Primary Data Collection Methods

In primary data collection, the data is collected using methods such as interviews and questionnaires. It is important to prepare a tabulation plan and based on it design the questionnaire to make sure that no table will be left out. There are cases when tables cannot be produced because questionnaires were designed without having a tabulation plan in place.

There are many methods of collecting primary data (observed or collected directly from first-hand experience). Published data and the data collected in the past or by other parties is called secondary data. The main methods of primary data collection include:

- Questionnaires
- Interviews
- Focus group interviews
- Observation
- Case studies
- Diaries
- Critical incidents
- Portfolios.

The primary data, which is generated by the above methods, may be qualitative in nature (usually in the form of words) or quantitative (usually in the form of numbers or where you can make counts of words used). A brief outline of these methods follow.

1. **Questionnaires**

Questionnaires are a popular means of collecting data, but are difficult to design and often require many rewrites before an acceptable questionnaire is produced.

**Advantages:**

- Can be used as a method in its own right or as a basis for interviewing or a telephone survey.
- Can be posted, emailed or faxed.
- Can cover a large number of people or organizations.
- Wide geographic coverage.
- Relatively cheap.
- No prior arrangements are needed.
- Avoids embarrassment on the part of the respondent.
- Respondent can consider responses.
- Possible anonymity of respondent.
- No interviewer bias (in general).

**Disadvantages:**

- Design problems.
- Questions have to be relatively simple.
- Historically low response rate (although inducements may help).
- Time delay while waiting for responses to be returned.
- Require a return deadline.
- Several reminders may be required.
- Assumes no literacy problems.
- No control over who completes it.
- Not possible to give assistance if required (unless interview is in person)
- Problems with incomplete questionnaires.
- Replies not spontaneous and independent of each other.
- Respondent can read all questions beforehand and then decide whether to complete or not, for example, perhaps because it is too long, too complex, uninteresting, or too personal.

A. **Design of postal questionnaires**
i. Theme and covering letter

The general theme of the questionnaire should be made explicit in a cover letter. You should state who you are; why the data is required; give, if necessary, an assurance of confidentiality and/or anonymity; and contact number and address or telephone number. This ensures that the respondents know what they are committing themselves to, and also that they understand the context of their replies. If possible, you should offer an estimate of the completion time. Instructions for return should be included with the return date made obvious. For example: ‘It would be appreciated if you could return the completed questionnaire by... if at all possible’.

ii. Instructions for completion

You need to provide clear and unambiguous instructions for completion. Within most questionnaires these are general instructions and specific instructions for particular question structures. It is usually best to separate these, supplying the general instructions as a preamble to the questionnaire, but leaving the specific instructions until the questions to which they apply. The response method should be indicated (circle, tick, cross, etc.). Wherever possible, and certainly if a slightly unfamiliar response system is employed, you should give an example.

iii. Appearance

Appearance is usually the first feature of the questionnaire to which the respondent reacts. A neat and professional look will encourage further consideration of your request, increasing your response rate. In addition, careful thought to layout should help your analysis. There are a number of simple rules to help improve questionnaire appearance:

- Liberal spacing makes the reading easier.
- Photo-reduction can produce more space without reducing content.
- Consistent positioning of response boxes, usually to the right, speeds up completion and also avoids inadvertent omission of responses.
- Choose the font style to maximize legibility.
- Differentiate between instructions and questions. Either lower case and capitals, but italics is commonly used, or responses can be boxed.

iv. Length

There may be a strong temptation to include any vaguely interesting questions, but this should be resisted at all costs. Excessive size can only reduce response rates. If a long questionnaire is necessary, then you must give even more thought to appearance. When a questionnaire is very long, it is best to leave pages unnumbered because usually respondents tend to flick to the end and all of a sudden see, say, ‘page 27’, and that can be very disconcerting!

v. Order

Probably the most crucial stage in questionnaire response is the beginning. Once the respondents have started to complete the questions they will normally finish the task, unless it is very long or difficult. Consequently, you need to select the opening questions with care. Usually the best approach is to ask for biographical/demographic details first, as the respondents should know all the answers without much thought. Another benefit is that an easy start provides practice in answering questions and makes the respondents feel at ease.

Once the introduction has been achieved, the subsequent order will depend on many considerations. You should be aware of the varying importance of different questions. Essential information should appear early, just in case the questionnaire is not completed. For the same reasons, relatively unimportant questions and/or sensitive questions should be placed towards the end. If questions are likely to provoke the respondent and remain unanswered, these too are best left until the end, in the hope of obtaining answers to everything else.

vi. Coding

If analysis of the results is to be carried out using a statistical package or spreadsheet it is advisable to code non-numerical responses when designing the questionnaire, rather than trying to code the responses when they are returned. An example of coding is:
The coded responses (1 or 2) are then used for the analysis.

vii. Thank you

Respondents to questionnaires rarely benefit personally from their efforts and the least the researcher can do is to thank them. Even though the cover letter will express appreciation for the help given, it is also a nice gesture to finish the questionnaire with a further thank you.

