DATA

Data are the facts and figures that are collected, summarized, analyzed, and interpreted.

- Data can be further classified as being qualitative or quantitative.
- The statistical analysis that is appropriate depends on whether the data for the variable are qualitative or quantitative.
- Qualitative Data can be either numeric or Logical (nonnumeric).
- Quantitative data indicate either how many or how much.
  - Quantitative data that measure how many are discrete.
  - Quantitative data that measure how much are continuous because there is no separation between the possible values for the data.
- Quantitative data are always numeric.

POPULATION: The collection or group of all items about which information is collected is called the **population** or the **Universe**.

SAMPLE: The group of items selected from population in a particular manner is called a **SAMPLE**. OR A part (subset) of the population selected in some prescribed manner.

CHARACTERISTIC: The properties which are to be studied for each individual of the population are called **CHARACTERISTIC** of the population.

ATTRIBUTE: The characteristics of an items that cannot be measure in some definite unit is called an **ATTRIBUTES**.

VARIATE: The characteristics of an item that can be measure in some definite unit is called a **VARIATE**.

PARAMETER: A statistical measure (such as mean, s.d) calculated from the population is called a **PARAMETER**.

STATISTIC: A Statistic measure (mean,s.d) calculated from the sample is called a **STATISTIC**.

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To apply statistical methods or to study a problem we must collect data.
Collection of data is very important as it forms the basis of the analysis.

Why We Need Data

- To provide input to survey
- To provide input to study
- To measure performance of service or production process
- To evaluate conformance to standards
- To assist in formulating alternative courses of action
- To satisfy curiosity.

It is important to understand the techniques of collection of data because if the data is not collected properly its reliability itself becomes questionable and our entire analysis will be on weak foundations. Based on whether the investigator collects data himself/herself or uses data collected by some other person or agency data is classified into two types. Primary data and Secondary data.

SOURCES OF INFORMATION

Primary Source

- Data is collected by Researcher himself
- Data is gathered through questionnaire, Interviews, observations etc.

Secondary Source

- Data collected, Compiled or Written by other Researchers eg. Books, Journals, newspapers
- Any reference must Be acknowledged

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STEPS TO COLLECT DATA

- REVIEW & COMPILE SECONDARY SOURCE INFORMATION
  (Referred to in the BACKGROUND/ INTRODUCTION section of report)
- PLAN & DESIGN DATA COLLECTION INSTRUMENTS
  TO GATHER PRIMARY INFORMATION
  (Referred to in the FINDINGS, CONCLUSIONS & RECOMMENDATIONS sections of report)
- DATA COLLECTION
- DATA ANALYSIS AND INTERPRETATION

➢ METHODS USED TO COLLECT PRIMARY SOURCE DATA

1. Interviews
2. Questionnaires
3. Survey
4. Experimentation
5. Case Study
6. Observation

However, for a small-scale study, the most commonly used methods are interviews, survey questionnaires and observations

1. INTERVIEW

- Effective way of gathering information
- Involves verbal and non-verbal communications
- Can be conducted face to face, by telephone, online or through mail

2. Steps To An Effective Survey Questionnaire

- Prepare your survey questions
  (Formulate & choose types of questions, order them, write instructions, and make copies)
- Select your respondents/sampling (Random/Selected)
- Administer the survey questionnaire (date, venue, time)
- Tabulate data collected (Statistical analysis-frequency/mean/correlation/%)
- Analyze and interpret data collected

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3. Survey Questionnaire
    - The most common data collection instrument
    - Useful to collect quantitative and qualitative information
    - Should contain 3 elements:

      Introduction – to explain the objectives

      Instructions – must be clear, simple language & short

      User-friendly – avoid difficult or ambiguous questions
    - Basic Types of survey questions:

Open-ended Questions	Close-ended Questions
- Free-response (Text Open End) - Fill-in relevant information	– Dichotomous question – Multiple-choice – Rank – Scale – Categorical – Numerical

4. In a small **scale study**, the most common forms of statistical analysis presented are:
    - Frequency
    - Mean
    - Percentage

5. Observations
    - Observe verbal & non-verbal communication, surrounding atmosphere, culture & situation
    - Need to keep meticulous records of the observations
    - Can be done through discussions, observations of habits, rituals, review of documentation, Experiments.

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Steps to an Effective Observation

- Determine what needs to be observed (Plan, prepare checklist, how to record data)
- Select your participants (Random/Selected)
- Conduct the observation (Venue, duration, recording materials, take photographs
- Compile data collected
- Analyze and interpret data collected

➢ COLLECTION OF SECONDARY DATA

Secondary data are those which are collected by some other agency and are used for further investigation. The sources of secondary data can be classified into

a) **Published sources** b) **Unpublished sources**

Published Sources

Some of the published sources providing secondary data are:

a. Government Publications: Government, semi-government and private organizations collect data related to business, trade, prices, consumption; production, industries, income, health, etc.
These publications are very powerful source of secondary data.
Central Statistical Organization (C.S.O.), National Sample Survey Organization (N.S.S.O.), office of the Registrar, and Census Commissioner of India, Directorate of Economics and Statistics and Labour Bureau-Ministry of labour are a few government publications

b. International Publications: Various governments in the world and international agencies regularly publish reports on data collected by them on various aspects.
For example, U.N.O.'s Statistical Year book, Demography Year Book.

c. Semi-official Publications : Local bodies like District Boards, Municipal Corporations publish periodicals providing information about vital factors like health, births, deaths etc.

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d. Reports of Committees and Commissions:
At times state and central governments appoint committees and commissions with a specific reference to study a phenomenon.

The reports of these committees and commissions provide important secondary data.
For example, Kothari commission report on education reforms, Report of National Agricultural Commission.

e. Private Publications: The following private publications may also be enlisted as the source of secondary data Journals and Newspapers such as the Financial Express and Economic times Research Publications of well-known agencies such as Indian Statistical Institute (I.S.I.) Calcutta and Delhi, I.C.A.R., N.C.E.R.T., I.C.M.R.,
Publications of Business and Financial Institutions such as the Stock Exchanges, Chambers of Commerce, Newspaper Articles are also sources of secondary data.
Although secondary data are easier and cheaper to procure they have certain limitations which one must be aware of it.

The limitations include

1. The possibility that proper procedure might not have been followed in their collection
2. These may not be relevant in the present contest.
3. These may not be free from personal bias and prejudices.
4. These may not have the needed accuracy or reliability.
5. These may not be adequate.

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