# Sampling – Advantages and Limitations of its use in Social Research

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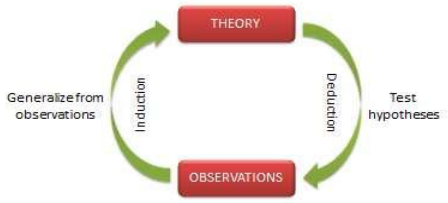
*"Research is an organized inquiry designed and carried out to provide information for solving a problem" Redman and Morey.*

*"Research is to see what everybody else has seen, and to think what nobody else has thought."*
*Albert Szent- Gyorgyi*

## INTRODUCTION

The word *research* derives from the French word rechercher, to search closely where "chercher" means "to search"; its literal meaning is 'to investigate thoroughly'. Social research refers to research conducted by social scientists within sociology and social psychology and also within other disciplines such as social policy, human geography, political science, social anthropology, Social work and education.




Research can also be divided into pure research and applied research. Pure research has no application on real life, whereas applied research attempts to influence the real world both theoretically and in practice.

The Social research is based on scientific investigation in the field of social and behavioral sciences. The human behavior and social problems are the subject matter in social research wherein by following the systematic method discovers the new facts or verify old facts, their sequences, interrelationships, causal explanations and the natural laws which govern them. The Social research aims to find social patterns of regularity in social life mostly in relation to its environment and usually deals with social groups (aggregate of individuals) and individuals as well; for example the 'Case Study' of Individual concerned.

Researchers usually cannot make direct observations of every individual in the population they are studying. Instead, they collect data from a subset of individuals – **a *sample*** – and use those observations to make inferences about the entire population. Ideally, the sample corresponds to the larger population on the characteristic(s) of interest. In that case, the researcher's conclusions from the sample are probably applicable to the entire population.

This type of correspondence between the sample and the larger population is most important when a researcher wants to know what proportion of the population has a certain characteristic – like a particular opinion or a demographic feature. Public opinion polls that try to describe the percentage of the population that plans to vote for particular candidate, for example, require a sample that is highly representative of the population.

## Concept of Sampling:

Sampling is that part of statistical practice concerned with the selection of a subset of individual observations within a population of individuals intended to yield some knowledge about the population of concern, especially for the purposes of making predictions based on statistical inference. Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining

parameters or characteristics of the whole population.

*Sampling may be defined as the selection of some part of an aggregate or totality on the basis of which judgment or inference about the aggregate or totality is made. In other words, it is the process of obtaining information about an entire population by examining only a part of it. In most of the research work and surveys, the usual approach happens to be to make generalization or to draw inferences based on samples about the parameters of population for which the samples are taken.*

*Population (or Universe) is the aggregate or totality of statistical data forming a subject of investigation, for example; the population of books in the National Library, the population of the heights of Indians, the population of Nationalized Banks in India, etc.*

*A sample is portion of the population which is examined with a view to estimating the characteristics of the population i.e. to assess the quality of a bag of rice; we examine only a portion of it. The portion selected from the bag is called a sample, while the whole quantity of rice in the bag is the population.*

## Purpose of Sampling

The basic purpose for which a researcher uses the Sampling technique over the Census is well known to every lay man laying hand on the research activities. In order to draw conclusions about populations from samples, we must use inferential statistics; which enables us to determine a population's characteristics by directly observing only a portion (or sample) of the population. We obtain a sample rather than a complete enumeration (a census) of the population for many reasons. Obviously, it is cheaper to observe a part rather than the whole, but we should prepare ourselves to cope with the dangers of using samples. . Some are better than others but all may yield samples that are inaccurate and unreliable. There are ways to minimize these dangers, but some potential error is the price we must pay for the convenience and savings, the samples provide.

## The Sampling procedure

The desirability of a sampling procedure depends on both its vulnerability to error and its cost. However, economy and reliability are competing ends, because, to reduce error often requires an increased expenditure of resources. Of the two types of statistical errors, only sampling error can be controlled by exercising care in determining the method for choosing the sample. The sampling error may be due to either bias or chance. The chance component (sometimes called random error) exists no matter how carefully the selection procedures are implemented, and the only way to minimize chance sampling errors is to select a sufficiently large sample. Sampling bias on the other hand may be minimized by the wise choice of a sampling procedure.

