Quest Journals
Journal of Electronics and Communication Engineering Research
Volume 2 ~ Issue 7 (2014) pp: 09-13
ISSN(Online) : 2321-5941
www.questjournals.org

Research Paper

Sampling in a Research Work

*[1]Dr. Mcchester Odoh and [2]Dr. Ihedigbo Chinedum E.
[1]*Director, ICT Michael Okpara University Of Agriculture Umudike, Umuahia, Abia State Of Nigeria.*
[2]*Department of computer science, Michael okpara university of agriculture umudike, Umuahia, abia state of Nigeria.*

I. INTRODUCTION TO POPULATION AND SAMPLING POPULATION

In general terms, population refers to a large number of people living in a given geographical location. In research, population means all members or elements – (human beings, animals, trees, objects, events) of a well defined group. The population defines the limit within which the research findings are acceptable. The population must be defined in such a way that the results of the investigation can be generalized into the population. Population therefore means all members and objects of the study (Orjih, 1996). The basic aim of sampling is to make an inference about a population parameter that is from a sample statistic that could be measured. A population can be defined as a collection of objects, individuals or events that share a common characteristic which the researcher is interested in investigating for example the age of students in the University of Nsukka.

A specified value of population is the population parameter and its counterpart in the sample is called the unit of analysis. If you want to investigate the age of student in a university, you want a complete list of registered student. The list is a census or sampling frame (Unyimadu, 2005).

A population can be classified into target population, accessible population, finite population, infinite population (Orjih, 1996).

SAMPLING

Sampling is a process through which a portion of a population is selected for the study. A sample may be viewed as a smaller group of element drawn through an definite procedure from a specified population. The elements making up the sample are those that are actually studied (Orjih, 1996).

SAMPLE FRAME

This refers to a list or map containing all the units from which a sample is selected. In order to obtain a reliable sample, the sample frame should be accurate, current and omission free.

II. METHODS OR TECHNIQUES OF SAMPLING

The types of sampling are plans specifying the methods, techniques that should be in selecting elements from the population. Sampling method or techniques may be grouped into broad categories via:
The probability random sampling
The Non probability sampling.
The Probability / Random Sampling

This is a sampling technique which gives every unit in the population an equal chance of being drawn into the sampling. It is also called the random sampling. In a probability sampling plan, the sizes of the population and the desired sampling must be known and each number of the population should have the same chance of being included in the sample. When these conditions are met, the resultant sample is considered representative of the population (Orjih, 1996).

CLASSIFICATION OF PROBABILITY SAMPLING

In this type of sampling, each element of the population has equal and independent chance of being included in the sample. It calculates chance being selected into the sample. It affords every unit of the population a calculable chance of being selected into the sample. Suppose we have a population of 1000 workers, the probability or chance of drawing each worker into the sample is 1/1000 or 0.001
Simple random sampling can be effectuated through any of the following means;
Toss of the coin
Throw of the die
The use of slips and paper

The use of computer
The use of table or random numbers.
Example of the use of table or random number

TABLE OF RANDOM UNIT

1	5	1	7	9	22
3					
8					
10					
12					

If you use the table of random units, any numbers you choose has wqual chance of appearing in your sample.

ADVANTAGES OF SAMPLE RANDOM SAMPLING
It is very easy
It is very simple to apply
It does not require special skill
It saves time
Blind picking

SYSTEMATIC SAMPLING

It involves selecting every element of the population after the first unit of analysis has been selected using any of the random sampling methods. Example. Suppose we have population size to be 100 and 10 element wanted in the sample.

$\text{Le} = \frac{N}{n}$

Where N = population size
n = sample

$\frac{100}{10} = 10 = \text{interval}$

If you choose the lottery method to get five and add the interval. They will be 5,15, 25, 35, 45, 55, 65, 75, 85, 95etc (Unyimadu, 2005).

MERITS OF SYSTEMATIC SAMPLING

1. It ensures that the even distribution of the items in the distribution.
2. It is simple to apply.

DEMERITS OF SYSTEMATIC SAMPLING

1. Poor management of units in the frame is capable of producing unrepresentative sample.
2. Use of systematic sampling is restricted to homogeneous population.

STRATIFIED SAMPLING

This method of sampling is applied when the population from which we draw our sample is heterogeneous. In order to make the sample a true representative of the parent population, we first divide the entire population into homogeneous groups called strata. Then by applying the simple random sampling, we select items from each stratum into the sample. In an industrial survey, industries could be classified according to the number of employees, or according to the size of the share capital or profit strength. (Akuezuilo, 1993).
In stratified sampling, what happens is that the existing knowledge of the population is used to divide the population into groups. Such that element within a group are more alike. For example, take the number of males and females to be representative in the sample and is assumed all the elements have a chance but not equal. (Unyimadu, 2005).

