Sampling

Meaning and Definition

A population is the entire collection of all observations of the interest for the research. After the selection of subjects or problem for the study, it is very costly and time consuming for the study of universe (entire population). Thus, to make easier to the study, representative portion of the population is selected for the study that is known as sample. The process of selecting the sample (individual, group etc.) based on the nature and necessity of research is known as sampling. Sample must represent the population so that the findings of the research can be generalized in the population.

If a researcher studies the entire individual, area and group then such study is known as census study. If the study is conducted selecting few representative sample from the population, then such study is known as sampling study.

If the sample selected by the researcher represents the entire population and findings of the study considering to sample can be generalized to entire population then such sample is considered as representative sample. Sampling has made possible to undertake the research in various subjects because it reduces costs and time. Following definitions give insights about sampling.

According to **Cooper and Schindler,** "*Sampling is some elements of population which helps to drawn conclusions about the entire population.*"

According to **U. Sekaran,** "*Sampling is a process of selecting sub-set of the population by the study of which a researcher would be able to draw conclusions that would be generalizable to the populations.*"

According to **P.V. Young,** "*A statistical sample is miniature picture or cross section of the entire group or aggregates from which sample is taken, the entire group from which sample is chosen is known as the population or universe.*"

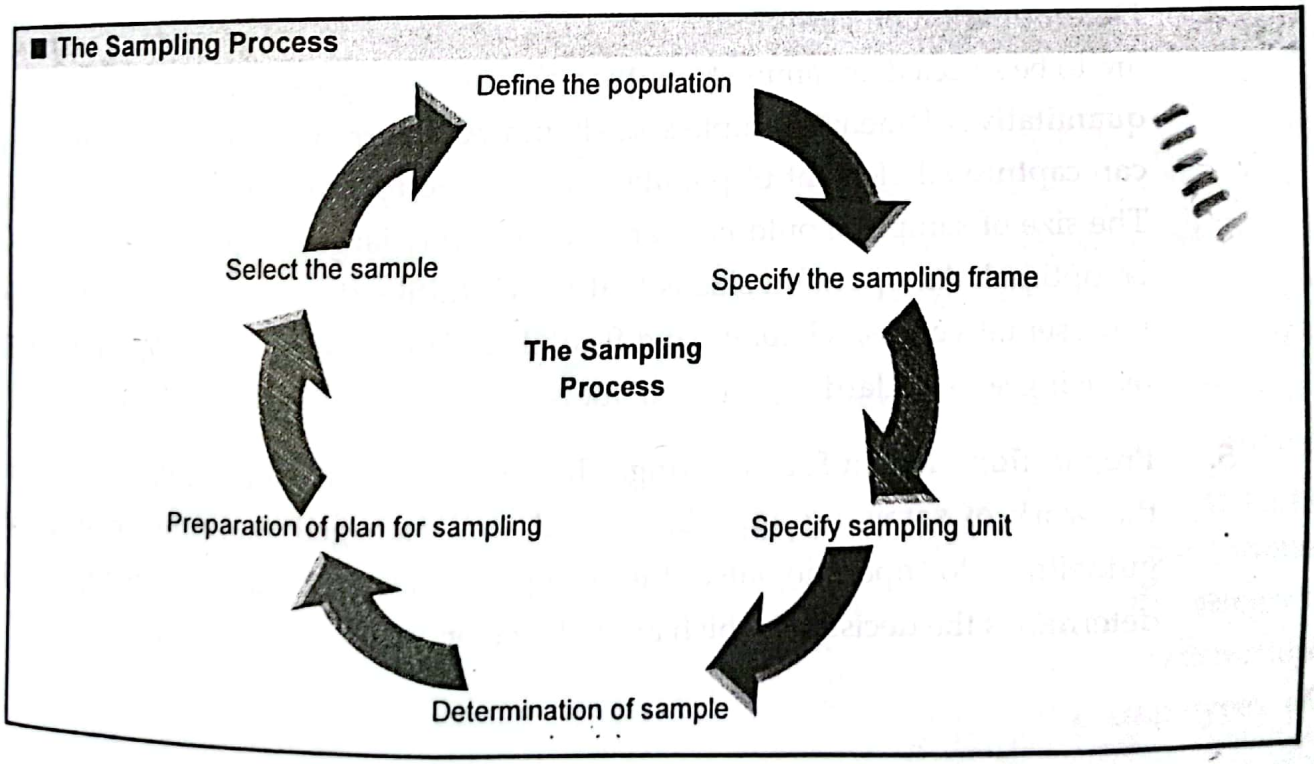
Reasons for Selecting Sample

There are several reasons for sampling. They are explained below:

1. **Lowers cost:** Researcher should spend large amount for census study. If researcher conducts the research taking sample, then the cost for collecting and analysing data will be less:
2. **Provides greater accuracy:** Sampling posses the possibility of better interviewing through investigation of missing, wrong or suspicious information, better supervision and better processing than census study. Thus, there is likely to be greater accuracy.
3. **Helps to greater speed of data collection:** There is less number of respondents and researcher or data collector. They can clearly give instructions to the respondents so that they can provide data quickly and researcher also gets the data with a greater speed.
4. **Inaccessible population:** Even though the population is well defined and countable, yet it is not possible to get information about every member. So, sampling is essential.

The Sampling Process

Sampling is an important function of research. Right sampling helps to draw right conclusions and such conclusions can only be applied in practice. Thus, sample should not be selected in hunches but it should be selected following certain process. Generally, the following procedures are pursued while selecting sample:



1. **Define the population:** The population is the collection of whole units (people, object etc.) that researchers are interested in knowing about them. Definition of population depends on the subject and nature of research and availability of resources and time for research. Findings of the research should be implemented in the population; therefore, it is to be defined clearly and precisely. The researcher can select sample after defining population. Population should be defined in terms of elements, sampling units and time. Defining a population incorrectly may render the results of the study meaningless or even misleading. If we are dealing with people, population of individuals are typically defined in some combination of demographic (age, gender, income etc.) geographic (Towns, village etc) and behavioural (introvert, extrovert etc.) components.

2. **Specify the sampling frame:** Sampling frame is the list of elements from which the sample is drawn. After defining the population, researcher should get the full, accurate and up-date list of all units of population. A sampling frame can be telephone directory, and employee roaster, voter list or list of all students attending a college. Thus, a perfect sampling frame is one in which every element of the population is represented.

3. **Specify sampling unit:** A decision should be taken by the researcher concerning a sampling unit before selecting sample. The sampling unit is the unit that represents every characters of population. The sampling is based on the sampling frame but determination of sampling unit depends on subject and nature of research and research design. Sampling unit may be geographical one such as state, district, village, etc. or a social unit such as family, club, school etc. or an individual.

4. **Determination of sample size (n):** Same size refers to the number of items which are to be selected as sample from the population. Populations have qualitative and quantitative elements. Sample size should be determined in such a way so that it can capture all element of population and able to attain the goal of the research. The size of sample should neither be excessively large nor too small but it should be optimal. An optimum size is that which fulfills the requirements of efficiency, representativeness, reliability and flexibility. Sample size can be determined either by using set standard or statistical tools.

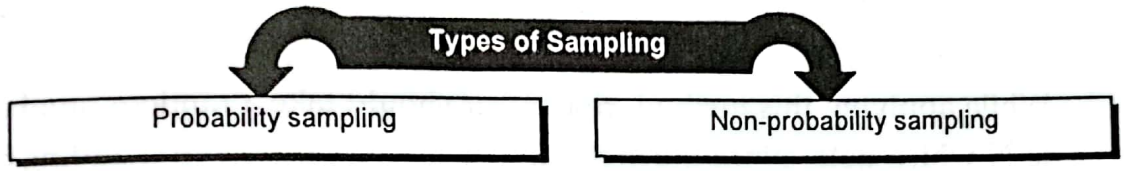
5. **Preparation of plan for sampling:** The researcher should formulate plan to make the work of sampling appropriate and well managed. Sampling plan provides guidelines to operationalise the sampling design and size. Sampling plan determines the decisions which are to be taken while selecting sample and its use.

6. **Select the sample:** It is a final step of sampling work. Selection of sample requires substantial amount of office and field work. Selected sample should represent to the population and useful to attain the goal of research.