viii. Questions

- Keep the questions short, simple and to the point; avoid all unnecessary words.
- Use words and phrases that are unambiguous and familiar to the respondent. For example, ‘dinner’ has a number of different interpretations; use an alternative expression such as ‘evening meal’. In some parts of the state of Ohio, dinner means lunch!!!!!!
- Only ask questions that the respondent can answer. Hypothetical questions should be avoided. Avoid calculations and questions that require a lot of memory work, for example, ‘How many people stayed in your house last year?’
- Avoid loaded or leading questions that imply a certain answer. For example, by mentioning one particular item in the question, ‘Do you agree that Colgate toothpaste is the best toothpaste?’
- Vacuous words or phrases should be avoided. ‘Generally’, ‘usually’, or ‘normally’ are imprecise terms with various meanings. They should be replaced with quantitative statements, for example, ‘at least once a week’.
- Questions should only address a single issue. For example, questions like: ‘Do you take annual holidays to Spain?’ should be broken down into two discreet stages, first find out if the respondent takes an annual holiday, and then find out if Spain is the destination.
- Do not ask two questions in one by using ‘and’. For example, ‘Did you watch television last night and read a newspaper?’
- Avoid double negatives. For example, ‘Is it not true that you did not read a newspaper yesterday?’ Respondents may tackle a double negative by switching both negatives and then assuming that the same answer applies. This is not necessarily valid.
- State units required but do not aim for too high a degree of accuracy. For instance, use an interval rather than an exact figure:

  ‘How much did you earn last year?’

  Less than $10,000 [ ]
  $10,000 but less than $20,000 [ ]

Avoid emotive or embarrassing words – usually connected with race, religion, politics, sex, money, vices, etc.

ix. Types of questions

a. Closed questions

A question is asked and then a number of possible answers are provided for the respondent. The respondent selects the answer which is appropriate. Closed questions are particularly useful in obtaining factual information:

  Sex:  Male [ ] Female [ ]
  Did you watch television last night?  Yes [ ] No [ ]

Some ‘Yes/No’ questions have a third category ‘Do not know’. Experience shows that as long as this alternative is not mentioned people will make a choice. Also the phrase ‘Do not know’ is ambiguous:

  Do you agree with the introduction of the new tax law?

  Yes [ ] No [ ] Do not know [ ]
What was your main way of traveling to the hotel? Tick one box only.

- Car [ ]
- Coach [ ]
- Motor bike [ ]
- Train [ ]
- Other means, please specify

With such lists you should always include an ‘other’ category, because not all possible responses might have been included in the list of answers.

Sometimes the respondent can select more than one from the list. However, this makes analysis difficult:

Why have you visited the historic house? Tick the relevant answer(s). You may tick as many as you like.

- I enjoy visiting historic houses . . . . . [ ]
- The weather was bad and I could not enjoy outdoor activities . . . . . . . . . . . . . . . . . [ ]
- I have visited the house before and wished to return . . . . . . . . . . . . . . . . . . . . . . . . . [ ]
- Other reason, please specify

b. Attitude questions

Frequently questions are asked to find out the respondents’ opinions or attitudes to a given situation. A Likert scale provides a battery of attitude statements. The respondent then says how much they agree or disagree with each one:

Read the following statements and then indicate by a tick whether you strongly agree, agree, disagree or strongly disagree with the statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My visit has been good value for money</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are many variations on this type of question. One variation is to have a ‘middle statement’, for example, ‘Neither agree nor disagree’. However, many respondents take this as the easy option. Only having four statements, as above, forces the respondent into making a positive or negative choice. Another variation is to rank the various attitude statements; however, this can cause analysis problems:

Which of these characteristics do you like about your job? Indicate the best three in order, with the best being number 1.

- Varied work [ ]
- Good salary [ ]
- Opportunities for promotion [ ]
- Good working conditions [ ]
- High amount of responsibility [ ]
- Friendly colleagues [ ]

A semantic differential scale attempts to see how strongly an attitude is held by the respondent. With these scales double-ended terms are given to the respondents who are asked to indicate where their attitude lies on the scale between the terms. The response can be indicated by putting a cross in a particular position or circling a number:

Work is: (circle the appropriate number)

Difficult 1 2 3 4 5 6 7 Easy
For summary and analysis purposes, a ‘score’ of 1 to 7 may be allocated to the seven points of the scale, thus quantifying the various degrees of opinion expressed. This procedure has some disadvantages. It is implicitly assumed that two people with the same strength of feeling will mark the same point on the scale. This almost certainly will not be the case. When faced with a semantic differential scale, some people will never, as a matter of principle, use the two end indicators of 1 and 7. Effectively, therefore, they are using a five-point scale. Also scoring the scale 1 to 7 assumes that they represent equidistant points on the continuous spectrum of opinion. This again is probably not true. Nevertheless, within its limitations, the semantic differential can provide a useful way of measuring and summarizing subjective opinions.

Other types of questions to determine peoples’ opinions or attitudes are:

Which one/two words best describes...?

Which of the following statements best describes...?