The following are the steps in drawing a Sample from a given population:

- Define the universe
- Prepare a Sample Frame
- Specifying the Sampling Units
- Selection of Sample Design
- Determination of Sample Size
- Select the Sample

## Samples in Social Research:

When social researcher undertakes a research work, he is to decide basically two important things namely, what will be the scope of his study and secondly, what will be his population or universe. He may decide to cover the whole population concerned with his subject, if he has time, energy, resources and capacity; but that is usually not possible due to several constraints. If that is done, that is known as census method of study. On the other hand, he can pick up a small sample out of the whole study. Such a unit is expected to be

representative of the whole population. When that is done it is call sampling method. Sampling is of course, nothing new and is adopted either in one form or the other in our day-to-day life.

Most behavioural and social science use convenience samples consisting of students, paid volunteers, patients, prisoners, or members of friendship networks or organizations. Studies with such samples are useful primarily for documenting that a particular characteristic or phenomenon occurs within a given group or, alternatively, demonstrating that not all members of that group manifest a particular trait. Such studies are also very useful for detecting relationships among different phenomena.

## Methods of social research

Social scientists use many methods in order to describe, explore and understand social life. Social methods can generally be subdivided into two broad categories. Quantitative methods are concerned with attempts to quantify social phenomenon and collect analyze numerical data focussing on the links among a smaller number of attributes across many cases. Qualitative methods on the other hand emphasizes personal experiences and interpretations over quantification, are more concerned with understanding the meaning of social phenomena and focus on links among a larger number of attributes across relatively few cases. While very different in many aspects, both quantitative and qualitative approaches involve a systematic interaction between theories and data.

**Advantages of sampling in social research:**

The important advantages of sampling over complete enumeration in social research are briefly stated below:

**1-** Sampling saves money as it is much cheaper to collect the desired information from a small sample than from the whole population.

**2-** Sampling saves a lot of time and energy, as the needed data are collected and processed much faster than census information. And this is a very important consideration in all types of investigations or surveys.

**3-** Sampling provides information that is almost as accurate as that obtained from a complete census; rather a properly designed and carefully executed sample survey will provide more accurate results. Moreover, owing to the reduced volume of work, persons of higher caliber and properly trained can be employed to analyze the data.

**4-** Sampling makes it possible to obtain more detailed information from each unit of the sample as collecting data from a few units of the population (i.e. sample) can be more complete and thorough.

**5-** Sampling may be the only means available for obtaining the needed information when the population appears to be infinite or is inaccessible such as the population of mountainous or thickly forested areas. In such cases, taking complete census to collect data would neither be physically possible nor practically feasible.

**6-** Sampling has much smaller “non-response”, following up of which is much easier. The term non-response means the no availability of information from some sampling units included in the sample for any reason such as failure to locate or measure some of the units, refusals, not-at-home, etc.

**7-** Sampling is extensively used to obtain some of the census information. The most important advantage of sampling is that it provides a valid measure of reliability for the sample estimates and this is one of the two basic purposes of sampling.

**8-** Sampling is cheaper than a census survey. It is obviously more economical, for instance, to cover a sample of households than all the households in a territory although the cost per unit of study may be higher in a sample survey than in a census survey.

**9-** Since magnitude of operations involved in a sample survey is small, both the execution of the fieldwork and the analysis of the result can be carried out speedily.

**10-** Sampling result in greater economy of effort, as a relatively small staff is required carry out the survey and to tabulate and process the survey data.

**11-** A sample survey enables the researcher to collect more detailed information than would otherwise be possible in census survey. Also, information of a more specialized type can be collected, which would not be possible in a census survey on account of the availability of a small number of specialists.

**12-** Since the scale of operations involved in a sample is small, the quality of the interviewing, supervision and other related activities can be better than the quality in a census survey.

## Limitations or disadvantage of sampling in social research:

*Frederick F. Stephen* has very rightly observed:

*"Samples are like medicines. They can be harmful when they are taken carelessly and without adequate knowledge of their effects. We may use their results without confidence if the applications are made without due restraint. It is foolish to avoid or discard them because someone else has misused them and suffered the predictable consequences of his folly. Every good sample should have proper label with instructions about its use.*

Sample studies can give better results only if the samples are drawn systematically, their size is adequate and an appropriate sample design is used. Besides these, sample surveys suffer from certain limitations and if they are not properly conducted they may give erroneous inferences.

If, for example, some selected units of the sample did not respond and are left out, or if the personnel conducting the survey are not qualified, the sample results may be highly misleading. Sometimes, sample surveys may need more time, money and labor also if the sample size is large and sampling technique is complicated.