Types of Sampling

Proper sample selection is a very important work in research. Appropriateness of sampling depends on the nature, goal, subject and availability of resources and time. Thus, various sampling techniques are developed which are described below:

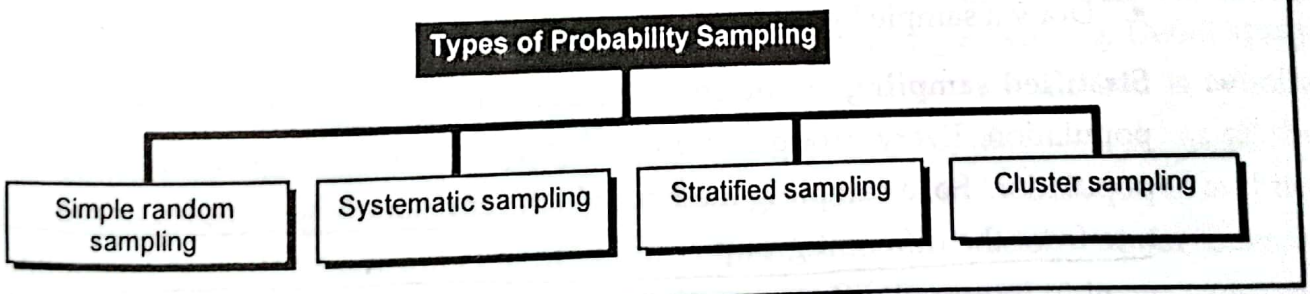
Figure: Types of Sampling



1. Probability Sampling

A sampling technique where every element in the population has equal chance of being selected as sample unit is known as probability sampling. Selection of element depends on incident. In this method, researcher also cannot estimate which element will be selected and can use his/her opinion in sampling. It is used when there is necessity of generalizing findings of the research in large population. There are various techniques of selecting sample based on probability. Some of the important probability sampling techniques are described below:

Figure: Types of Probability Sampling



a. **Simple random sampling:** Sampling where every element in the population has equal chance of being selecting as a sample is known as simple random sampling. Under this technique, required samples are selected using lottery method, number order method, random number test etc. but nowadays computerized lottery is used to select the sample. Simple random sampling is used when sampling frame can be developed and researchers need to generalize the findings of the research in population. For example, if a required researcher wants to know the satisfaction level of banking employees in Nepal then he/she considers the employees of

banking sector as population and selects the number of sample using computerized lottery system.

b. **Systematic sampling:** Systematic sampling involves the random selection of the first item from the systematically ordered population and then the selection of a sample items at every K^{th} interval. To select the sample items in systematic sampling, we need to calculate the sampling interval. Sampling interval is calculated as:

$$\text{Sampling interval (K)} = \frac{\text{Size of population (N)}}{\text{Size of sample (n)}}$$

This is a simplest and most widely used method of drawing a sample. The interval (K) is fixed by dividing the population by sample size.

While applying this method, researcher should take a random number between 1 to N which determines the first number for the sample. And adding or deducting to the internal value other sample items are selected. For example, if a researcher has framed 400 employees as population and intends to take 10% i.e. 40 persons as sample then first he/she will select one item that is from 1 - 400. Suppose first number selected is 5 then K-value is 10 (400/40 = 10). So, the sampling units are 5 + 10 = 15, 15 + 10 = 25, 25 + 10 = 35 and so on. Following procedures should be followed while applying this method.

- List the total number of units in the population.
- Decide the sample size (n).
- Calculate the sampling interval. Sampling interval = $\frac{N}{n}$
- Identify the random start of first number selected from population.
- Draw a sample by using sampling interval.

c. **Stratified sampling:** Strata refers to the overlapping homogenous groups in the population. Every group should be incorporated in the sample to represent the population. So, a sampling method which represents the samples in proportionate rate from the different group of population is known as stratified sampling. If we want to represent different section of the population in the study such as male and female, educated and uneducated or employed and unemployed, this method of sampling is suitable. In this sampling, population is divided into sub-groups or strata and a proportionate sample is selected from each group or strata. It is used in research because it helps to increase sample's statistical efficiency, provide adequate data for analyzing the various sub-groups and enables the use of different research method in different groups.

It can be proportionate or disproportionate. Proportionate stratified sampling refers to the act of selecting sample from each group in the same proportion. If the

selection of sample is made in less and more number when population of the sub-group is highly different such sampling technique is disproportionate sampling.

Stratified sampling can be made clear from the following example: If a manager wants to know the motivation of employees, he/she may select sample as follows:

Job Level	No. in Group	Proportionate Sample/Size	Disproportionate Sample Size
Higher level manager	20	2	5
Middle level mangers	40	4	2
Lower level mangers	50	5	4
Total	110	11	11

The processes that are to be followed while applying stratified sampling are given below:

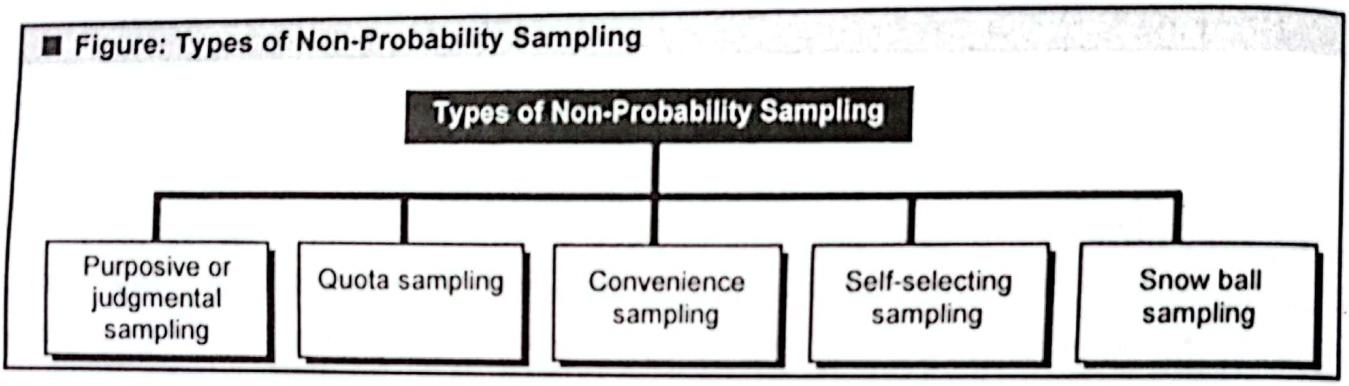
- Determine the variables to use for stratification.
- Determine the proportions of the stratification variables in the population
- Select proportionate or disproportionate stratification based on information needs and risk.
- Divide the sampling frame into separate frames for each group
- Follow random or systematic procedures to draw the sample from each group.

d. **Cluster sampling:** Cluster is a heterogeneous group that is in the population. Cluster sampling identifies clusters that are internally heterogeneous. Every cluster contains many elements into the single element so, it is considered as small population. Employees grouped in branch office, customers at each super market branch are examples of clusters. Sampling, where a group is selected as sample having all elements of the population, is known as cluster sampling. Generally, random sampling method is used while selecting clusters as sample. Detail study of selected cluster is essential to find the correct results. This method is usually convenient for collection of data as a cluster is a mini population and has all the features of the population. Clusters are heterogeneous within themselves and not like the homogeneous strata. Hence, collection of data would be far easy as compared to other methods. It is suitable in the absence of suitable sampling frame. Frames are needed for the selected cluster only and it reduces the cost of developing frame as compared to other probability sampling. For example: If a manager wants to know the reason of resignation of employees, he/she first develops the group on the basis of work level (position). He also prepares the list of employees of these groups. On the basis of random sampling, cluster is selected as sample. With the detail study of such cluster, researcher finds out the reason of resignation.

2. Non-Probability Sampling

Sampling where there is no equal chance of selecting as sample to each unit and sampling is made based on pre-plan is known as non-probability sampling. The findings of such sampling cannot be generalized because samples are selected with specific purpose or separating the area in advance. This sampling is considered appropriate if researcher needs to collect data with low cost and time and generalization of findings is not essential. There is a chance of biasness in selecting sample while using this method for sampling. Some of the important non-probability sampling methods are given below:

Figure: Types of Non-Probability Sampling



a. **Purposive or judgmental sampling:** A sampling method where samples are selected by the researcher based on his or her judgment is known as judgmental sampling. Those units or individuals are selected as sample which can fulfill the purpose but it does not consider the convenience of the researcher. Researcher sets the bases and those units are selected as sample which can ensure those bases. Researcher should know every unit of population and their features for applying this sampling method. Otherwise researcher cannot collect essential information and data. Thus, this sampling is generally used by the expert.

If a researcher needs to get the specific and specialized information this method is considered as appropriate method but it is a very difficult task that to find out the person who has knowledge about the subject of research. For example, if a researcher wants to test the effectiveness of training, he/she selects as sample to those employees who attend training and collects the information. This sampling is considered as judgmental sampling.

b. **Quota sampling:** A sampling method where population is divided into different groups based on their nature, features, qualities etc. and sample is selected from each group in a certain rate is known as quota sampling. In this sampling, first of all, groups are formed on the basis of profession, level, caste, area etc. based on the size of population like some sample from more population. It is non- probability sampling so its findings cannot be generalized.

