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***WORKSHOP ON  
RESEARCH METHODOLOGY***

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## **Lecture No. 4**

# **Survey Research and Sampling method**

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## **Definition of Survey Method:**

**A type of non-experimental method that focuses on obtaining information regarding the status quo of some situation, often via direct questioning of a segment of population.**

# Types of Surveys

- 1. Complete survey** - *whole objects or population*
- 2. Sample survey** - *population segment*
- 3. Regular survey** - *at regular intervals*
- 4. Ad-hoc survey** - *for a particular purpose and not of any routine nature*
- 5. Opinion survey** - *for attitudes, ideas, norms etc.*
- 6. Primary survey** - *personally collects for own purposes*
- 7. Secondary survey** - *somebody else collects for their purposes*
- 8. Pilot Survey** - *a survey prior to main survey*
- 9. Base-line Survey** - *to know existing situation*
- 10. End-line Survey** - *to know post-survey situation*

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Contd.

- **Cross Sectional Survey** - *Collects data at one time*
- **Longitudinal Survey** - *Take place over time with two or more data collection*  
*Commonly fall into one of 3 categories: panel, trend and cohort.*

# Sampling Survey Method

## ■ Sampling Terminology

- **Population**

*The entire set of individuals (or objects) having some common characteristics (all entities), universe.*

- **Sample**

*Sample can be defined as a scientifically drawn portion or a segment of the population which represents whole population.*

- **Sampling**

*The whole process of sample taking.*

- **Sample space or sample Frame**

*refers to the population or universe*

# Rationale of Sampling

- Sampling is done instances when the whole population can not be studied.
- When the population is very large and when it is dispensed in a wide geographical area, sampling is the best way to study about the characteristics of the population.

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- The rationale of sampling is to Maximize the precision/accuracy whilst minimizing the cost & Time (a kind of trade-off)

Precision/Accuracy



Cost and Time

# Conditions to meet trade-off

- 1. To select a proper sample size

Compute the required sample size using the following formulas:

1.  $n = \frac{[(\text{Confidence limit}) (\text{sd. pop})]^2}{\text{Accuracy}}$

2.  $n = \frac{\hat{S}^2}{(\text{S.E.})^2}$

3.  $n = \frac{N}{1 + N(e)^2}$

4.  $n = \frac{(c - c_0)}{c_1}$

- 2. To select a proper sampling method.

□ Non-sampling errors cover all errors other than those due to sampling errors. Those errors can be listed as follows:

- a. Interviewer bias
- b. Respondent bias
- c. Instrument or question error
- d. Coding error
- e. classification errors
- f. editing error
- g. data input error
- h. dissemination error
- i. printing error

# Interviewer errors

## Interviewer errors arise when

- different interviewers administer a survey in different ways
- differences occur in reactions of respondents to different interviewers, e.g. to interviewers of their own sex or own ethnic group
- inadequate training of interviewers
- inadequate attention to the selection of interviewers
- there is too high a workload for the interviewer

How can such errors be minimised?



# Reasons for respondent errors

Respondent errors arise for many reasons e.g.

- respondent gives an incorrect answer, e.g. due to prestige or competence implications, or due to sensitivity or social undesirability of question
- respondent misunderstands the requirements
- lack of motivation to give an accurate answer
- “lazy” respondent gives an “average” answer
- question requires memory/recall
- proxy respondents are used, i.e. taking answers from someone other than the respondent.



# Instrument Errors

Instrument or question errors arise when

- The question is unclear, ambiguous or difficult to answer
- the list of possible answers suggested in the recording instrument is incomplete
- requested information assumes a framework unfamiliar to the respondent
- the definitions used by the survey are different from those used by the respondent (e.g. how many part-time employees do you have? See next slide for an example)

How can such errors be minimised?

## Measuring non-sampling errors

Measuring non-sampling errors is difficult and often impossible. Attempts have often been through specific additional studies, e.g. characteristics of non-respondents in the 1996 British Crime Survey were investigated by a mini-questionnaire to those living in 25% of non-responding addresses.

Several studies to assess non-sampling errors can be found in Ruddock (1998) & in Lessler, J.T. and Kalsbeek, W.D. (1992) *Non-sampling error in surveys*; Wiley.

# Sampling Methods

- Probability Sampling
- Non-Probability Sampling

**Probability Sampling:** each member of the group has equal chance of getting selected for the sample.

*Probability sampling is mostly done when you have an idea of the entire population.*

Contd.

- **Non-Probability Sampling:** each member of the group has no equal chance or probability of getting selected for the sample.