How much do you agree with the following statement...?

c. Open questions

An open question such as ‘What are the essential skills a manager should possess?’ should be used as an adjunct to the main theme of the questionnaire and could allow the respondent to elaborate upon an earlier more specific question. Open questions inserted at the end of major sections, or at the end of the questionnaire, can act as safety valves, and possibly offer additional information. However, they should not be used to introduce a section since there is a high risk of influencing later responses. The main problem of open questions is that many different answers have to be summarized and possibly coded.

d. Testing – pilot survey

Questionnaire design is fraught with difficulties and problems. A number of rewrites will be necessary, together with refinement and rethinks on a regular basis. Do not assume that you will write the questionnaire accurately and perfectly at the first attempt. If poorly designed, you will collect inappropriate or inaccurate data and good analysis cannot then rectify the situation.

To refine the questionnaire, you need to conduct a pilot survey. This is a small-scale trial prior to the main survey that tests all your questions and subsequent procedures. Amendments to questions can be made. After making some amendments, the new version would be re-tested. If this re-test produces more changes, another pilot would be undertaken and so on. For example, perhaps responses to open-ended questions become closed; questions which are all answered the same way can be omitted; difficult words replaced, etc.

It is usual to pilot the questionnaires personally so that the respondent can be observed and questioned if necessary. By timing each question, you can identify any questions that appear too difficult, and you can also obtain a reliable estimate of the anticipated completion time for inclusion in the cover letter. The result can also be used to test the coding and analytical procedures to be performed later.

e. Distribution and return

The questionnaire should be checked for completeness to ensure that all pages are present and that none is blank or illegible. It is usual to supply a prepaid addressed envelope for the return of the questionnaire. You need to explain this in the cover letter and reinforce it at the end of the questionnaire, after the ‘Thank you’.

Finally, many organizations are approached continually for information. Many, as a matter of course, will not respond in a positive way.

2. INTERVIEWS

Interviewing is a technique that is primarily used to gain an understanding of the underlying reasons and motivations for people’s attitudes, preferences or behavior. Interviews can be undertaken on a personal one-to-one basis or in a group. They
can be conducted at work, at home, in the street or in a shopping center, or some other agreed location.

A. Personal interview

Advantages:

- Serious approach by respondent resulting in accurate information.
- Good response rate.
- Completed and immediate.
- Possible in-depth questions.
- Interviewer in control and can give help if there is a problem.
- Can investigate motives and feelings.
- Can use recording equipment.
- Characteristics of respondent assessed – tone of voice, facial expression, hesitation, etc.
- Can use props.
- If one interviewer used, uniformity of approach.
- Used to pilot other methods.

Disadvantages:

- Need to set up interviews.
- Time consuming.
- Geographic limitations.
- Can be expensive.
- Respondent bias – tendency to please or impress, create false personal image, or end interview quickly.
- Embarrassment possible if personal questions are sensitive in nature.
- Transcription and analysis can present problems – subjectivity.
- If many interviewers, training required.

B. Types of interview

a. Structured

- Based on a carefully worded interview questionnaire.
- Frequently require short answers with the answers being ticked off.
- Useful when there are a lot of questions which are not particularly contentious or thought provoking.
- Respondent may become irritated by having to give over-simplified answers.

b. Semi-structured

The interview is focused by asking certain questions but with scope for the respondent to express him or herself at length.

c. Unstructured

This also called an in-depth interview. The interviewer begins by asking a general question. The interviewer then encourages the respondent to talk freely. The interviewer uses an unstructured format, the subsequent direction of the interview being determined by the respondent’s initial reply. The interviewer then probes for elaboration – ‘Why do you say that?’ or, ‘That’s interesting, tell me more’ or, ‘Would you like to add anything else?’ being typical probes.

The following section is a step-by-step guide to conducting an interview. You should remember that all situations are different and therefore you may need refinements to the approach.

C. Planning an interview

- List the areas in which you require information.
- Decide on type of interview.
- Transform areas into actual questions.
- Try them out on a friend or relative.
• Make an appointment with respondent(s) – discussing details of why and how long.
• Try and fix a venue and time when you will not be disturbed.

D. Conducting an interview

a. Personally
   i. Arrive on time
   ii. Be smart
   iii. Smile
   iv. Employ good manners
   v. Find a balance between friendliness and objectivity

b. At the start
   i. Introduce yourself
   ii. Re-confirm the purpose of the visit
   iii. Assure confidentiality (if relevant specify what will happen to the data)

c. The questions
   i. Speak slowly in a soft, yet audible tone of voice
   ii. Control your body language
   iii. Know the questions and topics
   iv. Ask all the questions

d. Responses
   i. Recorded as you go on questionnaire, written verbatim (it’s slow and time-consuming)
   ii. Summarized by you
   iii. Taped (agreed beforehand) – have alternative method if not acceptable; consider effect on respondent’s answers; proper equipment in good working order; sufficient tapes and batteries; minimum of background noise.

e. At the end
   i. Ask if the respondent would like to give further details about anything or any questions about the research. Thank them.

E. Telephone interview

This is an alternative form of interview to the personal, face-to-face interview.

