backstrom and Hursh-Ceaser (1981), Isiugo-Abanihe (2002), suggested that ***sample*** can simply be described as a sub-category of the already identified population designated for participation in the anticipated research or study (Pandey and Pandey 2015). The sample characteristics which are referred to as statistics are most often used to make conclusions/interpretations about the selected population parameters (Hinkle, Wiersma and Jurs 2003; Marshall and Sandelowski 1995; Shavelson 1988). The drawn conclusions/ interpretations about the selected population parameters that link sample features/characteristics and the population parameters are appraisal procedures and tests of hypotheses (Onwuegbuzie and Collins 2007; Maas and Hox 2007; Atkinson and Flint 2001; Marascuilo and Serlin 1988).

A summary of the circumstances favouring the deployment of a population census in contrast to the use of a sample is given in table 10.1. The key factors that could constrain the utilization of a sample against the utilization of a census are budgetary limitations and time constraints as time and funds are not usually available to the researcher on a platter of gold. Carrying out a research or a study using an entire population or census can be both expensive and as well as time consuming. If the population is large, a census may become unrealistic, considering the financial implications and limited time that is always available to the researcher. However, a census may be deemed imperative or feasible and may be desirable if the population of the subject concerned, on the other hand, is relatively small in number. For example, in investigating the use of a certain machine, take for example, the use of bullet-proof cars in Nigeria. A census would be preferred and desired to a sample because the number of people who ride or have access to bullet-proof cars in Nigeria is limited to the affluence only. However, if a researcher is interested in

investigating the prevalence of *Okada* in Nigeria, it may not be feasible or desirable for a researcher to want to take the population of all the *Okada* riders in the country, the variance in the characteristic of interest is significant and cannot be comparable to the prevalence of the bullet proof cars. For clarity, usage of bullet-proof cars will vary considerably from the usage of *Okada* usage. Therefore, a small population size, as well as high variance in the characteristic to be measured, favors a census.

If the rate of sampling errors is high, a census, which will help exclude such errors, may be desirable. High costs of non-sampling errors, on the other hand, would favor sampling. Deploying a census can have a great impact on the issue of increase in non-sampling error to the point that these errors outstrip the sampling errors of a sample. A major contributory factor to total error is the problem of non-sampling errors; however random sampling errors have been relatively small in magnitude. Therefore, in most cases, consideration of accuracy would naturally be a significant factor in the deployment of a sample over the usage of a census.

Table 10.1: Conditions Favouring the Use of Census against the Use of Samples

		Conditions Favouring the Use of sample versus the use of census	
		CENSUS	**SAMPLE**
1.	Budgetary allocations	Significant budget allocations required	A small budgetary allocation is desirable
2.	Time availability constraints	A longer period is needed.	Requires a short period
3.	The population size of the subjects	Small populationsfavour the usage of a census	If the population is large, the use of a sample is desirable
4.	The discrepancy in the characteristic of the subjects	If there is a big variance in the underlyingfeatures of the subjects, a census may be helpful	Presence of a small variation in theessentialcharacteristics of the subjects, a sample, is desirable
5.	Total cost of sampling errors	High cost of sampling errors	Low cost of sampling errors
6.	Total cost of non-sampling errors	Low-slung cost associated with non-sampling errors	High-slung cost associated with sampling errors
7.	Giving attention to cases subjects	With a census, little attention is paid to the subjects	With a sample, greater attention is given to the subjects

(*Source*: Malhotra 2010: 405)

A sample may be ideal if the measurement results obliterate or contaminate the subjects so sampled. For example, using a census for the purpose of collecting information in a study that demands households to use a new brand of photographic film may not be feasible and desirable

(Henson 2001). Sampling may also be reasonable or desired if the objective of the study requires or focuses attention on individual cases, for instance, the use of depth interviews (Jacobsen and Landau 2003). In conclusion, some other practical or ethical considerations, such as keeping the study secret and some other factor, may favour a sample over a census (Byrne 1989).