STRATIFIED RANDOM SAMPLING
They can be classified into two:
a) **Proportionate Stratified Random Sampling:** in this category, the population is first stratified I terms of one or more variables of interest to the investigator. Elements are drawn randomly from each stratum in such a way that the relative proportions of the strata in the resultant sample are the same as exist in the parent population. The relative contribution of each stratum to the population is exactly its relative contribution to the sample. The sample will possess specified characteristics in exactly the same proportion as those characteristics exist in the parent population.

b) Disproportionate Stratified Random Sampling

In this type of sampling, the relative proportions of the strata in the sample do not correspond to their relative proportions in the population. Some strata may be over-represented or under-represented in the sample. This allows for some strata being assigned more weight than others, less weight than their respective weights in the population (Orji, 1995).

CLUSTER SAMPLING OR AREA SAMPLING

It is also called area sampling. In cluster sampling, population divided into units or sections with distinct boundaries, using sample random sampling, a specific number of these units or sections is drawn. All elements in the units or sections drawn now constitute the sample. This method is very widely applied in agricultural statistics for the geographical area. Suppose a household survey is to be conducted in rural community. The whole area is first divided into zones or clusters of villages, then by applying random sampling, we select villages, from the total list of villages and the entire household in the villages selected and studied (Orji, 1995).

ADVANTAGES OF CLUSTERED SAMPLING

1. It reduces cost per sample observations
2. It saves time
3. It is easier to study a number of household in a relative small area than to study the same number of household scattered over a wide area.

MULTI STAGE SAMPLING

When a large clusters are involved, it is not easy to enumerate all the households if large are selected. In a situation like this, the researcher may have to select only a sample of the household from each of the selected village for study.

ADVANTAGES OF MULTI STAGE SAMPLING

1. It reduces problem
2. It is more accurate than accidental sampling.

NON PROBABILITY OR NON RANDOM SAMPLING

The non-probability sampling is one which do not specify the chance of probability which an element has of being selected into a given sample. Sample is a non-randomly drawn and therefore there is no basis for determining the associated sampling error. (Akuezuilo, 1995)

NON PROBABILITY SAMPLING TECHNIQUES

1. Accidental sampling
2. Quota sampling
3. Purposive sampling
4. Chunk sampling

As refer to Orji and Onwura (1998)

ACCIDENTAL SAMPLING

Accidental sampling is one which includes only the elements, which are within the reach of the investigator. Convenience and economy in terms of finance and time are the determining factors of which elements should constitute the sample. The consideration is not whether these elements possess some specific characteristics or not. The resultant sample is biased and not representative of the population rom which the sample is drawn. Example a television-roving reporter who interviews any person he sees in a particular area is doing accidental sampling. (Orji, 1996).

The basic promise on which it rest is to get as many elements as came to hand in the sample. The problem with this method is that only some elements in the population with only some characteristics will appear in the research. So the question is how your sample will be representative of the population. (Unyimadu, 2005).

QUOTA SAMPLING

It entails selecting those elements having particular characteristics of interest to the researcher and are accessible to him. This type of sampling is used to ensure that specific elements will be included. This type of sampling allows the researcher to include any category of the population that is of particular interest to him. (Orji, 1996).

Quota sampling simply relies upon screening potential respondents in terms of certain desired characteristics, in this instance, the characteristics is used for establishing the representation of the class of the sample. When you establish a quota you can use accidental method to collect the sample. (Unyimadu, 2005).
Advantage of quota sampling is that it is easy and quick to conduct but the disadvantage is that the resultant sample is highly biased and is not representative. (Akuezuilo, 1993).

PURPOSIVE OR JUDGEMENT SAMPLING

In purposive sampling, specific elements which satisfy some predetermined criteria are selected. Although the criteria to be used are usually a matter of the researchers judgment. He exercises his judgment in relation to what he thinks will constitute a representative sample with respect to the research purpose. This type of sampling is similar to quota sampling except that in judgment sampling, extra care is taken to select those elements that satisfy the requirements of the research purpose. (Orji, 1996).
This sampling method is not a random one and generalization made from the sample may not be representative of the population it is relatively cheaper and easy to execute. (Akuezilo, 1993).

CHUNCK

A chunck is composed by a self-selecting process, that is a chunck is a merely a "convenience sample" a collection of subjects easily grouped such as the member, persons responding to a coupon or advertisement, or individuals who visit a display in a shopping centre. (Onwura, 1998).

NON-SAMPLING ERROR

Population parameter and sampling statistic always differ because the sample is smaller them the population. The sampling error is the difference between the value of the population parameters and the value of the sample statistic and this error occurs because the sample will never approximate as the population. The smaller the sampling error, the greater the precision of the estimate. (Unyimadu, 2005).
There are other sources of error which arise not because of the above such as:-
1. The way you measure your variables.
2. Non response.
Formula for calculating the response rate of your questionnaires,

$$R = 1 - \frac{(n - r)}{n}$$

R = response rate
n = marginal size of the sample
r = number of people who actually responded. The higher the level of response rate, the greater the sampling error.
3. Another source of non-sampling error is inadequate sampling frame.