1- The Sampling is not viable in a situation where knowledge about each element or unit or a statistical universe is needed for e.g. estimate or our national income for the current year. It cannot be based upon sample records. Similarly, if any University wants to make a quick assessment of payable amount as Puja advance or bonus to its employees it cannot do so, on sample basis to save time or money.

2- The correctly designed and follow of sampling procedures must be taken care in order to avoid, what can called a 'Wild sample' would crop with misleading results. Census method also is to be followed carefully. But in case of sampling study, the sampling error may be larger than expected if the sampling procedure is improperly designed or incorrectly carried out. This leads to biased data and incorrect generalizations.

3- There are numerous situations which the units to be measure are rare and highly variable. Here as very large sample is required in order to yield enough cases for achieving statistically reliable information. Reliability of information depends upon the representativeness of the sample of the total population and upon the amount and type of information derived from it.

4- The most of the sampling techniques require the service of sampling experts or statisticians. Knowing statistical techniques to determine size and reliability of sample and to estimate sampling error is not sufficient. In social research one also need considerable experience of dealing with and of collecting social data accurately.

5- Complicated sampling plans may ultimately involve almost the same amount of time, money, energy or, labour as is required in the census method.

6- There are many additional problems Social scientists are faced with in sampling because of scattered distribution of sample units, non-cooperative nature of respondents, in - accessibility to respondents and so on. These problems can be solved to a great extent when researchers are experienced and trained.

7- In order to know certain population characteristics, like; population growth rate, population density, etc. census of population at regular intervals is more appropriate than studying by sampling.

## Types of Sampling Techniques

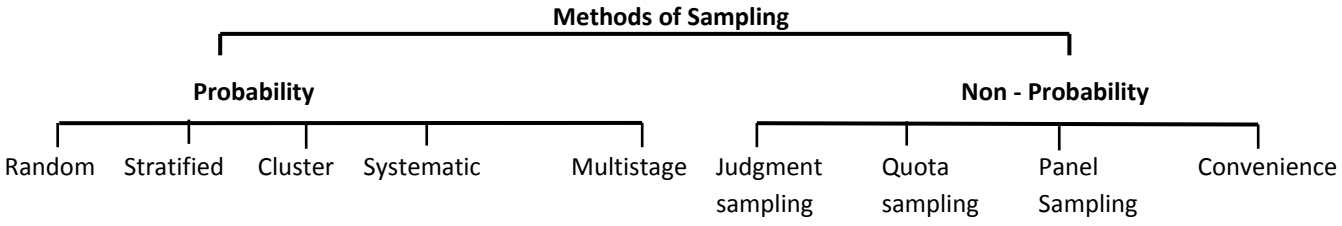
There are different types of sample designs based on two factor viz., **the representation basis and the elements selection techniques.**

On the **representation basis,** the sample may be **probability sampling** or it may be **non probability sampling.** Probability sampling is based on the concept of random selecting, whereas non-probability sampling is non- random sampling. **On element selection basis,** the sample may be either **unrestricted or restricted**. When each sample elements is drawn individually from the population at large, then the sample drawn is known as unrestricted sample .whereas all other forms of sampling are conversed under the terms restricted sampling. The following chart also exhibit the sample design as explained above.

**Chart Showing Basic Sampling Designs**

| **Elements or selections techniques ↓** | **Representation Basis** | |
|---|---|---|
| **Unrestricted sampling** | **Probability sampling** | **Non - probability sampling** |
| | Simple random sampling | Haphazard sampling or convenience sampling |
| **Restricted sampling** | Complex random sampling (such a cluster sampling, systematic sampling, stratified sampling) | purposive sampling (such as quota sampling, judgment sampling) |

Thus, sample designs are basically of two types viz., non- probability sampling and probability sampling as



## 1. Non - Probability Sampling

Non - probability sampling is that sampling procedure, which does not afford any basis for estimating that probability, that each item in the population has been included in the sample. Non-probability sampling is also known by different names such as deliberate sampling, purposive sampling and judgment sampling. In this type of sampling, item for the sample are selected deliberately by the researcher, his choices concerning the items remain supreme. Under Non-Probability Sampling the organizer of the inquiry purposively, choose the particular units of the universe for constituting a sample on the basis that the small mass that they select out of a huge one will be typical or representative of the whole.

