

E-Content (M.com sem 3)  
Research Methodology.

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Data collection and Measurement  
(Primary data)

After selecting a proper research design the next most important task is collection of data. It is the foundation stone of statistical investigation so it should be collected with maximum efficiency & ability and accuracy.

The analysis of data results into certain inferences which is known as information.

Sunday 18

Method of data collection

- (A) Primary data sources
- (i) Direct personal investigation
  - (ii) Indirect oral investigation
  - (iii) Investigation through schedule & questionnaires  
    (a) filled by respondent (ii) filled by enumerators.
  - (iv) Registration method.

## **Primary Sources**

Primary sources mean first hand sources or original sources at the hands of a researcher, which is not collected previously. For example, the various replies received by the teachers from their students as regards their assessment of teaching method, constitute primary source of data. Primary data is collected through principle sources of observation and surveys.

The first hand information bearing any research, which has been collected by the researcher or his agent or assistant, may be called primary data. These are original observations collected for the first time. Such data facilitate original investigations and observations, leading to useful and valuable results. The results, which are based on primary data, are bound to be empirical and of great utility value. The primary data, collected and compiled without any bias, are more reliable and dependable and are accurate and apt for specified investigations. Once the primary data have been put to use, the original character of these data disappears, and they become secondary. The data which are primary at one time point are, therefore, bound to become secondary at a later stage.

**(1) Direct Personal Investigation—**

Under this method the investigator personally visits the area of enquiry, establishes personal contact with the informants and collects necessary facts and figures. For instance, if an investigator wishes to study the economic condition of workers in a factory and he goes personally to the factory and collects data on the basis of personal contacts with the workers, it will be called direct personal investigation. It is clear that this method is called direct because data are collected from those persons directly about whom information is to be collected and it is personal because the investigator personally visits the area of investigation and collects necessary data.

**Merits**—The main advantages of direct personal investigation are as follows:—

- (1) **High level of accuracy**—As the data are collected by the investigator himself, they are bound to be more accurate, reliable and standardised.
- (2) **Flexibility**—This method is flexible because the investigator can make necessary adjustments in the questions, while collecting data. Moreover, he can explain in a better way the meaning, objective and spirit of the questions.
- (3) **Homogeneity**—As the data are collected by one person, the quality of homogeneity and uniformity exist in data which make data easily comparable.
- (4) **Cross-checking**—In this method the investigator visits the spot himself and thus he can check the correctness of information by careful observation and intelligent cross-questioning.
- (5) **Collection of other informations**—The investigator may collect other informations also which may be used easily in other investigations.
- (6) **Effect of personal contact**—Personal approach encourages the respondents in providing necessary information and usually that carelessness or reluctance is not observed which is found in collecting data by postal method.

**Demerits**—The main demerits of this method are as follows:—

- (1) **Limited area**—This method is suitable only for intensive study in limited area. In other words, the method is not suitable if the field of investigation is too wide in terms of the number of persons to be contacted or the area to be covered.
- (2) **Effect of personal bias**—Every investigator has his own approach, assumptions and prejudices, which may effect the findings of investigation.
- (3) **More costly**—This method is more costly and requires more time.

(4) **Doubt in reliability**—On account of limited area of investigation it is just possible that data used may not represent properly the whole universe and findings may become fallacious. Moreover, the success of such investigation largely depends upon the ability, efficiency and tactful skill of the investigator and in case of absence of such qualities, the results obtained may not be fully reliable.

Throwing light on limitations of this method *W.L. King* observes, "This type of enquiry, while admirable because of additional accuracy due to personal supervision, must not cover too narrow a field to be representative and is also liable to too large an injection of the personal element. The prejudices and the desires of the investigators become too often unconsciously woven into the fabric of his conclusions."

**Suitability**—This method is more suitable where:—(1) more emphasis is to be laid on accuracy, (2) data are to be kept confidential, (3) originality of data is more important, (4) the field of investigation is limited and (5) due to complexity of the subject of investigation personal presence of the investigator is required.