Advantages
• Relatively cheap
• Quick
• Can cover reasonably large numbers of people or organizations
• Wide geographic coverage
• High response rate
• No waiting
• Spontaneous response
• Help can be given to the respondent
• Can tape answers

Disadvantages
• Often connected with selling
• Questionnaire required
• Not everyone has a telephone
• Repeat calls are inevitable – average 2.5 calls to get someone
• Time is wasted
• Straightforward questions are required
• Respondent has little time to think
• Cannot use visual aids
• Can cause irritation
• Good telephone manner is required
• Question of authority (who wants the answers?)

a. Getting started

- Locate the respondent
  
  i. Repeat calls may be necessary especially if you are trying to contact people in organizations where you may have to go through secretaries.
  
  ii. You may not know an individual’s name or title – so there is the possibility of interviewing the wrong person.
  
  iii. You can send an advance letter informing the respondent that you will be telephoning. This can explain the purpose of the research.

- Getting them to agree to take part
  
  i. You need to state concisely the purpose of the call – scripted and similar to the introductory letter of a postal questionnaire.
  
  ii. Respondents will normally listen to this introduction before they decide to cooperate or refuse.
  
  iii. When contact is made respondents may have questions or raise objections about why they could not participate. You should be prepared for these.

b. Ensuring quality

- Quality of questionnaire – follows the principles of questionnaire design. However, it must be easy to move through as you cannot have long silences on the telephone.

- Ability of interviewer – follows the principles of face-to-face interviewing.

c. Smooth implementation

- Interview questionnaire – each questionnaire should have a cover page with number, name and address. The cover sheet should make provision to record which call it is, the date and time, the interviewer, the outcome of the call and space to note down specific times at which a callback has been arranged. Space should be provided to record the final outcome of the call – refusals, not at home, number disconnected, etc.

- Procedure for callbacks – a system for callbacks needs to be implemented. Interview questionnaires should be sorted according to their status: weekday callback, evening callback, weekend callback, specific time callback.

d. Comparison of postal, telephone and personal interview surveys

The table below compares the three common methods of postal, telephone and interview surveys – it might help you to decide which one to use.
Table 3.1: Comparison of the three common methods of surveys

<table>
<thead>
<tr>
<th></th>
<th>Postal Survey</th>
<th>Telephone Survey</th>
<th>Personal Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost (assuming a good response rate)</td>
<td>Often lowest</td>
<td>Usually in-between</td>
<td>Usually highest (but most accurate)</td>
</tr>
<tr>
<td>Ability to probe</td>
<td>No personal contact or observation</td>
<td>Some chance for gathering additional data through elaboration on questions, but no personal observation</td>
<td>Greatest opportunity for observation, building rapport, and additional probing</td>
</tr>
<tr>
<td>Respondent ability to complete at own convenience</td>
<td>Yes</td>
<td>Perhaps, but usually no</td>
<td>Perhaps, if interview time is prearranged with respondent</td>
</tr>
<tr>
<td>Interview bias</td>
<td>No chance</td>
<td>Some, perhaps due to voice inflection</td>
<td>Greatest chance</td>
</tr>
<tr>
<td>Ability to decide who actually responds to the questions</td>
<td>Least</td>
<td>Some</td>
<td>Greatest</td>
</tr>
<tr>
<td>Impersonality</td>
<td>Greatest</td>
<td>Some due to lack of face-to-face contact</td>
<td>Least</td>
</tr>
<tr>
<td>Complex questions</td>
<td>Least suitable</td>
<td>Somewhat suitable</td>
<td>More suitable</td>
</tr>
<tr>
<td>Visual aids</td>
<td>Little opportunity</td>
<td>No opportunity (yet)</td>
<td>Greatest opportunity</td>
</tr>
<tr>
<td>Potential negative respondent reaction</td>
<td>‘Junk mail’</td>
<td>‘Junk calls’</td>
<td>Invasion of privacy</td>
</tr>
<tr>
<td>Interviewer control over interview environment</td>
<td>Least</td>
<td>Some in selection of time to call</td>
<td>Greatest</td>
</tr>
<tr>
<td>Time lag between soliciting and receiving response</td>
<td>Greatest</td>
<td>Least</td>
<td>May be considerable if a large area involved</td>
</tr>
<tr>
<td>Suitable types of questions</td>
<td>Simple, mostly dichotomous (yes/no) and multiple choice</td>
<td>Some opportunity for open-ended questions especially if interview is recorded</td>
<td>Greatest opportunity for open-ended questions</td>
</tr>
<tr>
<td>Requirement for technical skills in conducting interview</td>
<td>Least</td>
<td>Medium</td>
<td>Greatest</td>
</tr>
<tr>
<td>Response rate</td>
<td>Low</td>
<td>Usually High</td>
<td>High</td>
</tr>
</tbody>
</table>

3. Focus group interviews

A focus group is an interview conducted by a trained moderator in a non-structured and natural manner with a small group of respondents. The moderator leads the discussion. The main purpose of focus groups is to gain insights by listening to a group of people from the appropriate target talk about specific issues of interest.

