



SAD

SAMPLING



SAMPLING DESIGN

- ▶ Sampling is an approach in which only few units of population under study are considered for analysis.
- ▶ **ELEMENT:** an element is the unit about which information is sought. E.g individuals, products, stores, companies, families etc.
- ▶ **POPULATION:** A population or a universe is the aggregate of all elements defined prior to selection of the sample.
- ▶ The aggregate of elements from which the sample is actually drawn.
- ▶ It must be defined in terms of
 - (a) elements,
 - b) sampling unit
 - (c) extent.

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- Eg: If we wished to monitor sales of a new consumer product the population might be:

a) Element	Our product
b) Sampling unit	Supermarkets, discount stores
c) Extent	Kigali
d) Time	Nov 28- Dec 2, 2022

SAMPLING UNIT

- ▶ This is an element available for the selection at some stage of the sampling process.
- ▶ In the simplest type of sampling single stage sampling the sampling units and the elements of are the same.
- ▶ When the sampling stages are more than one you must specify the sampling units at each stage.
 - Stage 1. Cities/ towns over 100,000 population
 - Stage 2 City blocks
 - stage 3 Households
 - stage 4 Males 40 and over

SAMPLING FRAME

- ▶ It is the list of all the sampling units available for selection at a stage of the sampling process.
- ▶ For example In the above four- stage sampling process, one would require four sampling frames as follows:
 - A list of cities/ towns of over 100,000 population
 - A list of city blocks within the selected cities
 - A list of households within the selected city blocks
 - A list of males 40 and over within the selected households.

THE SAMPLING PROCESS

- ▶ **Step 1:** Define the **population**- this would include the elements, the sampling units , the extent and the time
- ▶ **Step 2:** Identify the **sampling frame** from which the sample will be selected.
- ▶ **Step 3:** decide on a **sample size**- here we determine how many elements to include in the sample .
- ▶ **Step 4:** Select a specific procedure by which the sample will be determined, exactly how will the decision be made on which population elements to include in the sample.
- ▶ **Step 5:** Physically select the sample based upon the procedure described in step four.

SAMPLING PROCEDURE

- There are two major sampling procedures namely
 - Probability Sampling, and
 - Non probability sampling

PROBABILITY SAMPLING

- Each element of the population has a known chance of being selected for the sample.
- There are four types of probability sampling which are:
 - Simple random sampling,
 - Systematic sampling,
 - Stratified sampling and
 - Cluster sampling.

SIMPLE RANDOM SAMPLING

- ▶ In a simple random sampling each number of the population has a known and equal chance of being selected.
- ▶ e.g If you want a sample of 25 people out of 250 you can assign each name a number placing these 250 numbers in a container and then randomly drawing out 25 numbers.
- ▶ After a number is drawn out it then replaced back into the container so that the probability of any number being selected remains known and equal.

SYSTEMATIC SAMPLING

Here the number are chosen in a systematic manner from the entire population.

- ▶ Each number has a known chance of being selected but not necessarily equal one.
- ▶ E.g if you want to select a sample of 25 from the universe of 250 employees or one out every 10, simple ratio of sample size to population size is 10. i.e
 - $N/n=250/25=10$
- ▶ We randomly select a digit between one and ten say 7. Thus we would select from our list of names the 7th ,17th , 27th ,....up to 247th name,

STRATIFIED SAMPLING

- ▶ **A STRATIFIED SAMPLE** is used when the researcher is particularly interested in certain groups within the total population.
- ▶ the population is divided into several sub populations (strata) that are individually more homogeneous than the total population, and items from each stratum are selected to constitute a sample
- ▶ The universe is divided into strata on the basis of recognizable or measureable characteristics of its members-**age, income, education** etc.
- ▶ The total sample then is composed of members from each stratum so that the stratified sample is really a combination of a number of smaller samples.

Proportionate Stratified sampling

- ▶ It is classified into two categories such as proportionate and disproportionate.
- ▶ Proportionate stratified sampling is the method where the number of items in each stratum is proportionate to their numbers in the universe.
- ▶ For example if we have 50 students 20 of which are females whereas 30 are males, if we want to draw simple random sample it should be in the ratio of 50, 30 and 20
- ▶ That is the total sample elements are allocated to strata in proportion to the number of population elements in the strata.