However, in selecting a sample, a researcher should endeavour to analyse the population under study, make sure the population is carefully isolated and defined; the researcher will also ensure that homogeneity and heterogeneity characteristics of the population are also considered in selecting the population for a particular study (Gouldner 2014).

Sampling: Choosing the Population of Study

The processes involved in the selection of a population of study are and are shown in figure 10.1. The steps are interrelated closely and are relevant to all the characteristics of the research project, starting from the problem definition to the presentation of results. Therefore, sample design decisions should be integrated with all other decisions in a research project.

(a) Definition of Target Population

The process of sampling design begins by stipulating/specifying the target population for the study. The ***target population*** can be described as the collection of elements or subjects that possess the data sought by the researcher and about which conclusions and/or inferences are to be drawn (Kelley, Clark, Brown and Sitzia 2003). The inclusion and exclusion criteria for the target population must be precisely defined in such a way that no ambiguity is observed; a precise definition of the target population that explicitly states the inclusion and exclusion criteria will result in research that is efficient and systematic in the approach (Sabeti et al. 2007; Teddlie et al. 2007; Heckathorn 1997). By defining the target population in an unambiguous manner, the research objectives of the study will easily translate the problem definition into a precise statement or result that will aid policy decision (Lavis, Robertson, Woodside, McLeod and Abelson 2003).

However, in defining the target population, effort should be made to capture in the definition the clarification and classification of such terms as elements of the study, the sampling units, the extent and time desired to complete the study (Watters and Biernacki 1989). Holsti (1969) defined an ***element*** as a subject to which or from which the information the researcher is seeking is appropriated. In a survey research method, the element usually, is the respondent. A ***sampling unit*** is an element or the unit encompassing the element that is present to be considered for selection at some stage of the sampling process (Kothari 2004). Suppose the Federal Ministry of Health in Nigeria needs to access citizens' response to a new line of female contraceptives and wants to sample

women over 18 years of age. It may be possible only to sample females over 18 directly, in which case, the sampling unit will be the same as an element. Alternatively, the sampling unit might be households. In the latter case, households would be sampled, and all females over 18 in each selected household would be chosen for the interview. In this instance, the sampling unit and the population element are different. The extent of the coverage according (Stevens 2012) refers to the boundaries to be covered regarding the geographical spread to be covered for the proposed study, and ***the time factor*** is the period or the time under consideration. Consider a research project assessing consumer response to a new brand of men's contraceptives. Who are the people that should be included in the target population? (Guetterman 2015) All men? Or men who have used a contraceptive during the last twelve months? Or maybe, men who are seventeen years and above? Will it be suitable to recruit females into the study, because some women are involved in the purchase of contraceptives for their husband's use? These and other similar questions need to be resolved before the target population can be appropriately defined.