4. Observations
Observation involves recording the behavioral patterns of people, objects and events in a systematic manner. Observational methods may be:

a. **Structured or Unstructured**

In structured observation, the researcher specifies in detail what is to be observed and how the measurements are to be recorded. It is appropriate when the problem is clearly defined and the information needed is specified.

In unstructured observation, the researcher monitors all aspects of the phenomenon that seem relevant. It is appropriate when the problem has yet to be formulated precisely and flexibility is needed in observation to identify key components of the problem and to develop hypotheses. The potential for bias is high. Observation findings should be treated as hypotheses to be tested rather than as conclusive findings.

b. **Disguised or Undisguised**

In disguised observation, respondents are unaware they are being observed and thus behave naturally. Disguise is achieved, for example, by hiding, or using hidden equipment or people disguised as shoppers.

In undisguised observation, respondents are aware they are being observed. There is a danger of the Hawthorne effect – people behave differently when being observed.

c. **Natural or Contrived**

Natural observation involves observing behavior as it takes place in the environment, for example, eating hamburgers in a fast food outlet.

In contrived observation, the respondents’ behavior is observed in an artificial environment, for example, a food tasting session.

d. **Personal**

In personal observation, a researcher observes actual behavior as it occurs. The observer may or may not normally attempt to control or manipulate the phenomenon being observed. The observer merely records what takes place.

e. **Mechanical**

Mechanical devices (video, closed circuit television) record what is being observed. These devices may or may not require the respondent’s direct participation. They are used for continuously recording ongoing behavior.

f. **Non-participant**

The observer does not normally question or communicate with the people being observed. He or she does not participate.

g. **Participant** (with the participant taking a number of different roles).

In participant observation, the researcher becomes, or is, part of the group that is being investigated. Participant observation has its roots in ethnographic studies (study of man and races) where researchers would live in tribal villages, attempting to understand the customs and practices of that culture. It has a very extensive literature, particularly in sociology (development, nature and laws of human society) and anthropology (physiological and psychological study of man). Organizations can be viewed as ‘tribes’ with their own customs and practices.

The role of the participant observer is not simple. There are different ways of classifying the role:

- Researcher as employee
- Researcher as an explicit role
- Interrupted involvement
- Observation alone
Researcher as Employee

The researcher works within the organization alongside other employees, effectively as one of them. The role of the researcher may or may not be explicit and this will have implications for the extent to which he or she will be able to move around and gather information and perspectives from other sources. This role is appropriate when the researcher needs to become totally immersed and experience the work or situation at first hand.

There are a number of dilemmas. Do you tell management and the unions? Friendships may compromise the research. What are the ethics of the process? Can anonymity be maintained? Skill and competence to undertake the work may be required. The research may be over a long period of time.

Researcher as an explicit role

The researcher is present every day over a period of time, but entry is negotiated in advance with management and preferably with employees as well. The individual is quite clearly in the role of a researcher who can move around, observe, interview and participate in the work as appropriate. This type of role is the most favored, as it provides many of the insights that the complete observer would gain, while offering much greater flexibility without the ethical problems that deception entails.

Interrupted involvement

The researcher is present sporadically over a period of time, for example, moving in and out of the organization to deal with other work or to conduct interviews with, or observations of, different people across a number of different organizations. It rarely involves much participation in the work.

Observation alone

The observer role is often disliked by employees since it appears to be ‘eavesdropping’. The inevitable detachment prevents the degree of trust and friendship forming between the researcher and respondent, which is an important component in other methods.

Choice of roles

The role adopted depends on the following:

♦ **Purpose of the research**: Does the research require continued longitudinal involvement (long period of time), or will in-depth interviews, for example, conducted over time give the type of insights required?
♦ **Cost of the research**: To what extent can the researcher afford to be committed for extended periods of time? Are there additional costs such as training?
♦ **The extent to which access can be gained**: Gaining access where the role of the researcher is either explicit or covert can be difficult, and may take time.
♦ **The extent to which the researcher would be comfortable in the role**: If the researcher intends to keep his identity concealed, will he or she also feel able to develop the type of trusting relationships that are important? What are the ethical issues?
♦ **The amount of time the researcher has at his disposal**: Some methods involve a considerable amount of time. If time is a problem alternate approaches will have to be sought.

5. Case-studies

The term case study usually refers to a fairly intensive examination of a single unit such as a person, a small group of people, or a single company. Case studies involve measuring what is there and how it got there. In this sense, it is historical. It can enable the researcher to explore, unravel and understand problems, issues and relationships. It cannot, however, allow the researcher to generalize, that is, to argue that from one case study the results, findings or theory developed apply to other similar case studies. The case looked at may be unique and, therefore not representative of other instances. It is, of course, possible to look at several case studies to represent certain features of management that we are interested in studying. The case study approach is often done to make practical improvements. Contributions to general knowledge are incidental.

The case study method has four steps:
1. Determine the present situation.

2. Gather background information about the past and key variables.

3. Test hypotheses. The background information collected will have been analyzed for possible hypotheses. In this step, specific evidence about each hypothesis can be gathered. This step aims to eliminate possibilities which conflict with the evidence collected and to gain confidence for the important hypotheses. The culmination of this step might be the development of an experimental design to test out more rigorously the hypotheses developed, or it might be to take action to remedy the problem.