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- ▶ Assume the following:
- ▶ P_i represents the proportion of population included in stratum “i”
- ▶ n Represents the total sample size- the number of elements selected from stratum “i” is $n \cdot P_i$
- ▶ Suppose that we want a sample of size $n = 30$ to be drawn from a population of size
- ▶ $N = 8000$ which is divided into three strata of size $N_1 = 4000, N_2 = 2400$ and $N_3 = 1600$
- ▶ For strata with $N_1 = n_1 = n \cdot P_1 = 30(4000/8000) = 15$
 $N_2 = n_2 = n \cdot P_2 = 30(2400/8000) = 9$
 $N_3 = n_3 = n \cdot P_3 = 30(1600/8000) = 6$

Disproportionate Sampling

- ▶ This is used when there appear to be major variances in the values within certain strata.
- ▶ With a fixed sample size, those strata exhibiting greatest variability are sampled more heavily than strata that are fairly homogeneous.
- ▶ This means that in some of the strata the number of units would differ greatly from their real representation in the universe.
- ▶ Thus using a disproportionate stratified sample necessitates that the researcher have some previous knowledge about the population being studied.

CLUSTER SAMPLING

- In cluster sampling a cluster or a group of elements is randomly selected at one time. The population must be divided into mutually exclusive and collectively exhaustive groups and each cluster has a known chance of being selected.

NON-PROBABILITY SAMPLING

- In non probability sampling the chance of any particular unit in the population being selected is unknown.
- There are four types of non probability sampling:
 - Judgment,
 - convenience,
 - quota sampling, and
 - snowball sampling.

Judgment / purposive sampling

- ▶ Judgment samples or purposive samples are selected in the basis of what some expert thinks those particular sampling units or elements will contribute to answering the particular research question at hand, for example in testing marketing, a judgement is made as to which cities\towns would constitute the best ones for testing the marketability of a new product.

QUOTA SAMPLING

- ▶ This is a special type of purposive sample.
- ▶ The universe is divided into strata on the basis of characteristics of population.
- ▶ For example an interviewer may be instructed to conduct half the interviews with people 30 years old and over and half with people under 30.
- ▶ Here the control characteristics is the age of respondents.

CONVENIENCE SAMPLING

- ▶ In the method the sample units are chosen primarily on the basis of convenience to the investigator.
- ▶ Examples: asking for people to volunteer to test products and then using these people
- ▶ Stopping people in a shopping mall to get their opinion
- ▶ Using students for conducting on experiment
- ▶ Interviewing people in the street by media people

CENSUS OR SAMPLE?

- When a complete enumeration of all items in the population is done it is known as a census inquiry.
- It can be presumed that in such an inquiry,
- When all items are covered, no element of chance is left and highest accuracy is obtained.
- But in practice this may not be true. Because even the slightest element of bias in such an inquiry will get larger and larger as the number of observation increases.

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- ▶ At times, this method is practically beyond the reach of ordinary researchers.
- ▶ Governments are the only institutions that can get the complete enumeration carried out – thus governments conduct population census once in a decade.
- ▶ When the field of inquiry is large, this method becomes difficult to adopt because of the resources involved.
- ▶ However , when the universe is a small one, it is no use resorting to a sample survey.

ADVANTAGES OF USING A SAMPLE

- ▶ Two of the major advantages of using a sample rather than a census are speed and timeliness i.e A survey based on a sample takes much less time to complete than one based on a census.
- ▶ In certain instances a complete count may require such a long time that, because of changes in conditions, it becomes a historical record by the time it is completed and available for use.
- ▶ **The relative cost and effort.** The total effort and expense required to collect the information by sampling methods will be very much less than that required for a census of the entire population
- ▶ **Administratively.** Considerations dictate that sampling uses, particularly when a census would necessitate the hiring, training and supervising of a large number of people.
- ▶ A sample is necessary because of the distractive nature of the measurement such as the testing of matches.

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- ▶ A sample may be desirable for controlling non sampling errors - taking a sample may permit tighter control of the measuring operations (better interviewing, less non response).
- ▶ A sample may be necessary to enable one to concentrate attention on individual cases. E.g in depth studies.
- ▶ It is possible to obtain more detailed information from a sample- because individuals concerned may be more willing to provide more detailed information if they know they represent only a small proportion of the population.
- ▶ A sample may be necessary because there is no other alternative except to collect information at all- the entire population may not be available for measurement at the time the study must be made.