## 1. Convenience Sampling:

In convenience sampling selection, the researcher chooses the sampling units on the basis of conveniences or accessibility. It is also called accidental sample, because the sample units enter by accident. This is also know as a sample of the man in the street i.e., selection of units where there are sample units which are selected because they are accessible for example; in testing a potential new product the Sample work is done by adding the new product to the appropriate shops in the locality. Purchasing and selling of the new Product is observed there.

### Advantages of convenience Sampling

(i) Major advantages of conveniences sampling is that it is quick, convenient and economical.

(ii) Convenience sampling is best used for the purpose of exploratory research and supplemented subsequently with probability sampling.

### Disadvantages / Limitations of Convenience Sampling

(i) Sample may or may not be typical of the populations.

(ii) Difficult to generalize findings of study.

## 2. Judgement Sampling:

A second method of non - probability sampling; that is sometimes advocated is the selection of universe items by means of expert judgment. Using this approach, specialists in the subject matter on the survey chooses which they believe to be the best sample for that particular study. For examples, a group of sales managers might select a sample of grocery stores in a city that they regard as representative for studying the sale of the product recently being launched in the market.

### Advantage of Judgmental Sampling:

I. This is applicable in qualitative research.
II. This method may be useful when the total sample size is extremely small.

### Disadvantages / Limitations of Judgment Sampling

I. The assumptions made that the researcher has enough knowledge about the population of interest is quite questionable

II. The bias of researcher may enter into sample selections. . This approach has been empirically found to produce unsatisfactory results.

## 3. Quota sampling:

One of the most commonly used non- probability sample designs is quota sampling. This sampling method also uses the principle of stratification. As in

stratified random sampling, the researcher begins by constructing strata. Bases for stratification are commonly demographic i.e. Age, sex, income and so on. Often compound stratification is used - for example; age groups within sex. The sample size (called quotas) is established for each stratum. As with stratified random sampling, the sampling within strata may be proportional or disproportional. The researchers then conduct interviews with the designated quotas, with the identification of individual respondents being left to the field workers. For example; a food manufacturer wished to sample current users of the company's brand to obtain their reactions to proposed new packaging.

A quota sample of brand users, stratified by age within sex, was designed with following quotas.

| Stratum | Quota |
|---|---|
| Men, 18-34 | 50 |
| Men, 35-49 | 50 |
| Women, 18-34 | 100 |
| Women, 35-49 | 100 |

### Advantages of Quota Sampling

(i) It is economical as traveling costs can be reduced. An interviewer need not travel all over a town to track down pre-selected respondents. However, if numerous controls are employed in a quota sample, it will become more expensive though it will have less selections bias.

(ii) It is administratively convenient. The labour of selecting a random sample can be avoided by using quota sampling. Also, the problems of non-contacts and call – backs can be dispensed with altogether.

### Disadvantages/Limitations of Quota Sampling

(i) Since quota sampling is not based on random selections. It is not possible to calculate estimates of standard errors for the sample results.

(ii) It may not be possible to get a representative sample within the quota as the selection depends nearly on the mood and convenience of the interviewers.

## 4. Panel Sampling:

Here the initial samples are drawn on random basis and information from these is collected on regular basis. It is semi- permanent sample, where members may be included repetitively for successive studies. Here there is a facility to select and quickly contact such well balanced samples and to have relatively high response rate even by mail through a questionnaire.

### Advantages of Panel Sampling

(i) Lesser cost and time involved in the collection of information.

(ii) Due to fixed sample units, one can measure the change in repeated reporting. Shift of behavior over time can be traced.

### Disadvantages/Limitation of Panel Sampling

(i) The sample may not be fully representative.

(ii) The members of panel may become conditioned to some specific situations. It may be difficult to preserve the representative character of the panel for a long time as the professional members of

the panel may drop out voluntarily and may need replacement.

## Advantages and Disadvantages of Non- Probability Sampling

The limitation of any type of non-probability sample is that, it gives no reasonable certainty that findings will be representative of the larger population. And to be useful, most sampling research must be applicable to the entire population rather than to only the relatively few people sampled.

Still, non - probability sampling is not without its good side. The non - probability sampling can be useful in many situations like when the purpose of the study is to gain general, non - specific insight into a particular group, the high margin of error is not a major concern in the research outcome, if the research is such that the budget does not allow for more costly probability sampling and the schedule does not allow for more time - consuming sampling. These techniques do have a legitimate role in many researches like public relations and marketing research and other social researches.