4. Take remedial action. The aim is to check that the hypotheses tested actually work out in practice. Some action, correction or improvement is made and a recheck carried out on the situation to see what effect the change has brought about.

The case study enables rich information to be gathered from which potentially useful hypotheses can be generated. It can be a time consuming process. It is also inefficient in researching situations which are already well structured and where the important variables have been identified. They lack utility when attempting to reach rigorous conclusions or determining precise relationships between variables.

6. Diaries

A diary is a way of gathering information about the way individuals spend their time on professional activities. They are not about records of engagements or personal journals of thought! Diaries can record either quantitative or qualitative data, and in management research can provide information about work patterns and activities. They are commonly used in “Income and Expenditures Survey” also known as “Consumer Expenditures Survey” and “Family Household Budget Survey.” Diaries are very important because the respondents write down their expenses during a specified period of time (one week or two weeks) and then the enumerator (field researcher) meets with the family and retrieves the diary so that the information can be transcribed or converted into data readable format.

**Advantages**

- Useful for collecting information from employees
- Different writers compared and contrasted simultaneously
- Allows the researcher freedom to move from one organization to another
- Researcher not personally involved
- Diaries can be used as a preliminary or basis for intensive interviewing
- Used as an alternative to direct observation or where resources are limited

**Disadvantages**

- Subjects need to be clear about what they are being asked to do, why and what you plan to do with the data
- Diarists need to be of a certain educational level
- Some structure is necessary to give the diarist focus, for example, a list of headings.
- Encouragement and reassurance are needed as completing a diary is time consuming and can be irritating after a while
- Progress needs checking from time to time
- Confidentiality is required as content may be critical
- Analyses problems, so you need to consider how responses will be coded before the subjects start filling in diaries

7. Critical incidents

The critical incident technique is an attempt to identify the more ‘noteworthy’ aspects of job behavior and is based on the assumption that jobs are composed of critical and noncritical tasks. For example, a critical task might be defined as one that makes the difference between success and failure in carrying out important parts of the job. The idea is to collect reports about what people do that is particularly effective in contributing to good performance. The incidents are scaled in order of difficulty, frequency and importance to the job as a whole.

The technique scores over the use of diaries as it is centered on specific happenings and on what is judged as effective
behavior. However, it is laborious and does not lend itself to objective quantification.

8. Portfolios

A measure of a manager’s ability may be expressed in terms of the number and duration of ‘issues’ or problems being tackled at any one time. The compilation of problem portfolios is recording information about how each problem arose, methods used to solve it, difficulties encountered, etc. This analysis also raises questions about the person’s use of time. What proportion of time is occupied in checking; in handling problems given by others; on self-generated problems; on ‘top priority’ problems; on minor issues, etc? The main problem with this method and the use of diaries is getting people to agree to record everything in sufficient detail for further analysis. It is very time consuming!
Sampling

Collecting data is time consuming and expensive, even for relatively small amounts of data. Hence, it is highly unlikely that a complete population will be investigated. Because of the time and cost constraints, the amount of data you collect will be limited and the number of people or organizations you contact will be small in number. You will, therefore, have to take a sample and usually a small sample.

Sampling theory says a correctly taken sample of an appropriate size will yield results that can be applied to the population as a whole. There is a lot in this statement but the two fundamental questions to ensure generalization are:

1. How is a sample taken correctly, using unbiased selection procedures?
2. How big should the sample be to get reliable data?

The answer to the second question is ‘as large as possible given the circumstances’. It is like answering the question ‘How long is a piece of string’? It all depends on the circumstances.

While in our case (with the sample sizes we use in the IDP camps) I do not expect to normally generalize the results and take a large sample, it is expected (and desired) to follow a recognized sampling procedure, such that, if the sample was increased substantially, generalization would be possible. So, here are the basic of sampling through an example for easy understanding.

Example

The theory of sampling is based on random samples – where all items in the population have the same chance of being selected in sample. Random samples can be drawn in a number of ways but are usually based on having some information about population members. This information is usually in the form of an alphabetical list – called the sampling frame. An example of a sampling frame in the case of an IDP camp is the total number of tents or the total number of families that live in all the tents (assuming, of course, there are several families in one tent).

Three types of random samples can be drawn (or a mixture of them):

  a. simple random sample (SRS)
  b. stratified sample;
  c. systematic sample.

a. **Simple random sampling**

Pure SRS can be carried out in two ways: (i) the lottery method and (ii) using random numbers.

**The lottery method involves:**

- transferring each person’s name from the list and putting it on a piece of paper
- the pieces of paper are placed in a container and thoroughly mixed
- the required number are selected by someone without looking
- the names selected are the simple random sample.

This is basically similar to a game of bingo or the national lottery. This procedure is easy to carry out especially if both population and sample are small, but can be tedious and time consuming for large populations or large samples.