It is used widely because every society and work field has heterogeneous group and for the study of those groups, this sampling method is used. To know the buying behaviour of different group of people, to know the attitude of the group of employees regarding the culture of their organization, this sampling method is considered as appropriate method. Following steps should follow to apply this sampling method:

- Classify the population into different classes based on demographic factors i.e. age, sex, income level etc.
- Determine number of samples to be selected from each class.
- Select the sample based on pre-determined number from each class.

c. **Convenience sampling:** Researcher selects the units as sample on the basis of his/her convenience is considered as convenience sampling. The researcher selects those units that are available, nearby and willing to participate or has relationship. It is also known as accidental sampling because samples can be selected from anywhere else. Generally, this method is used when there is high limitation of time and resources. For example: If any person wants to have research on the facilities provided to banking employee, then researcher selects those banks as sample where his/her relative works or nearby banks then it is convenience sampling. It is not totally valid method but for pre-testing of questionnaire and descriptive research it is considered as the best method. A researcher can collect data quickly and at low cost and time using convenience sampling method.

d. **Self-selecting sampling:** If the researcher gives information through media to the respondents and respondents provide information on the basis of information received through media then such sampling is known as self-selecting sample. Those who provide information on the basis of information are considered as sample. Validity and reliability of this method is less. Generally, it is used to know the goodwill and evaluate the service provided by the organization.

e. **Snow ball sampling:** It is also known as reference sampling. If the population is infinite or not fixed, then researcher selects one or few sample whose profile is fit to get the information and on the basis of reference of those sample people, other samples are selected. Such sampling method is known as snow ball sampling. If it is difficult to find out the sample then few people or single person is identified and other persons are identified based on the reference of previously selected persons. It is considered as snow ball because in this sampling small sample unit forms large sample as the snow ball. It is usually used by police to find out criminals, and to study over the group activities, culture and relationship of society etc. Main problem of this sampling is to maintain relation with the first person or sample unit. The following steps should be pursued to use this method:

- Finding out the first person from the population who can give information about the subject under study.
- Ask to refer to other persons who can give information about the subject under study.
- If further sample is not found or sample formed large number of person then close the sampling work.

Descriptions of various types of samples are summarized below:

Types of Sampling	Brief Description
A: Probability Sampling	
a. Simple random sampling	All elements in the population are considered and each element has an equal chance of being chosen as the subject.
b. Systematic sampling	Every n^{th} element in the population is chosen stating from a random point in the population frame.
c. Stratified sampling	Population is first divided into meaningful segment and samples are selected in proportionate or disproportionate way from each meaningful segment.
d. Cluster sampling	Groups that have heterogeneous members are first identified then some are chosen at random. Members in each of the randomly chosen groups are studied.
B: Non-Probability Sampling	
a. Purposive or judgmental sampling	Subjects selected on the basis of their expertise in the subject investigated.
b. Quota sampling	Subjects are conveniently chosen from target groups according to some predetermined number or quota.
c. Convenience sampling	The most easily accessible members are chosen as samples.
d. Self-selecting sampling	Selecting the sample based on the response provided spontaneously.
e. Snowball sampling	Selecting few or single sample at first and obtaining other sample units on the basis of their reference.

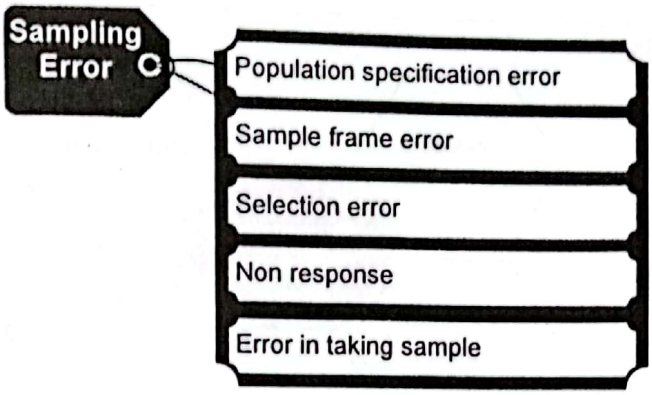
Adopted from Sekaran (1992)

Sampling Errors

The error that arises as a result of taking a sample from a population rather than using the whole population is known as sampling error. An estimate of a population parameter, such as a sample mean or sample proportion, is likely to be different for different samples (of the same size) taken from the population and each estimate is likely to be different from the true population parameter. Sampling error is one of two reasons for the difference between an estimate and the true, but unknown value of the population parameter. For example, if one measures the height of a thousand individuals from a country of one million, the average height of the thousand is

typically not the same as the average height of all one million people in the country. Since sampling is typically done to determine the characteristics of a whole population, the difference between the sample and population value is considered a sampling error. The sampling errors commonly taken place are given below:

Figure: Sampling Errors



1. **Population specification error:** This error occurs when the researcher does not understand who should be surveyed. For example, imagine a survey about breakfast cereal consumption. Who should be surveyed? It might be the entire family, the mother, or the children. The mother probably makes the purchase decision, but the children influence her choice.

2. **Sample frame error:** A sample frame error occurs when the wrong sub-population is used to select a sample. If we use the telephone directories as sample frame for conducting research of those people who do not use telephone then sample frame is wrong so the prediction of the research will also be incorrect.

3. **Selection error:** This occurs when respondents self select their participation in the study – only those that are interested to respond. Selection error can be controlled by going extra lengths to get participation. A typical survey process includes initiating pre-survey contact requesting cooperation, actual surveying, post survey follow-up. If a response is not received, a researcher can make second survey request, and finally interviews using alternate modes such as telephone or face-to-face.

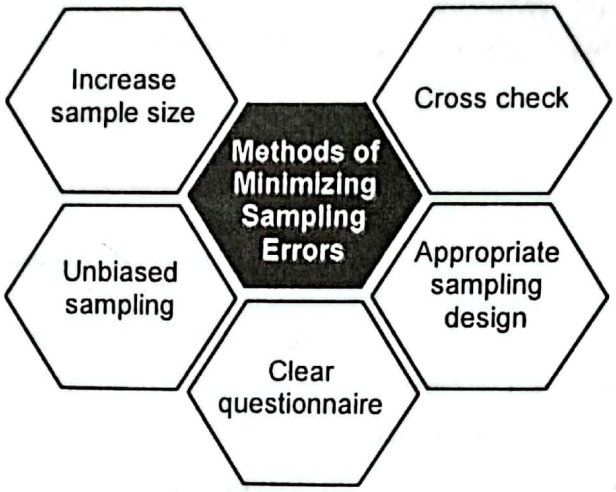
4. **Non response:** Non-response errors occur when respondents are different than those who do not respond. This may occur because either the potential respondent was not contacted or they refused to respond. The extent of this non-response error can be checked through follow-up surveys using alternate modes.

5. **Error in taking sample:** These errors occur because of variation in the number or representativeness of the sample that responds. Sampling errors can be controlled by (1) careful sample designs, (2) large samples, and (3) multiple contacts to assure representativeness of response.

Methods of Minimizing Sampling Errors

Population always remains larger so census study is not possible. Thus, researcher conducts research considering to the sample. Obviously, there will be sampling errors while conducting research considering to samples. Such errors can be minimized doing following works:

■ Figure: Methods of Minimizing Sampling Errors



1. **Increase sample size:** Increase in sample size represents to the more characters of population. Errors can be minimized if sample size is increased. A researcher, as far as possible, should increase the sample size to minimize sampling errors.

2. **Cross check:** Sample and responses are collected from the various sources. Such responses should be checked so that unrelated and biased responses can be removed and errors can be minimized.

3. **Unbiased sampling:** If the samples are selected without any bias or using statistical method then there is chance of selection of right samples that helps to minimize errors.

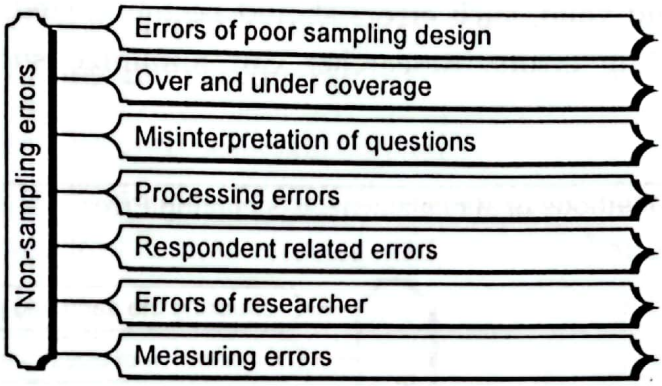
4. **Appropriate sampling design:** A researcher should prepare sample plan before selecting sample. Sampling plan considers to the importance and necessity of sample and nature of research so that appropriate sampling is possible that helps to minimize sampling errors.

5. **Clear questionnaire:** A questionnaire should be clear and should not include ambiguous words and complex sentences. If questionnaire is clear, there are chances of right response so that errors can be minimized.