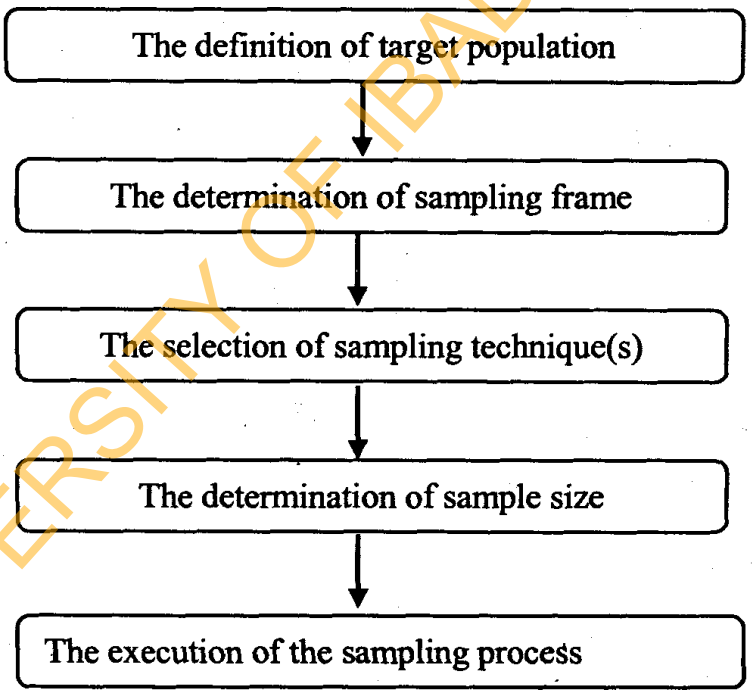

Fig. 10.1: The sampling design process.

Source: Ritchie, Lewis, Nicholls and Ormston (2013: 93)

(b) How to Determine the Sampling Frame

A representation of the elements of the target population is what is known as the sampling frame (Hage, Oliver, Powles and Wahlqvist 1990). A good sampling frame will naturally consist of a list or set of guidelines that will be used for the identification of the target population. Examples of a sampling frame include an association directory, a telephone

directory, a mailing list gotten from the post office or bought from any organization that may have a mailing list of the people; it could also include the city directory or the map of a city. However, if it becomes difficult to obtain a list, the ingenuity of the researcher will become imperative here, the researcher may then decide to identify some guidelines for the identification of the target population, which of course should be well specified in the methodology. With the advent of technology, the sampling frame could also comprise a computer-based programme specifically designed and deployed to randomly and efficiently generate telephone numbers or addresses of the target respondents.

It is not often possible to obtain or compile a list or set of population elements, as the list may unintentionally omit some elements of the population or include some elements that do not belong to the population. Therefore, the use of a single list may lead to sampling frame error. In some instances, however, the variation or discrepancy between the target population and the sampling frame is small enough to disregard. However, in most cases, the researcher needs to recognize and treat the sampling frame error. There are three approaches recommended for this purpose. The first approach will be to redefine or reorganise the target population regarding the sampling frame. If for example, the telephone book is deployed as a sampling frame, the populations in households could be redefined or reorganized as those with the correct listing in the phonedirectory in a given area. Although this approach is simplistic, it will prevent the researcher from being misinformed about the actual population being studied or investigated.

The second approach will be to account for detailed sampling frame error by properly screening the respondents in the data-collection stage. The subjects or respondents could be screened with respect to their demographic characteristics, familiarity, usage, awareness, and prevalence, etc. This task is carried out with an intention of ensuring that the population meets or satisfies the criteria of inclusion and/or exclusion for the study. The screening will help to eliminate unqualified or inappropriate elements contained in the sampling frame, but it may not take into account those elements that have been omitted from the study.

The third approach will be to adjust the collected data by using a weighting scale or scheme to (or "intending to") help to counterbalance the sampling frame error. However, regardless of which approach is adopted, it is very important to recognize any sampling frame error that exists, so that inappropriate population conclusion/inferences can be eliminated.

(c) Selection of Sampling Technique

The process of the selection of sampling technique involves several decisions of a broad nature. The researcher must decide whether to use a

traditional or Bayesian sampling approach, to select a sample with or without replacement, and to use probability or non-probability sampling.

In the Bayesian approach, Gill (2014) argued that the elements are selected sequentially. After each element must have been added to the sample, the data are first collected, sample statistics are computed, and sampling costs are determined. The Bayesian approach to sampling technique explicitly incorporates prior information about population parameters as well as the costs and probabilities that could be associated with making wrong decisions in the sampling method. Meanwhile, in the traditional sampling approach, the entire sample will be selected before the process of actual data collection begins.

In ***replacing the sample,*** an element is chosen from the sampling frame, and appropriate data are obtained. Then the element is replaced back in the sampling frame. Consequently, it is, possible for an element to be included in the sample twice. In the ***sampling without replacement,*** once the researcher has selected an element for inclusion in the sample it is then removed from the sampling frame and, therefore, not suitable be included in the sample frame.