**Precautions**—The following precautions should be taken for making this method a success:—(1) The investigator should be diplomatic, hardworking and sincere so that he may win the co-operation and confidence of respondents. (2) The investigator should be neutral so that his personal sentiments and bias may not influence the investigation. (3) The questions should be limited, simple and in a language which is not vague so that the respondents may give answer in natural way without any resistance or irritation. (4)

Cross-questions should be in order to check doubtful answers. (5) The investigator should be familiar with the language, custom and local connotations of the respondents so that he may easily approach the persons concerned.

### (II) Indirect Oral Investigation—

In this method informations are not collected directly from the persons or parties related to investigation but are collected from the parties or witness having information about the problem. For example, obtaining the information related to standard of living of workers from their officers in place of asking from workers directly. Enquiry Committees and Commissions mostly use this method to carry on their investigations.

**Advantages**—The following are the advantages of this method:—

- (1) **Wide coverage**—This method can easily be used in case when area of investigation is wide.
- (2) **Collection of some specific informations**—There may be certain aspects about which we may not obtain correct informations from the persons concerned directly viz., habit of drinking, smoking, gambling, etc. However, such informations can easily and correctly be obtained under this method by interviewing personal friends, relatives or neighbours of the persons concerned.
- (3) **Experts' advice**—In this method, the opinion and suggestions of experts can be solicited.
- (4) **Economy**—As compared to the wide area of investigation, this method is less expensive and requires less time for conducting the enquiry.
- (5) **Neutrality**—This method is free from the bias of the investigator as well as of the informant.

**Disadvantages**—The main disadvantages of this method are as follows:—

- (1) **Incorrect informations**—As the informations are obtained indirectly from other persons or parties, there remains possibility of getting false informations and lack of high level of accuracy.
- (2) **Limitations of witness**—The carelessness, ignorance, and reluctance of witness may adversely affect the findings of the enquiry.
- (3) **Possibility of bias**—Though there are less chances of bias study in this method as compared to direct personal investigation but the bias in selection of informants or witness may make the investigation biased.

**Suitability**—This method of data collection is considered suitable:—

- (i) when the area of investigation is wide,
- (ii) where informants are reluctant to give information or data and are of such complicated nature that it is difficult to get them directly,
- (iii) when biased behaviour and answers are expected from the persons concerned.

**Precautions**—The following precautions are required in order to control demerits of this method:—(i) Proper care should be taken in selection of witness and they should be in reasonable number. It should be seen that witness really possess the knowledge about the problem under study and are in a position to give a clear, detailed and correct account of the problem. (ii) It should also be ascertained that the enumerators are intelligent and tactful enough to solicit proper and correct response from the informants keeping in view the psychological and instinctive reactions of these informants. (iii) Proper allowance should be made for the inherent optimism or pessimism of the informants. (iii) Proper allowance

**(III) Data collected through Correspondents or Local Sources**—

In this method data are collected by local correspondents appointed in different parts of the field of enquiry or the use of some local source already functioning is made. For example, this method is widely used for the publication of price statistics in newspapers.

**Merits**—This method of data collection has the following advantages:—

- (1) **Wide area**—This method can easily be used in a wide area of investigation.

(2) **Economic**—This method works out to be very cheap and economical keeping in view the wide area of data collection.

(3) **Useful for prompt and regular informations**—This method proves very useful in the areas where data are collected promptly and on regular basis.

**Demerits**—This method suffers from the following demerits:—

(1) **Lack of Reliability and Accuracy**—There remains the doubt about reliability of data because it becomes a routine work for the correspondents to supply data every day or after a regular interval.

(2) **Lack of Uniformity**—In this method data are collected by different persons in different areas. Thus, there may be chances of lack of uniformity if different correspondents adopt different attitudes towards the problem under investigation.

(3) **Effect of Prejudices of Correspondents**—The collection of data may be influenced by the personal prejudices and whims of the correspondents in different fields of the enquiry. For example, such influence can be visualised in the estimates of the position of different parties in different areas during election period.

**Suitability**—This method of data collection is useful:—(i) where the area of investigation is very wide, (ii) where data are to be collected on a regular basis, and (iii) where high level of accuracy is not required and the purpose of investigation is to obtain routine and approximate estimates only.