Alternatively random numbers can be used. Random numbers are strings of digits that have been generated by the lottery method and can be found in many statistics books. An example of these is:

| 03 47 43 73 86 | 36 96 47 36 61 |
| 97 74 24 67 62 | 42 81 14 57 20 |
| 16 76 62 27 66 | 56 50 26 71 07 |
| 12 56 85 99 26 | 96 96 68 27 31 |
Random numbers tend to be written in pairs and blocks of 5 by 5 to make reading easy. However, care is needed when reading these tables. The numbers can be read in any direction but they should be read as a single string of digits i.e. left to right as 0, 3, 4, 7 etc’, or top to bottom as 0, 9, 1, 1, 5, 3, 7, … etc. It is usual to read from left to right.

The random number method involves:

- Allocating a number to each person on the list (each number must consist of the same number of digits so that the tables can be read consistently).
- Find a starting point at random in the tables (close your eyes and point).
- Read off the digits.
- The names matching the numbers are the sample units.

Say we have to select 9 people out of 90. Proceed as follows:

- The sampling frame is the list of 90 people. Number this list 01, 02, …, 90. Note that each number has two digits and the numbering starts from 01.
- Suppose a starting point is found at random from the random number tables and let this number be 16. Then the person that has been numbered 16 is the first sample unit.
- Let the next two digits be 76, then the person numbered 76 is the second sample unit.
- This procedure is repeated until the nine people have been identified.
- Any number occurring for a second time is ignored as is any two-digit number over 90.

SRS is used as the basis for many other sampling methods, but has two main disadvantages (there are many others):

- A sampling frame is required. This may not be available, exist or be incomplete.
- The procedure is unbiased but the sample may be biased. For instance, if the 90 people are a mixture of men and women and all men were selected this would be a biased sample.

b. **Stratified Sample**

To overcome this problem a stratified sample can be taken. The population structure is reflected in the sample structure, with respect to some criterion.

For example, suppose the 90 people consist of 30 men and 60 women. If gender is the criterion for stratification then:

- 30% of the sample should be men; i.e., 30% x 9 = 3 men.
- Similarly, 60% of the sample should be women; i.e., 60% x 9 = 6 women

Thus the sample reflects the population structure in terms of gender.

The 3 men and 6 women would then be selected by simple random sampling e.g., using random number tables or some other random method of selecting units.

The problem with this approach is that the criterion for stratification should be highly correlated with the main variable of interest or main variables of interest (there’s usually more than one). To use stratification, a more detailed sampling frame is required. For instance, in many household surveys (labor force, income and expenditure, health) the variable that is used to stratify the sampling frame is the household’s economic status because a household (or a person’s) economic status is highly correlated to labor characteristics, income and expenditures, and health status, among other topics. In a census data base, there are ways of determining whether a household belong to a low, medium or high socioeconomic stratum.

c. **Systematic sampling**

This method is used extensively in practice (large and small-scale surveys) because it is easy and quick to implement, even when the population and the sample are both large.

Let’s first take a systematic sample of size 9 from a population of size 90 people, regardless of the sex composition in the
1. Obtain the Sampling Interval (SI)

\[ SI = \frac{90}{9} = 10 \]

**REMEMBER TO KEEP TWO DECIMAL PLACES WHEN CALCULATING THE SI, EXCEPT WHEN YOU OBTAIN A WHOLE NUMBER, AS IS THE CASE IN THIS EXAMPLE.**

2. Obtain a random number between 0 and 10. There are many ways to obtain random numbers. One method was mentioned above, using random number tables. Many common hand calculators have random number generator keys that produce a random number between 0 and 1. Many computer software packages also have this feature and provide either random numbers between 0 and 1 or random numbers between 0 and the number desired, 10 in our case. For instance, EXCEL has a random number function that provides a random number between 0 and 1 and some versions of EXCEL provide the random number between 0 and the desired number. In EXCEL, the function that is used to obtain a random number between 0 and 1 is:

\[ +\text{RAND()} \]

Once you see the random number between 0 and 1, say 0.608248 (RN), you must immediately COPY this number and using the PASTE SPECIAL, VALUES feature of EXCEL, and move it to another cell in order to anchor it. Otherwise, every time the cursor is moved, the random number will change values.

3. Obtain the Random Start (RS)

\[ RS = SI \times RN = 10 \times (0.608248) = 6.08 \text{ (keep two decimal places)} \]

4. The first person in sample is person number 7. Why? Because 6.08 means the person after person number 6. Therefore, if you obtain 6.01 or 6.99, the person that must be chosen is person number 7. Remember that 6.08 does not represent a number, but a person, so you **cannot** round 6.08 to the nearest integer which is 6.

5. To obtain the other persons in sample, proceed as follows:

   Second person in sample = RS + SI = 6.08 + 10 = 16.08 (person number 17 is in sample)
   Third person in sample = 16.08 + 10 = 26.08 (person number 27 is in sample)
   Fourth person in sample = 26.08 + 10 = 36.08 (person number 37 is in sample)
   Fifth person in sample = 36.08 + 10 = 46.08 (person number 47 is in sample)
   Sixth person in sample = 46.08 + 10 = 56.08 (person number 57 is in sample)
   Seventh person in sample = 56.08 + 10 = 66.08 (person number 67 is in sample)
   Eighth person in sample = 66.08 + 10 = 76.08 (person number 77 is in sample)
   Ninth person in sample = 76.08 + 10 = 86.08 (person number 87 is in sample)

Notice that we have not gone over 90. If in the selection process your last sample unit falls outside the last population value (90 in our case), then there is something wrong with the SI, or the RS, or the procedure itself.