## II. Probability Sampling

Probability sampling is also known as random sampling or chance sampling. Under this sampling design, every item of the universe has an equal chance of inclusion into the sample. It is so to say, a lottery method in which individual units are picked up from the whole group not deliberately but by some mechanical process. Here it is blind chance only that, determines whether one item or the other is selected. The result obtained from probability or random sampling can be assured in terms of probability i.e., we can measure the errors of estimation or the significance of result obtained from a random sample, and this fact brings out the superiority of random sampling design over the Non-Probability sampling design.

1. **Simple Random Sampling:** This is the simplest and most popular technique of sampling. In it; each of the population has equal chance of being included in the sample. This unit method implies that if N is the size of the population and n units are to be drawn in the sample, then the sample should be taken in such a way that each of the $Nc_n$ samples has an equal chance of being selected.

Some of the common methods of drawing random samples are:

**(i )** **Lottery Methods:** Though the method is simple and easy to apply, but incase the size of the population is infinite, the method becomes unmanageable.

(iii) **By using Random Numbers:** A table of true random number is one in which any digit from 0 to 9 have an equal chance of appearing in any position of the table. Random numbers are most useful when population is of infinite size.

### Advantage of Simple Random Sampling

i) This method is objective. Simple random sampling gives each element in the population an equal chance of being included in the sample and all choices are independent of each other and each possible sample combination an equal chance of being chosen. . Accurate mathematical tests may be applied to judge the randomness of the sampling method.

ii) The method of simple random sampling eliminates the chance of bias or personal prejudices in the selection of units. The conclusion can be derived in terms of probability or errors of estimation

## Disadvantages / Limitation of Simple Random Sampling:

I) One factor limiting the use of simple random number sampling is the cost. Because the method guarantees that every possible item in the universe has the same chance of being chosen, the actual sample selected often consist of universe item that are widely dispersed geographically. If interview Schedule is used, interviewers may have to travel considerable distance thereby increasing the costs of the field operation. A number of difficulties are associated with the administration of simple random samples.

**ii)** The serious limitation to practical use of simple random sampling is the need for an availability of a current accurate listing of Universe Elements. Moreover it is often statistically inefficient. One sample design is said to be statistically more efficient than another when, for the same size sample, a smaller standard error is obtained.

**2. Systematic Sampling:** In this form of sampling; one unit is selected at random from the universe and the other units are at a specified interval from the selected unit. This method can be used when the population and the unit of the Universe can be arranged on the basis of any system like alphabetical arrangement, numerical arrangement or geographical arrangement etc. A systematic sample can be selected from a list of universe items using a four-step procedure.

i. Determine the total number of items in the universe.

ii. Select a random number between 1 and the sampling interval figure.

iii. Add the sampling interval to the random number selected in step (ii)

iv. Continue adding the Sampling interval to each total to create a new total.

## Advantages of Systematic Sampling

I. This is very simple and convenient, and the results obtained by them are generally satisfactory.

II. If the population is large, systematic sampling would give us results which will be similar to those obtained by proportionate stratified random sampling.

## Disadvantage/Limitation of Systematic Sampling

I. The systematic sampling may select only one-cluster of the population although there may be several clusters in the universe. The sampling error, therefore, may be very high and cannot be evaluated properly. It may be possible to obtain an unbiased estimate of the sampling error by drawing a number of systematic samples instead of one.

II. There may be possibility of selecting impracticable units of the population. In a practical situation, it may be easy to determine whether a periodicity is present or to evaluate it's significance.

**3. Stratified Random Sampling:** Stratified random sample is one in which random selection is done not from the universe as a whole but from different parts of strata of a universe. In this sampling procedure the universe to be sampled is divided (or stratified) into groups that are mutually exclusive and include all items in the universe. A simple random sample is then chosen independently from each group or stratum unlike the simple random sampling where sample items are chosen at random from the entire universe. In simple random sampling the distribution of the sample among strata is left entirely to chance for example.

Suppose a researcher wishes to study retail sales of a product such as wheat in a universe of 100,000 grocery stores. The researcher might first subdivide this universe into three strata, based on store size, as

| Store Size Stratum | Number of Stores | Percentage of Store |
|---|---|---|
| Large Stores | 20,000 | 20 |
| Medium store | 30,000 | 30 |
| Small stores | 50,000 | 50 |
| **Total** | **1,00,000** | **100** |

Then by random sampling, independently within each of the three strata, the researcher could guarantee the desired sample allocation of stores within each size group-instead of leaving representation to chance.