*When you do not know about the population you will have to depend on non-probability sampling.*

# Probability sampling:

**There are several methods for probability sampling:**

- (1) Simple Random Sampling
- (2) Stratified Sampling
- (3) Cluster sampling
- (4) Systematic sampling

# Non Probability sampling:

- (1) Accidental/ convenience sample – lead to snowball sample.
- (2) Purposive or judgmental sampling
- (3) Quota Sampling

# Simple Random Sampling (SRS)

- *a Definition and Description of procedure*

Simple random sampling is a sampling procedure that allows each member in the population equal chance of getting selected in the sample, i.e., every members of the population must have an equal and known nonzero probability of being selected.

Scientists usually use computer programmes or tables of random digits to select random samples. By taking numbers from the table the sample is selected by matching the numbers of the table with the list of population till the required sample size is obtained.



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- b. *Advantages*

- i) The sample mean is an unbiased estimate of the population mean.
- ii) Estimation methods are simple and easy.
- iii) No sampling bias and it is the method of sampling from a large population.

- c. *Disadvantages*

- i) The sampling frame should be available.



cont.

- ii) The sample chosen may be widely spread, thus entailing high transportation costs.
  - iii) The sample chosen may not be truly typical of the population.
- d When to use
- i) SRS is done where there is a sampling frame (list of population)
  - ii) When the population is homogeneous.
  - iii) If the population is not widely spread geographically.

# Stratified Sampling

- *a Definition and Description of procedure*

It is a method in which in the first instance the whole population that is required to be studied is divided into different groups of strata.

Stratified sampling is used primarily to ensure that different groups of a population are adequately represented in the sample so that the level of accuracy in estimating parameters is increased

# Types of stratified sampling

## I) Proportionate Stratified Sampling

- The number of elements from each stratum in relation to its proportion in the total population is selected.

## ii) Disproportionate stratified sampling

- consideration is not given to the size of the stratum.

## b. *Advantages*

- i) Allows each group in a heterogeneous population to be selected in an equal manner.
- ii) Administratively convenient.
- iii) Stratification may bring about a gain in precision of the estimates of the characteristics of the population

## *Disadvantages*

- i) A listing of the population from stratum to stratum is needed.
- ii) transportation costs are high specially if the population covers the wide population area.
- iii) stratified sample requires even more labour and effort that SRS because a sample must be drawn from multiple enumerated listings.

d. When to use

- i) stratified sample is done when there is a heterogeneous population.
- ii) if precise estimates are desired for certain parts of the population.

# Cluster sampling

- *A. Definition and Description of procedure*

cluster sampling is a method of selection in which the sampling units consists of more than one population elements.

each sampling units is a group or cluster of population elements.

# *Advantages and disadvantages of cluster sample*

## *Advantages*

- i) Listing cost is reduced.*
- ii) Transportation cost is reduced.*
- iii) A population list is needed.*

## *Disadvantages*

- *i) the cost and problems of statistical analysis are grater.*
- *ii) estimation procedures are difficult.*

### **d. When to use**

- I) To study group of people rather than individual selection in order to lower the cost per element more than compensates for its disadvantages**
- 11) To highlight the different characteristics under study**

# Systematic Sampling

## a. *Definition and Description of procedure*

Sampling wherein every  $k$ th subsequent unit after the chosen random start is taken for the sample.

( here  $k = N/n$  )

## b. **Advantages**

- i) Drawing of the sample is easy
- ii) Easy to administer in the field
- iii) Sample is spread evenly over the population
- iv) Likely more precise than random sampling



## C. Disadvantages

- i) A systematic sample may give poor precision when unsuspected periodicity is present in the population
- ii) A population frame or list is needed.

### d. When to use

- i) If the ordering of the population is essentially random
- ii) If there is a slight stratification in the population.

# Non Probability Sampling

- (1) Accidental/ convenience sample – lead to snowball sample.

*- A convenience sample is obtained when the researchers selects whatever sampling units are conveniently available. There is no way of estimating the representative ness of convenience samples and thus of estimating the population's parameters.*

*- A form of convenience sample is snowball sampling which is the process of selecting a sample using networks. To start with, a few individuals in a group or organization are selected and the required information is collected from them and asked from them other people in the group and continue in the gathering of information.*

## Purposive or judgmental sample

- The sampling units are selected subjectively by the researcher, who attempts to obtain a sample that appears to be representative of the population. The researcher selects only those people who in her/his opinion are likely to have the required information and be willing to share it.
- ***Quota Sampling***

The main aim of a quota sample is the selection of a sample that is as similar as possible to the sampling population.

# Advantages and Disadvantages

- i) All non probability sampling are easy to draw.
- ii) Least expensive compared to probability sampling
- iii) You do not need any information about the population such as sampling frame.

## Disadvantage:

- i) As the resulting sample is not a probability one, the findings cannot be generalized.
- ii) Less representative ness.

## When to use:

1. Population list is not available
2. Researcher needs to explore a phenomena subjectively

*Thank you  
for your listening*