Non-Sampling Errors

Errors which are incurred from other sources than selection of sample are known as non-sampling errors. Non-sampling errors may arise at the time of planning and execution of the survey and collection, processing and analysis of the data. As well, non-sampling errors take place due to wrong selection of questions, wrong understanding and response of respondents, wrong method of research and use of wrong tool of analysing data. Non-sampling errors are exist both in census and sampling study. Following errors are major non-sampling errors.

Figure: Non-Sampling Errors



1. **Errors of poor sampling design:** If the researcher fails to identify appropriate respondent and proper planning for selecting sample then results of the research cannot present the actual output.

2. **Over and under coverage:** Sometimes, researcher may select more elements while selecting sample or may leave the essential elements of population. Such study cannot give appropriate results.

3. **Misinterpretation of questions:** If researcher uses difficult and ambiguous words, respondents may interpret the questions differently so that their responses do not represent the concept. Thus, researcher should prepare questionnaire considering the level of respondents otherwise there is a chance of wrong response.

4. **Processing errors:** There may be errors in coding, decoding, editing and analyzing the data and interpreting the results of the research. Such errors mislead the results of the research.

5. **Respondent related errors:** When respondent do not give response or give bias response or not able to give response or researcher not able to record the response properly then the result of the research will be wrong.

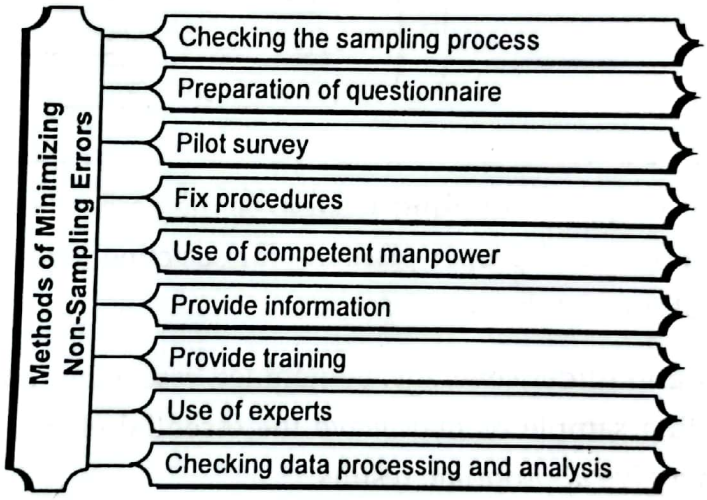
6. **Errors of researcher:** There might be errors in the research result due to weak definition of variables, selection of wrong method, and preparation of weak questionnaire and weak administration of questionnaire by the researcher.

7. **Measuring errors:** Due to weakness in the measuring instruments like lack of awareness in respondents, unclear understanding of questionnaire due to poor preparation, unskilled, and untrained surveyor, errors may take place such errors are measuring errors. Measuring errors also influence the results of the research adversely.

Methods of Minimizing Non-Sampling Errors

Human errors are obvious in every human activity but to make research work more reliable and valid, such errors should be minimized. It is very hard to minimize the non-sampling errors. Researcher can minimize such errors performing following works:

Figure: Methods of Minimizing Non-Sampling Errors



1. **Checking the sampling process:** Check the elements of population while selecting it for research to find out whether the essential elements are left or unnecessary elements are included or elements are repeated. Such check can be made by the researcher himself or with the help of experts.

2. **Preparation of questionnaire:** Researcher should prepare questionnaire considering to the level of respondents. Questionnaire should not contain dual meaning, unclear and ambiguous words and complex sentences. Questionnaire should be clearly and easily understandable to the respondents.

3. **Pilot survey:** Conducting pilot survey helps to reduce the problems related to the questionnaire. It helps to get feedback and improve the questionnaire.

4. **Fix procedures:** Establishing certain procedures while involving respondents and researchers in the research work.

5. **Use of competent manpower:** Competent surveyor or interviewer is to be selected so that they can collect appropriate information or data.

6. **Provide information:** Surveyor should tell his/her experience or related facts or other informal issues to the respondents to draw their attention but should not talk about the weaknesses of the researchers.

7. **Provide training:** Providing training to surveyor related to the filling up of questionnaire, method of taking interview, behaviour to be presented with the society and individual and method of concluding the interview or other works.

8. **Use of experts:** Researcher should take the help of expert to minimize errors especially in coding, recording and decoding.

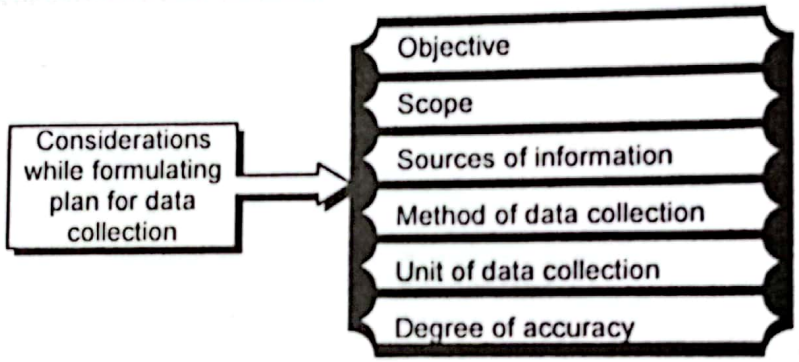
9. **Checking data processing and analysis:** Researcher should use various techniques to check all the steps in the processing and analysis of data. Such check helps to strengthen the work of data processing and analysis that helps to reduce errors

Concept of Data

Data collection is an important work of research. Data helps to find out accurate results. The information or facts collected through record, observation and measurement is known as data. Thus, data does not only represent to quantitative facts but it refers to video tapes, interview, records and photos. Generally, data are classified as subjective and objective, quantitative and qualitative and primary and secondary.

The first work of research is data collection. Essential information for research is collected through data collection procedures. Collection and analysis of appropriate and accurate information helps to take right decision. Thus, we shall collect information carefully. The researcher should prepare data collection plan before the collection of data. Following things should be taken into consideration while formulating plan for data collection:

Figure: Considerations While Formulating Plan for Data Collection



1. **Objective:** First of all, researcher should be clear about the objective of collecting data. Objective derives the data collection procedure. If similar types of research were conducted in the past then a researcher should see the method adopted in data collection in the past getting for information so that researcher can use the same method.

2. **Scope:** Scope determines the nature of data to be collected. It determines the population and sample for data collection. Suppose a researcher wants to assess the training need of the employees of banking sector then he/she should determine the bank from which the data should be collected so that everyone's representation can be made. Determination of on sector for the study like bank is determination of scope of data collection.

3. **Sources of information:** Sources of information are primary and secondary. The researcher can collect the information either from primary or secondary sources on the basis of nature of research. Thus, a researcher should decide the source of information considering to research objective and nature of research.

4. **Method of data collection:** We can collect data from census and sample. Information is collected from every unit of population in census method and information is colleted from the selected representative units of population in sample method. The researcher should decide any one method of data collection considering to research objective, nature of research and size of population.

5. **Unit of data collection:** Those units which are considered by the surveyors while collecting data for research is known as unit of data collection. The researcher should clarify the unit of data collection. If a researcher units develop different types of data from wrong unit that creates problem in comparing data and developing result. The research result drawn from such data will not be reliable.

6. **Degree of accuracy:** The researcher should decide the extent of accuracy of the results in advance or researcher should decide the level of significance. Absolute accuracy is impossible but high degree of accuracy is pre-requisite for the research. Generally, degree of accuracy depends on research objectives.

Types of Data

Mainly data are classified as primary and secondary and quantitative and qualitative. Those classifications are described below:

1. **Primary and secondary data:** Data that has been collected by the researcher himself/herself as per the objective of the research is known as primary data. Such data are originally collected by the researcher and field work is required to generation primary data. Primary data can be generated through administration of questionnaire, telephone contact, observation, group discussion, interview, etc.

   If a researcher uses the data developed by others in the past for their own purpose is known as secondary data. Secondary data can be obtained from published and unpublished sources. Those data which are published by other organizations in the form of reports and publications like government reports, and publications reports of NGOS and INGOS, reports of private organizations such as report of FNCCI, Chamber of Commerce, Trade Promotion Centre (TPC) etc. are published sources of secondary data and unpublished sources refer to the report of various research conducted by individuals and organizations but not published by the researcher like dissertation (thesis) of students and research report of freelancer researchers.

   Generally, there is no much more difference in primary and secondary data because same data is primary data to those who collect it but same data is secondary data for the next person. For example, Data collected by Nepal Rastra

Bank related to national income is primary data to Nepal Rastra Bank but same data is secondary data to the other ministries, departments and individuals.

2. **Qualitative and quantitative data:** Data collected on the basis of quality or characteristics is known as qualitative data. In other words, they are the data that they can be observed and not measured. Qualitative data are subjective in nature and can be explained but can not be tested using statistical tools. For example, kindness of human beings is an example of qualitative data.