## Advantages of Stratified Random Sampling

i) It is more representative particularly when the universe is heterogeneous. By stratifying the universe in homogenous groups, in different strata the chance of any particular element of heterogeneity being prominent in the sample is ruled out.

ii) This type of sampling balances the ascertaining of random sampling against bias of deliberate selection. Since variability in each stratum is reduced, it provides more precise estimates than those provided by simple random sampling and the division of the universe into different strata of sub-groups results in administrative convenience.

## Disadvantages/Limitation of Stratified Random Sampling

i) Stratified random sampling suffers from the difficulties of assigning weights to different strata and if the weights are not properly assigned inference drawn become misleading.

ii) There are difficulties in stratification of the universe into homogenous groups and also in determining appropriate size of the samples to be drawn from each stratum.

**4. Cluster Sampling:** In this method, the universe is divided into some recognizable sub-group which is called clusters. After this a simple random sample of these clusters is drawn and then all the units belonging to the selected clusters constitute the sample. For example if we have to conduct an opinion poll in the city of Delhi, then the city may be divided into, say 50 blocks and out of these 50 blocks, 5 blocks can be picked up by random sampling and the inhabitants in these five blocks can be interviewed to give their opinion on a particular issue. While using this method it is to be ensured that cluster are of as small a size as possible and the number of sample units in each cluster should be more or less the same.

## Advantages of Cluster Sampling

i. This method is commonly used in collecting data about some common characteristics of the population. But certainly it is less precise than random sampling.

ii. Cluster sampling reduces cost by concentrating in selected cluster estimates based on cluster samples are usually more reliable per unit cost.

## Disadvantages/Limitation of Cluster Sampling

i. It is less precise than the random sampling

ii. There is very less information in 'n' observations within a cluster than in 'n' randomly drawn observations.

5. **Area Sampling:** If cluster happens to be some geographic subdivision in that case cluster sampling is better known as area sampling. In other words, cluster designs where the primary sampling unit represents a cluster of units based on geographical area, are distinguished as area sampling.

The advantage and disadvantages/Limitations of cluster sampling are also applicable to area sampling.

6. **Multi - Stage Sampling:** This is a modified form of cluster sampling. While in cluster sampling all the units in a selected cluster constitute the sample. In Multistage, the sample units are selected in two or three or four stages. In this system the universe is first divided into first stage sample units, from which the sample is selected. The selected first - stage samples are then sub-divided into second stage units, from which another sample is selected. Third stage and fourth - stage sampling is done in the same manner if necessary.

## Advantages of Multistage Sampling

(i) It is easier to administer than most single-stage designs mainly because of the fact, sampling frame under multi - stage sampling is developed in partial units.

(ii) A large number of units can be sampled for a given cost under multistage sampling because of sequential clustering, whereas this is not possible in most of the sample designs.

## Disadvantages/Limitation of the Multistage Sampling

i. The quantum of errors in it maybe large and

ii. The variability of the estimates in this method would depend on the composition of the primary and secondary units.

## Advantages and Disadvantage/Limitations of probability Sampling

**The** Probability sampling is the only sampling method that provides essentially unbiased estimates having measurable precision. If the investigator requires this level of objectivity, then some variant of probability sampling is essential. It permits the researcher to evaluate, in quantitative terms, the relative efficiency of alternate sampling techniques in a given situation. Usually this is not possible in non- probability sampling. Moreover it requires relatively little universe knowledge. Essentially, only two things need to be known:

(i) A way of identifying each universe element uniquely, and

(ii) The total number of universe elements.

It has its own demerits that it is relatively expensive than non-probability sampling. The method of selection in many cases can be complex and time – consuming. The constraints of budget and time may give preference to non-probability method of sampling.

The control and measurement of sampling error inherent in probability sampling technique should not be the sole determinant of Sampling Procedure. The informal judgments on objective of the inquiry, the nature of the universe, resource available at

one's disposal may be guiding factors in the selection of appropriate sampling methodology.

## Conclusion:

In conclusion, it can be said that using a sample in research saves mainly on money and time, if a suitable sampling strategy is used; appropriate sample size selected and necessary precautions taken to reduce on sampling and measurement errors, then a sample should yield valid and reliable information.

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