Taking the decision on which of the non-probability and probability sampling techniques to use is very important in the choice of sampling technique. It is imperative to specify precisely in what way the elements within the sampling unit would be selected. In the in-home personal face-face interviews and telephone interviews, a mere specification of the address or the phone numbers may not be sufficient. For example, should the person answering the phone or the doorbell be the one to be interviewed, or should the researcher speak to someone else in the household? Very often, more than one person in a household may qualify to be interviewed. For instance, both the female and male heads of the household may be eligible for participation in a study designed to examine family household income and spending. When a probability sampling technique, for example, is being deployed, a random selection must be made from all the qualified persons in each household. A simple procedure for random selection is the respondents' next birthday method. The interviewer asks questions to determine which of the eligible individuals in the household has the next birthday close by and includes that person in the sample.

(d) Determination of the Sample Size

The number of elements to be included or involved in the study is what is referred to as the ***sample size***. The process involved in the determination of a sample size is somehow multifarious and embroils the consideration of a lot of quantitative and qualitative methods of data collection. In the determination of the sampling size, several important factors should be put into consideration for the qualitative method (1) the nature of the research in question importance of the decision, (2) the decisions expected to be

taken at the end of the study, (3) the format the analysis will take, (4) the number of the variables, (5) considerations for the sample sizes previously deployed for similar studies, (6) the incidence rates, (7) the rates of completion, and (8) the expected constraints of resources. Furthermore, to make more precise and accurate decisions, additional information is imperative, the other required information needs to be obtained with precision. However, to get the detailed information, a larger sample is required; but the implication of this is that as the sample size is increased, every other unit of information is obtained at a much greater cost.

However, the nature of the research also has an impact on the sample size. For exploratory research designs, such as those using qualitative research, the sample size is typically small, compared to survey research, such as descriptive studies, in which larger samples are required. Likewise, if data are being collected on a large number of variables, significantly large samples are desirable. The cumulative effects of the sampling error across variables are substantially reduced in a large sample.

If sophisticated analysis of the data, deploying the use of multivariate techniques becomes necessary, it then means the sample size should be big. The same trend will apply if the data to be analyzed are also big. Suffice to say that, the more significant sample would automatically be required, if the data is being analyzed at the sub-group level or the segment level is limited to the aggregate or total sample size.

Finally, the sample size decision should also be guided by considerationof resource constraints. In any research project, money and time are usually limited, and the limitations should be considered while deciding the population of the study. The other constraints could include the availability of qualified personnel for data collection. The sample size required should also be attuned to the incidence of eligible respondents and the completion rate of the instruments deployed.

(e) Execute the Selection Process

In the implementation of the process for the selection for specification of the population, a detailed analysis of the manner of the sampling design outcomes, that have to do with the target population of the study, the sampling unit for the study, the sampling frame to be deployed for the study, sampling size required or agreed on, and the sampling techniques designed for the study are to be achieved at this stage. For example, an operational definition of the household needs to be given, to make a clarification of what type of household will be covered in the study, also, a specified procedural process that is designed with a view to mark out housing units that are vacant, in case of houses that are not habitable, and to draw out the method to be employed to call back at houses where there were no one at home at the time of the first visit to the house for the purpose of conducting interview.

Conclusion

While the importance of research to the acquisition of knowledge, and the subsequent application of findings to the human society cannot be overstated, it is equally important to note that research cannot be carried out haphazardly. Rather, it is systematic in its pursuit and methodical in its approach. A crucial part of it revolves around the study population to be used, as well as the pertinent issues of sample selection as discussed above. Without a proper prior resolution of the issues revolving around the sample selection, the research is more likely to fail than succeed. As such, while this paper has attempted to provide a detailed inventory of what and what goes into the selection of the population of study, as well as how such a selection is to be achieved, it has done so with the view that the reader would understand how important this phase of research is to the entire study.

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