   Quantitative data deals with numbers. They are the data that can be measured. Length, height, area, volume, weight, speed, time, temperature, humidity, cost, members, age, etc. are few of the examples of quantitative data.

Sources of Data

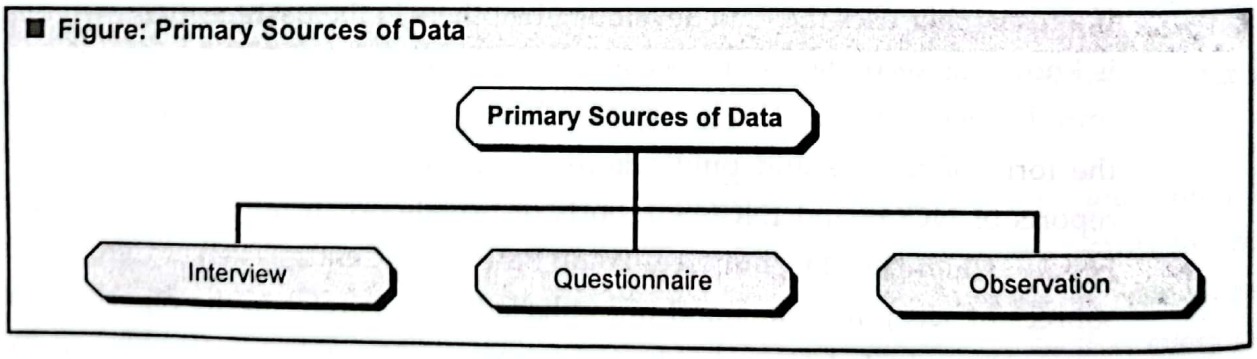
The sources of data are classified based on the types of data. In this regards, one can categorize sources of data into two parts.

- Primary sources of data
- Secondary sources of data

Primary Sources of Data

Data developed by the researcher himself for the purpose of present research is known as primary data. Primary data is used when secondary data is not available or secondary data only is not sufficient to draw conclusions or to know the attitude and behaviour of individual and groups. Primary data can be collected using various methods. Those methods of collecting primary data are described below:

Figure: Primary Sources of Data



1. **Interview:** The data collection method where data are collected by asking questions orally to the respondents is known as interview. This technique is widely used in research to collect primary data. The interview may be structured and unstructured. The interviewers may ask questions and then suggest a list of possible answer is known as structured interview. The interviewers may ask open questions letting them the chances to give their views are known as unstructured or open interview.

2. **Questionnaire:** A questionnaire is a formal list of questions designed to gather response from respondents on a given topic, issue or event. Thus, questionnaire is an efficient data collection mechanism when the researcher knows exactly what is required and how to measure the variables. The response obtained from such questionnaire is used to test hypothesis.

   A questionnaire can be designed to secure different type of primary data related to intentions, attitudes and opinions, activities or behaviour and demographic factors. Questionnaire is a list of questions developed systematically. The proper questionnaire design is also essential for the quality of data. The keys to successful questionnaire design are: order, layout, length and appearance. Such questionnaires are delivered to the respondents personally or by mail or email and internet. Respondents fill up the questionnaire and return back to the researcher. Generally, questionnaire is delivered to respondent personally in Nepal.

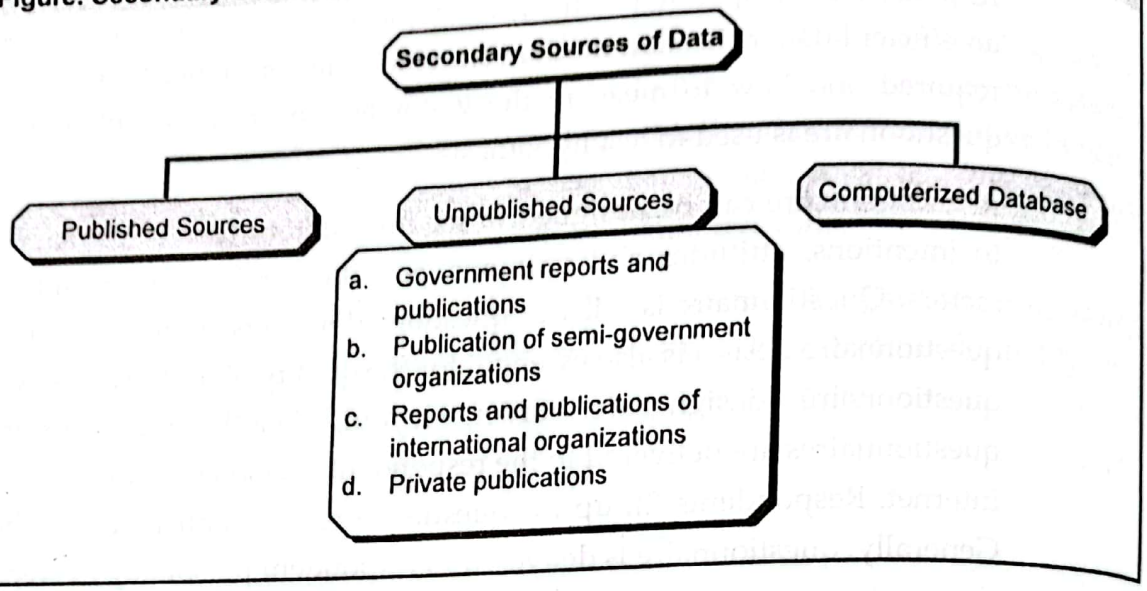
3. **Observation:** A method of collecting data where researcher observes, analyses and interprets the events or works personally is known as observation. Researcher does not ask the questions but observes the events and keeps the record of important information and facts. Besides, collecting data visually, observation involves listening, reading, smelling and touching. It provides insight information about any product, subject or event which helps to understand about those product, subject and events.

It is also an important method of data collection in the field of social science. It removes the difficulties of interview and helps to obtain a lot of information. This method is used in every scientific research. This method is particularly suitable in studies which deal with those people who are not capable of giving verbal reports or their feelings due to any reasons.

Secondary Sources of Data

Information gathered by someone other than the researcher associated with the current study is known as secondary data. Secondary data are irreplaceable element of organizational research. In every type of research, primary data cannot be used. Primary data collection is impossible when there is lack of time and resources. Therefore, researcher uses secondary data. A researcher can obtain secondary data from various sources. Those sources of secondary data are given below:

■ Figure: Secondary Sources of Data



1. **Published sources:** Various agencies like government, non-government and private and individuals collect primary data for their research and publish such data for the knowledge of stakeholder (Concerned people or organizations). Such published data may be used by the other researchers for their purpose. These data are secondary data to the second researchers. Those researchers obtain such data from the following forms:

   a. **Government reports and publications:** Government offices like ministries, departments, Nepal Rastra Bank, Central Bureau of Statistics, Planning Commission etc. publish their progress report, research report and information for the knowledge of public in the form of books or booklets. Further researchers conduct the research collecting data from such books and booklets published by the government offices.

   b. **Publication of semi-government organizations:** Various semi-government organizations like industrial service centre, Trade Promotion Centre, Nepal Airlines Corporation, Nepal Food Corporation etc. publish books and reports time and again. Other researchers can collect data for their research from these books and reports.

   c. **Reports and publications of international organizations:** International organizations like World Bank, International Monetary Fund, World Health Organization. UN Mission and Agencies, Asian Development Bank, International Labour Organizations, and commercial organizations publish progress report and conduct research and publish report of such research time and again. As well they publish bulletins and books for the knowledge of public. Other organizations and individuals use such data to conduct further research in the same field.

d. **Private publications:** Various individuals and business houses establish organizations like FNCCI, Chamber of Commerce, Confederation of industry etc. Private organizations publish reports for the knowledge of public. Private organizations conduct research in the related field and publish the report of research. Such reports are also the prime sources of information or data to others. As well the research reports and progress reports of NGOs and INGOs are also the prime source of secondary data.