CONSIDERATION IN SELECTING SAMPLE SIZE.

1. Where the sampling error is expected to be small, the sample size should be large and vise versa.
2. Non-experimental studies should have samples.
3. Availability of subjects.
4. Cost of sampling.
5. Time available for the study.

ADVANTAGES OF SAMPLING

1. REDUCTION IN COST.

If data is secured from only a small fraction of the aggregate, expenditures are smaller than when complete census is attempted with large populations, results accurate enough to be useful can be obtained from samples that represents only a small fraction of the population.

2. ECONOMY OF TIME

The time required to study a small group of objects will definitely to less than that needed to study the whole population. The data can be collected and summarized more quickly for sample than the total population.

3. MORE ACCURATE INFORMATION.

Sampling has been known to provide more accurate information than census in most surveys. This is because in a sample survey, it is often possible to employ the best available agents, provide them with better equipment, train and supervise them more effectively. All these make for better quality of work thereby increasing the reliability of the collected data.

4. GREATER SCOPE OF INQUIRY.

In complete enumeration, information of a more specialized nature requiring the use of efficient agents, highly sophisticated and costly techniques is difficult to collect. In sampling, where use is made of the best resources, it is possible to collect a variety of information by studying the inter-relationship of various factors. (Orji 1996).

SAMPLE FRACTION

The term means the proportion or percentage of the population selected for for study. Example purpose a firm has 1000 employees and 500 are selected for study, the sample fraction is:

Sample fraction = $\frac{\text{Sample}}{\text{Population}}$

$= \frac{500}{1000}$

= ½ or 0.5 or 50%

III. SUMMARY AND CONCLUSION

There are many occasions in which the researcher collects data by directly making observations of phenomena in a chosen real world situation. This case is the direct opposite of using stored data collected by other observer. Although it is sometimes feasible to collect all the items, measurements, or observations that are relevant to a given problems, this method is the exception rather than the rule. Even in simple problems involving relatively small numbers of individuals or items there are usually time and cost limitations which make it necessary to take only a sample rather than all of the data. In other words, the researcher often takes samples from populations consisting of the totality of the items or observations with which he is concerned. Thus in business research, for example, products are tested by checking, say, each tenth item coming off an assembly line; and consumer preferences are investigated by interviewing sample of housewives in certain areas. (Onwura, 1998).

In all statistical studies that use samples, great case must be exercised to ensure that the sample will lend themselves to valid generalizations; a key issue here is the question of bias. A sample is said to be biased if it is not representative of the population which it is supposed to represent. Every precaution must always be taken to avoid inadvertent biases, and it goes without saying that it is very unethical to introduce deliberate biases to prove particular points. (Onwura, 1998).

According to (Akuezilo, 1990) a number of advantages are gained by using sampling methods of data collection. Among these may be listed greater speed, greater scope, and greater accuracy and reduced cost. It is clear that results can be obtained more quickly with sampling than with complete survey of the population. Analysis of a 1 percent ample of the 1963 national population census would be such an example. Again, in certain types of inquiry highly trained personnel or specialized equipment, limited in availability, must be used to obtain the data.

A complete census is impracticable: the choice lies between obtaining the information by sampling or not at all for example, there are cases in business research in which the investigation entails the destruction of the materials e.g to discover the life of electric lamp- sampling method are the only methods to use. These surveys that rely on sampling have more scope and flexibility regarding the types of information that can be obtained. Again, a sample may produce more accurate results than the kind of complete enumeration that can be taken. One reason for this possibility is the fact that with sampling personnel of higher quality can be employed and given intensive training on computing, tabulating and analysis of the data. (Onwura, 1998).

Another reason is that more careful supervision of the field work and processing of results becomes feasible when the volume of work is reduced. Indeed, a sample is often used as a check on the accuracy of complete censuses. Sampling makes it easier to guard against incomplete and inaccurate returns and also to follow up non-responses. Finally it is clear that if data are secured from only a small fraction of the aggregate, expenditures are smaller than if a complete census is attempted. (Onwura, 1998).

REFERENCES

[1]. Akuezilo, E. O, (1993) Research Methodology and Statistics Nigeria: Nuel Centi (nig) Publishers.
[2]. Onwura, E. A, (1998) Introduction to Academic Research Methods, Enugu: gostak printing & publisher Co. Ltd.
[3]. Orjih, H. (1996) Business research method. Enugu: Meteson Publicity Company.
[4]. Unyimadu, S. O, (2004) Research Method and Procedures in the Social Science, Management Science, Education, Science and Engineering. Benin City: harmony book.