If you must select a systematic sample using stratification, the procedure is exactly the same, but you would select 3 men out of the 30 men and 6 women out of the 60 women in the population. You must obtain, FOR EACH STRATUM SEPARATELY, an SI and a RS. **DO NOT USE THE SAME RANDOM NUMBER FOR BOTH STRATA.** This procedure (stratification) will ensure that you will obtain 3 men and 6 women from the sampling frame.

There are situations in which no sampling frame is available, as is the case with customers entering a store or an amusement park or a restaurant or a museum, etc. In that case, based on prior information (maybe 350 customers go to the amusement park on an average day), you decide how many people you want to interview, say one customer out of 25, and then you proceed to interview every 25th customer that comes into the business. The 50th person to enter is the second sample unit and so forth.
This process is carried on until the required sample size is met. This approach usually generates a good cross section of the population. However, you may need a team of people when no sampling frame exists to help with counting, interviewing, etc.
Accuracy of the Research Method

Some common worries researchers have are:

1. Will the research I’ve done stand up to outside scrutiny?
2. Will anyone believe my findings?

These questions are addressed by researchers by assessing the data collection method (the research instrument) for its reliability and its validity.

Reliability

The term RELIABILITY has many different meanings in everyday language, but in the field of statistics it has unique connotations depending upon its use.

The reliability of a method is the extent to which the same finding will be obtained if the research was repeated at another time by another researcher. If the same finding can be obtained again, the instrument (method) is consistent or reliable.

An estimate is called reliable if it has a low sampling error (see below). This is sometimes compared to the term ACCURACY. An estimate is accurate if its value is close to the true value. However, an estimate can be accurate and be unreliable (have high sampling error). Therefore, the reader must distinguish between these two words, ACCURACY and RELIABILITY.

Validity

When we talk about validity, we try to answer the following question: “Are we measuring what we think we are measuring?” This is very difficult to assess. The following questions are typical of those asked to assess validity issues:

1. Has the researcher gained full access to the knowledge and meanings of informants?
2. Would experienced researchers use the same questions or methods?

No procedure is perfectly reliable, but if a data collection procedure is unreliable then it is also invalid, but if it is reliable it doesn’t necessarily have to be valid.

Triangulation

Triangulation is cross-checking of data using multiple data sources or using two or more methods of data collection. There are different types of triangulation, including:

1. time triangulation – longitudinal studies
2. methodological triangulation – same method at different times or different methods on same object of study
3. investigator triangulation – uses more than one researcher.

Sampling Error

Sampling error is a measure of the difference between the sample results and the population parameters being measured. Sampling error can be measured when probability samples are chosen and it may be reduced by increasing the sample size and making sure that strict quality control procedures are in place to avoid introducing biases or non-sampling errors into the data.

Before calculating a meaningful sampling error, the following questions need to be raised in order to assess the sample:

1. Was the sample selected using random techniques?
2. Is the sample large enough to have reliable estimates?
3. Were biases introduced while selecting the sample?
The term “representative sample” is often used inappropriately in daily parlance. In statistical terms it really does not make any sense to call a sample representative or not representative. What’s important in the selection of a sample is that the proper stratification techniques be used prior to sample selection (to make the sample more “representative”) and that the sample size is big enough to provide reliable estimates (estimates with low sampling errors).

**Example:** Suppose that I want to measure the average income is Islamabad and I hire a sampler (who has access to the sampling frame for the city of Islamabad) to design a survey to that effect. Let’s consider the following two situations:

1. **A high sampling error**
   - Estimate = Average household monthly income measured in rupees = 10,000
   - Sampling error = 10,000 rupees
   - 95% confidence interval for the estimate = [-10,000, 30,000]
   - Coefficient of variation of the estimate = 100% (sampling error divided by estimate times 100)

2. **A low sampling error**
   - Estimate = 10,000 rupees
   - Sampling error = 100
   - 95% confidence interval for the estimate = [9,800; 10,200]
   - Coefficient of variation of the estimate $= \left( \frac{100}{10,000} \times 100 \right) = 1\%$

In the first instance, I wasted the money I paid the sampler because the 95% confidence interval does not shed any light on the estimate. In other words, I knew before the survey was undertaken that the true monthly average household income lay somewhere between 0 and 30,000 rupees. The sampler and his/her sample design did not produce any new information.

In the second instance, it tells me that the error in my estimate is very low and the 95% confidence interval assures me that the true income lies in that interval with 95% probability. Also the coefficient of variation of the estimate is 1%, which is very low, which means the estimate is very reliable. Coefficients of variation higher than 15% mean that the users should not place their trust on the estimates.