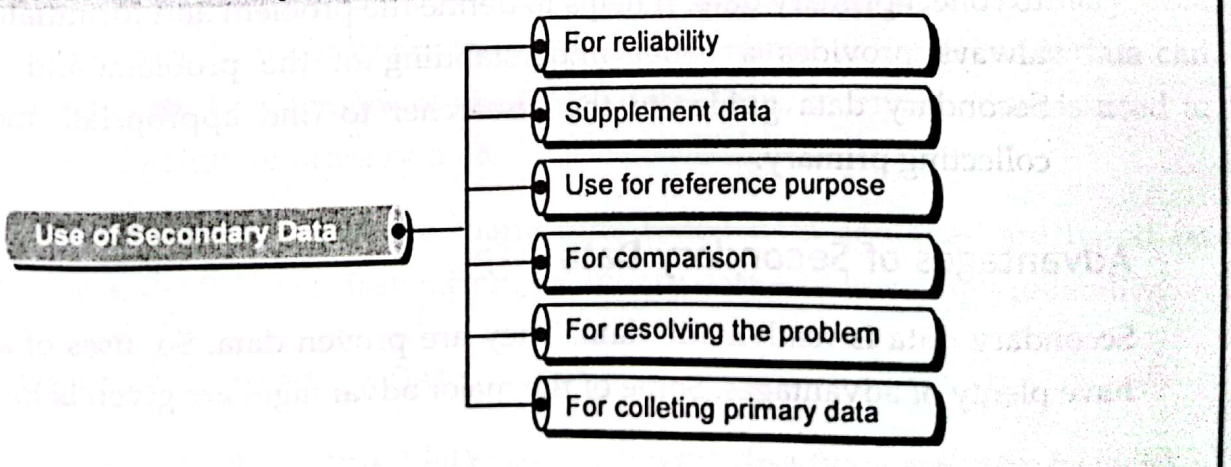
2. **Unpublished sources.** Some data and information are not published after the completion of the work. Such sources of data are known as unpublished sources of data. Reports of private offices and organizations, some secret information of government and non-government organizations, record of hospitals, schools and dissertations of students are some unpublished sources of data. It is also a major source of secondary data.

3. **Computerized database:** Computerized database consist of information that has been made available in computer for electronic distribution. Computerized database may be classified as online, internet or off-line. Online database consists of a central data bank which is accessed with the computer through telecommunication network. Internet database can be accessed, searched and analyzed on the internet and off-line databases that make the information available on diskettes or CD-ROM disks.

Uses of Secondary Data

Data which are generated by other organizations or individuals is known as secondary data. Secondary data can be used for the further research with several purposes. Secondary data can be used for the following purposes:

■ Figure: Uses of Secondary Data



1. **For reliability:** Reliability refers to the consistency and stability of result. If same data is used for the similar research then the results of the research remain consistent and stable. Thus, a researcher uses secondary data to prove the reliability of the results of the conducted using primary data.

2. **Supplement data:** Always the data collected from primary sources may not be authentic and correct. To test the authenticity and reliability of primary data, a researcher can have cross check using secondary data. For example, an organization trains its employees on the assumption that their skill and performance improves. Primary data proves the assumption of the organization but really it has been improved or not, to known this facts, a researcher should see the data of sales and profit. Thus, secondary data is essential to prove the results of primary data.

3. **Use for reference purpose:** To explain the facts and information on any subject, researcher, first of all, requires to study the published and unpublished information of organizations and individuals. Such information forms the bases of research. For example, a researcher reviews the literature to have in-depth knowledge about the subject before analyzing data.

4. **For comparison:** Researcher needs to show the quality of his work comparing with the results of previous studies. Researcher should take help of secondary data for the comparison of research result.

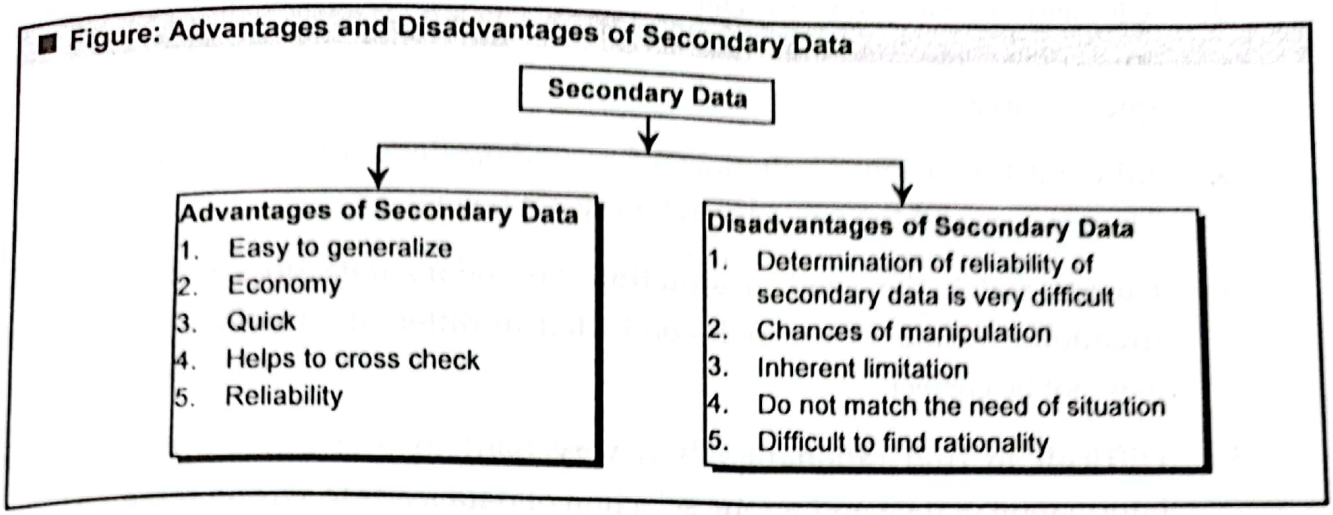
5. **For resolving the research problem:** Researcher faces various problems before or during the course of conducting research. Secondary data actually provides enough information to resolve the problem being investigated. It solves the problem of choosing the methodologies.

6. **For colleting primary data:** Examining available secondary data is a prerequisite to collect primary data. It helps to define the problem and formulate hypotheses. It always provides a better understanding of the problem and methodologies. Secondary data guides to the researcher to find appropriate methodology for collecting primary.

Advantages of Secondary Data

Secondary data is readymade data. They are proven data. So, uses of secondary data have plenty of advantages. Some of the major advantages are given below:

Figure: Advantages and Disadvantages of Secondary Data



1. **Easy to generalize:** Secondary data are developed by numbers of organizations and individuals. Thus, we can get large stock of secondary data. It is easier to generalize the findings which are drawn from the use of those data that are developed and tested by the number of individuals and organizations in the past.

2. **Economy:** Secondary data is readymade data. It can be collected from the reports of the organizations and dissertations of the individuals. Additional people and time is not required for the collection of data. So, use of secondary data is economical.

3. **Quick:** Secondary data is already developed by other organization and individuals. They are tested data. Such published data can be easily found without wasting more time. Nowadays, secondary data is found in the research centre too. Thus, collection of secondary data is quicker than the collection of primary data.

4. **Helps to cross check:** Accuracy of primary data depends on the capacity of surveyors, respondents and more other factors. The findings of the primary data may not be reliable. So, they are to be checked. Findings of the primary data can be checked with the reference of secondary data. Thus, secondary data is used to check the reliability of primary data.

5. **Reliability:** Secondary data are many time tested data and they are based on reality. Thus, the findings drawn from secondary data will have high reliability.

Disadvantages of Secondary Data

From the collection and use of secondary data, following disadvantages may be faced:

1. **Determination of reliability of secondary data is very difficult.** Issues will be contextual but the secondary data are developed in one situation but the issue might be different. So, the reliability of the research will be questionable.

2. **Chances of manipulation:** Data may be manipulated by the previous researchers to achieve the research objectives; so, the reliability of secondary data is questionable.
3. **Inherent limitation:** Limitations of secondary data are obvious in new research. Thus, the crux of the new research may not be met.
4. **Do not match the need of situation:** Secondary data does not match the new situations. Results of research conducted in different situations using same data may not be correct.
5. **Difficult to find rationality:** It is very hard to find out the rationality of the information of data and wrong selection of data leads to wrong research.

Methods of Primary Data Collection

A. Questionnaire

A questionnaire is a formal list of questions designed to gather response from respondents on a given topic, issue or event. Thus, questionnaire is an efficient data collection mechanism when the researcher knows exactly what is required and how to measure the variables. The response obtained from such questionnaire is used to test hypothesis.

A questionnaire can be designed to secure different type of primary data related to intentions, attitudes and opinions, activities or behaviour and demographic factors. Questionnaire is a list of questions developed systematically. The proper questionnaire design is also essential for the quality of data. The keys to successful questionnaire design are: order, layout, length and appearance. Such questionnaires are delivered to the respondents personally or by mail or email and internet. Respondents fill up the questionnaire and return back to the researcher. Generally, questionnaire is delivered to respondent personally in Nepal.

Some of the definitions of questionnaires are given below:

In the words of **G.A. Lundberg**, "*Fundamentally the questionnaire is a set of stimuli to which literate people are exposed in order to observe their verbal behaviour under these stimuli.*"

According to **Wallace and Wallace**, "*A questionnaire is a means of gathering information by having the respondents full in answers to printed questions.*"

Following facts are found while analyzing the above definitions:

i. Questionnaire is a set of questions.

ii. Questionnaire is sent to the respondents personally or by using post office, internet or email.

iii. Questionnaire is sent to those who are literate or can read and write.

iv. Respondents give information in some issues or subjects in the form of answers to the questions.

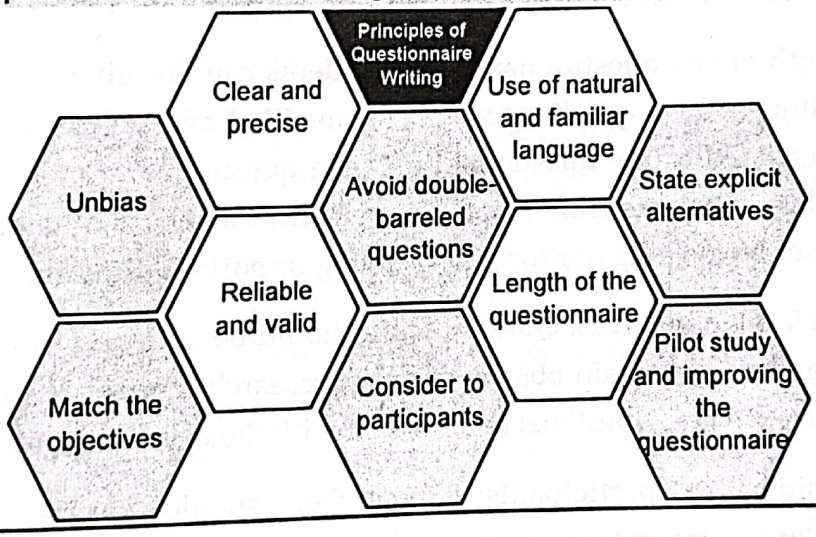
v. There is no direct relationship between researcher and respondents.

vi. Generally, it is used to study the behaviour of people.

Principles of Questionnaire Writing

Researcher should consider to certain guidelines while designing and administering the questions which are known as principles of questionnaire. Major principles of questionnaire are given below:

■ **Figure: Principles of Questionnaire Writing**



1. **Clear and precise:** A questionnaire designer should use those words and items that are more easily understood rather than the words which are stressful and long. So, questionnaire designer should use appropriate and simple words and short sentences while designing the questionnaire.

2. **Use of natural and familiar language:** Even though it depends on the competence of the respondent, generally researcher should use simple and common language and should not use jargons of the particular subject or research while designing questionnaire.

3. **Unbias:** Researcher should not use such words which show biasness. Use of the words like more, less, better, good shows biasness of the researcher in the

preparation of questionnaire. For example; pay is more valuable than other factors for employee satisfaction in the organization. In this statement researcher is trying to draw the responses focusing to pay not other non-financial factors. Thus, researcher should not use this sort of statement while preparing questionnaire.

4. **Avoid double-barreled questions:** A double-barreled question combines two or more issues in a single question. Like: Do you elicit information from parents and other teachers? If the question contains this sort of words; then such questions are double-barreled questions. It creates confusion in results. Thus, such questions should not be included in the questionnaire.

5. **State explicit alternatives:** Whatever the alternatives are provided to the respondents, those alternatives must be clearly express the views of the respondents. If the alternatives are not clear, it will be difficult to draw the results from the responses. So, while providing alternatives in questions, they must be stated explicitly.

6. **Reliable and valid:** The instruments that are used for collecting information must be valid and the results expected from the survey should be similar to the actual results. It can be done through pilot survey.

7. **Length of the questionnaire:** Respondents can not give more time to researcher. So, unnecessary questions should be avoided and only essential questions are to be included in the questionnaire. If the questionnaire is long, there is chance of careless responses from respondents. Thus, the length of the questionnaire should neither be too long nor too short leaving important dimensions of the research.

8. **Match the objectives:** Questionnaire should be designed in such a way so that the researcher can obtain objectives of the research through the analysis of responses collected. Thus, questions must match with the objectives of the research.

9. **Consider to participants:** Researcher should decide participants before developing questionnaire. Structures and language of questionnaire depends on the quality and competence of participants. For example; if participants are top level employees, words used in question will be different than the words used for targeting lower level employees.

10. **Pilot study and improving the questionnaire:** Researcher should implement/ administer questionnaire in a very small group of sample which is known as pilot study. Questionnaire should be finalized only after the incorporation of suggestions of pilot study.

Contents /Components of Questionnaire Writing ⟵ V. Imp

Generally, questionnaire divides subjects into three groups. Such groups should arrange serially. Parts of the questionnaire are arranged in the following ways while preparing questionnaire:

1. **Part incorporating explanatory information:** In this part, researcher provides information about the need of information, objective of collection of information and reasons of filling the questionnaires. As well researcher provides guidelines for filling up the questionnaire. It helps to remove the confusions of the respondents. Thus, researcher can collect quality information. Generally, researcher includes following information in this part while preparing questionnaire.

   - Introduction of researcher and research organization (if any)
   - Main objective of research
   - Guidelines to fill up the questionnaire
   - Assurance of secrecy of responses provided by respondents
   - Address to deliver the questionnaire
   - Thanks for participating in the research work

   Example of this part is given below:

> This study entitled expected training benefits and organizational commitment aims to see the impact of training benefits on organizations commitment. This research is conducted as a partial fulfillment of MBS degree.
> You have been selected as sample from the large population and your accurate response impacts on the result of research. Your responses will be kept confidential and used only for the purpose of this study. Your answers will be presented numerically and subjectively.
> Please tick '√' to the most appropriate option going through given questions and options.
> I am pleased to you that you have provided time participating in this survey work and your response will be included in the research with due importance.
> I am waiting for your answer.
>
> Yours
> Priya Katuwal
> Central Department of Management, Kirtipur
> Phone: 9851171590

2. **Main part:** It is a part which consists of number of questions and probable answers of those questions. In this part, researcher enlists the questions for the collection of data with the purpose of solving the research problem. Questions can

be long or short as per the necessity of the research. This part of the questionnaire covers all necessary subjects under study.

For example, following types of questions may be prepared to collect the data related to training:

i. Needs are identified based on the report of appraisal system.

Yes ☐ No ☐

ii. Training is the regular activity of the organization.

Fully agree ☐ Agree ☐ Undecided ☐

Disagree ☐ Fully disagree ☐

iii. Give your opinion on the effectiveness of training program provided by your organization.

.....

.....

.....

3. **Part incorporating personal information:** This part usually covers socio-demographic variables. It facilitates to group the answer of the respondents and study the pattern. These questions usually appear at the end of a survey questionnaire. This part incorporates age, gender, education, marital status, family income, occupation, religion etc. This information is used for segmenting the samples on the basis of characteristics. Classification of information enables the researcher to analyze the data through tabulation. Such information is also important to prepare profile of the respondents and determining significant differences between the different groups of respondents. Example of this part is given below:

Respondent's name (optional): ... ...

Belonging organization: ... ...

Age: [Less than 20 years] [20 to 30 years]
[More than 30 years]

Qualification: [More than mater level], [Bachelor level]
[12 class pass], [S.L.C. pass]

Service tenure: [Less than 5 years], [5 to 9 years], [10 to 14 years] and [More than 14 years].

Questionnaire Design

Questionnaire is prepared to obtain the information for attaining the goal of the research. Success of questionnaire depends on the collection of necessary information. A surveyor should ask right question to right person so as to obtain right information. Questionnaire should be simple, well understandable and should not create confusion. Although each questionnaire must be designed with specific research objectives but there is sequence of logical steps that every researcher should follow to develop a good questions. Those steps are given below:

1. **Plan what to measure**
   - Revisit the research objective
   - Decide issue of research problem
   - Get additional information on the research issue from literature review
   - Decide the issues to be asked.
2. **Formulate questions to obtain the needed information**
   - Determine the content of each questions
   - Decide the format of the questions
3. **Decide on the order and working of questions and its layout**
   - Determine the words for questions
   - Evaluate each research questions on the basis of comprehensibility, knowledge and ability
   - Evaluate inclination of respondents to answer the question.
   - Group all the questions in sub-topic to develop a complete questionnaire.
4. **Use a small sample test, the questionnaire to check omissions and ambiguity**
   - Read thoroughly the whole questionnaire to check the sense and validity.
   - Check the questionnaire to find out errors that are in the questionnaire
   - Check the physical appearance of the questionnaire.
   - Pretest the questionnaire.
5. **Correct the questionnaire and finalize the questionnaire**

B. Research Interview

It is an important method of collecting primary data in research. It is a method where interviewer and interviewee personally asks the questions and gives the answer. It is a medium of expressing internal interest, attitude and feelings. Research interview refers to those interviews that are taken to meet the research objectives but all interviews are not research interviews. Researcher asks questions on the issue of his or her interest and records the answers of respondents in a paper or tape or videos in research

interview. The information collected in such a way provides valuable insights on the subject under study. Various experts have defined research interview, one of them is given below:

According to **N.H. Gopal**, "*The interview is conversation with a purpose and therefore is more than oral exchange of information.*"

From the analysis of above definition, following facts are found:

- Interview is always purposive.
- It is face to face conversation.
- It is related to the area of research.
- It helps to understand the interest, attitude, behaviour and perception of people.

Features of Research Interview

Research interview is always purposive and tries to collect the information within the scope/area of research. Appropriate and effective interview only can collect necessary information. Thus, good research interview should possess following features:

a. Questions should be purposive and in order.

b. Interview should provide adequate time to interviewee so that appropriate information can be collected.

c. Question should not under value to the respondents. Thus, interviewer should use appropriate words while asking the questions.

d. Questions should be asked considering to the capacity of respondents.

e. Interviewer should listen carefully to the respondents.

f. Interviewer should not give direction to the respondents but can put queries and motivate to the respondents.

g. Interviewing is an art. Thus, interviewer must have art and knowledge of taking interview.

Types of Research Interview

Research interview differs as per the structure of interview and objectives of the research. Generally, research interviews are classified on the basis relationship between interviewer and interviewee. Interview is classified as face to face interview and telephonic interview. Personal or face to face interview is considered appropriate for unstructured interview and telephonic interview is appropriate for structure interview. Descriptions of these two types of interviews are given below:

I. Personal or Face to Face Interview

Interview where interviewer talks to the respondents or asks the questions to the respondents directly is known as personal or face to face interview. Personal interview is taken in the home of the respondents or place of employment or in any other suitable places. This method is more applied when data is collected by applying survey method. In this method, interviewer and respondents interacts each other so that the interviewer can obtain depth and reliable information. Interviewer can also collect information from non-verbal communication i.e. gestures and facial expressions. The researcher should consider to the following points while using personal interview:

a. Whether the personal interview is appropriate method for collecting data or not.
b. It is expensive method. Thus, researcher should consider to the cost factor before applying it.
c. Researcher should consider to the skill of interviewer. If the interviewer is unskilled then the data collected from personal interview may not be reliable and useable.
d. Researcher should consider to time limit. This method requires more time to collect data.
e. Researcher should consider to the biasness of surveyor. If surveyor is bias, they can not collect appropriate and reliable data.

Advantages of Personal Interview

It is a widely used method of survey. Thus, personal interview has number of benefits. These benefits are given below:

a. **Possibility of clear answer:** Researcher/ surveyor can put questions until and unless the clear answer of the question is obtained or the doubt is not clear. Thus, there is possibility of obtaining clear answer.
b. **Get information for non-communicating means:** Researchers can watch the gestures and facial expressions of the respondents. He/she can collect some information from such non-verbal cues. Thus, researcher can collect more information than spelled words.
c. **Get detail information:** Researcher puts sub-questions to clarify the answers of the respondents. It can collect the information from the gesture. Thus, researcher can collect detail information.
d. **Know the attitude of respondents:** Researcher can understand the attitude of respondents towards the event or research issue. Respondents may have positive or negative attitude. Such attitude reduces the reliability of data. Thus, the researcher knows the attitude and decides whether to use such data for further study or not.

Disadvantages of Personal Interview

Following are the disadvantages of personal interview:

a. **More respondents:** Where more respondents are to be taken for the collection of data, personal interview method will be more costly and time consuming. Thus, it remains impracticable.

b. **Expensive:** Researcher should give training to the surveyor to reduce biasness which is very expensive. Thus, every researcher cannot adopt this method.

c. **Chances of obtaining inaccurate information:** Respondents do not like to give interview to unknown person. Even if they are ready, they do not provided real information. Thus, the data collected by the researcher may not be corrected.

II. Telephone Interview

When a researcher takes the interview from the widely spread respondents using telephone, such interview is known as telephone interview. This technique of interview is widely accepted and adopted by the researcher nowadays because of the wide distribution of telephone service. Structured questionnaire is used in this method. This method of interview is suitable when many respondents are to be interviewed over a wide geographical area and time available for interview is very short. Researcher should take care of using the words because the questions are asked orally to the respondents.

Advantages of Telephone Interview

The chief merits or advantages of telephone interview are given below:

a. **Flexible:** It is flexible method because scope of interview can be increased or decreased. Telephone facility is widely used nowadays.

b. **Less time and labour:** Researcher first finds out the related person and their telephone number. Researcher can contact them in no time and with less labour.

c. **Reliable:** Respondents can spell/tell any information that may be difficult to spell in personal interview. Thus, the information provided by the respondent will be more reliable.

d. **Cheaper:** It is cheaper than personal interview method because the researcher can meet the respondents with the help of telephone. Cost of telephone is very low.

e. **Higher rate of response:** The response rate will be obviously higher then the response rate in mailing method. The non-response rate is normally low.

Disadvantages of Telephone Interview

The chief demerits or disadvantages of telephone interview are given below:

a. **Chances of incomplete information:** Researcher can conclude interview without providing pre-notice. Thus, there is chance of incomplete information.

b. **No chances of non-verbal communication:** Researcher can understand many things from gesture and non-verbal cues but in this method that is not possible.

c. **Limited respondents:** Researcher can not contact to those who do not have telephone facilities. Thus, most of the respondents are out of the scope of the research. So, the reliability of answer is questionable.

d. **Not suitable to comprehensive survey:** Comprehensive answer requires various questions. But more questions using telephone is not appropriate.

e. **Biasness is high:** Chances of biasness of interviewer is high because they put biased questions to the respondent so as to develop research results as intended.

III. Computer assisted interview (CAI)

Interview that is conducted using computer especially laptop rather than using paper questionnaire is known as computer assisted interview. CAI stands for Computer-Assisted-Interviewing, which refers to the way in which computers can be used in the development and administration of survey questionnaires. It has also been known as Computer-Assisted Survey Information Collection (CASIC). Rather than using a paper questionnaire, interviewers carry laptops from which questions are read out and responses to the survey questions are entered. The data is then transmitted back to the field centre via modem. CAI was first used in the UK in 1990 on the Labour Force Survey, and by 1995, all of the social surveys carried out by the Office for National Statistics used this method. It is thought to be one of the most influential developments in survey data collection. One of the most commonly used software programmes for this is Blaise, which was developed by Statistics Netherlands (although this is by no means the only one of its kind).

Different types of CAI

There are different types of Computer-Assisted-Interviewing, each of them are used for the various modes of survey data collection. They are described in more detail below:

a. CAPI (Computer Assisted Personal Interviewing) is used when administering a questionnaire face-to-face. The interviewer reads questions from the screen (which the respondent cannot usually see) and responses are typed into designated fields.

b. CATI (Computer Assisted Telephone Interviewing) is a similar setup to CAPI and is used in telephone interviews.

c. CASI (Computer Assisted Self Interviewing) is used particularly when questions are of a sensitive nature, such as crime and offending or sexual behaviour and attitudes. Respondents are given the laptop and are able to enter their responses themselves. It is thought to increase the validity of responses, as respondents are more likely to give truthful answers (whilst the interviewer cannot see what they are doing).

IV. Focus Group Interview

This interview pays attention on the experience of the informants and its possible effects. The purpose of this interview is to focus on the certain issue and collect maximum information from the group of respondents so that researcher can reach to the certain concrete conclusions. Generally interview is taken with the small group of 6 to 8 people.

V. Depth interview

It deliberately aims to elicit unconscious as well as other types of materials relating especially to personality dynamics and motivations. Ordinary conversation is the most common form of information collection. The in-depth interview extends and formalizes everyday conversation. This type of data collection is different from the structured or standardized interview, where the respondent receives questions with fixed response categories. The in-depth interview is discursive and allows the researcher and respondent latitude to explore an issue within the framework of guided conversation.

C. Observation

A method of collecting data where researcher observes, analyses and interprets the events or works personally is known as observation. Researcher does not ask the questions but observes the events and keeps the record of important information and facts. Besides, collecting data visually, observation involves listening, reading, smelling and touching. It provides insight information about any product, subject or event which helps to understand about those product, subject and events.

It is also an important method of data collection in the field of social science. It removes the difficulties of interview and helps to obtain a lot of information. This method is used in every scientific method. This method is particularly suitable in studies which deal with those people who are not capable of giving verbal reports or their feelings due to any reasons.

Methods or Types of Observation

1. **Structured and unstructured observation:** It can be structured and unstructured. When observation is made by characterizing style of recording the observed information, standardized conditions of observation, definition of the units to be observed and selection of pertinent data of observation then it is structured observation.

   When observation is done without any thought before observation then it is known as unstructured observation.

2. **Participant and non-participant observation:** when the observer is member of the group which he is observing then it is participant observation. In participant observation researcher can record natural behavior of group and verify the truth of the statement given by informants in the context of questionnaire.

   When observer is observing people without giving any information to them then it is known as non-participant observation.

3. **Controlled and uncontrolled observation:** When the observation takes place according to definite pre-arranged plan and with experimental procedures then it is known as controlled observation. In this method, observer develops the plan for observing the behavior and undertakes the observation work. Generally, it is done in laboratories.

   When observation takes place in natural condition then that is considered as uncontrolled observation. It is done to get spontaneous picture of life and persons.