#### (IV) Investigation through Schedules or Questionnaires filled in by Informants—

This method is also called as 'Mailed Questionnaire Method'. In this method a schedule or questionnaire is prepared and which is mailed to the respondents or informants. Usually, a covering note is also attached with the questionnaire explaining in detail the objectives and importance of collecting the information. Respondents are also requested to extend their co-operation by furnishing the answers and returning the questionnaire duly filled in within a definite period. A self addressed and duly stamped envelope is also sent to the informants alongwith the questionnaire to avoid unnecessary delay. Respondents are also assured that the information supplied by them will be kept strictly confidential and will only be used for the purpose of investigation.

**Advantages**—This method of data collection has following advantages:—

(1) **Economical**—This method is the least expensive in terms of time, money and manpower provided the respondents supply the informations in time.

(2) **Suitable in Wide Area**—This method is suitable for extensive inquiries covering a very wide area.

(3) **Original and Correct Informations**—The informations collected in this method are original and much more authentic because questionnaires are filled in by the informants themselves. Moreover, errors due to the personal bias of the investigator or enumerator are completely eliminated.

**Disadvantages**—This method is not very satisfactory due to the following limitations:—

(1) **Non-response**—The most serious drawback of this method is that most informants do not pay attention and interest, and they do not respond to the questionnaire.

(2) **Incomplete information**—In many cases, the information obtained on the basis of these questionnaires remain incomplete and inaccurate. It is possible that the informants may not be able to follow some of the questions or they may fill in the questionnaire in non-responsive manner.

(3) **Lack of flexibility**—There is less flexibility in this method because no modification is possible in the questionnaire after its mailing. Similarly, there is no scope for asking supplementary or complementary questions after receiving the questionnaire.

(4) **Unreliable conclusions**—If questionnaire does not get proper response there is possibility of getting unreliable findings on the basis of insufficient number of replies.

(5) **Use in educated class**—This method can be used only where the informants are educated and can fill in the questionnaires or the schedules.

(6) **Practical Difficulties**—An important limitation of this method is that the informants may give oral informations about certain facts but may not be willing to give written information in their own handwriting *e.g.*, facts like income, property, personal habits and so on.

**Suitability**—This method is suitable where the area of investigation is very wide and informants are educated. This method also provides proper information where filling in the questionnaire is a legal obligation.

(V) **Information through Questionnaire filled in by the Enumerators**—

In this method enumerators are appointed for the collection of data and these enumerators collect data on the basis of standardised questionnaire and explicit instructions. This method is generally used by research institutions, large public enterprises and various government agencies. In India population census after every 10 years is an important example of data collection by this method.

**Advantages**—

(1) **Wide Area**—This method is very useful for census study in a wide area. Unlike the mailed questionnaire method, this technique can be used with advantage even when the respondents are illiterate.

(2) **Reliable and complete Information**—As the information is collected on the basis of personal contact between enumerators and informants, correct and complete information can be obtained even on difficult and complex questions.

(3) **Uniformity**—This method brings uniformity in collection of data because data are collected by trained and experienced enumerators on the basis of a standardised questionnaire or schedule.

(4) **Unbiased**—Personal bias of enumerator or informant does not affect materially because the information is collected on the basis of standardised questions and checking the accuracy by cross-questioning wherever needed.

**Disadvantages**—

(1) **Expensive Method**—It is fairly expensive method since a number of enumerators are appointed and paid for their services. Hence, it is not suitable for personal investigations.

(2) **Problem of Enumerators**—There is problem of proper selection and training of enumerators. Moreover, if the enumerators are biased they may influence the results of the investigation.

(VI) **Investigation through Registration Method**—

In this method arrangements are made for the registration of informations related to particular fact and on that basis data are collected. For example, in India the registration of birth and death is compulsory and data related to birth and death are collected on this basis. This method is economic and accuracy can be maintained by legal compulsions, but it requires a permanent arrangement for the facility of registration.

**Selection of Suitable Method for the Collection of Primary Data**—

In the context of various methods of collection of primary data an important question arises that which of these methods is best? The fact is that none of these methods can be best for all types of investigations or under different conditions. It will have to be decided for each investigation as to which of the methods is the best for it. Generally, the following factors are considered while taking this decision.

(1) **Nature of Investigation**—It depends upon the nature of investigation as to which method should be adopted for collecting primary data. If the enquiry is such where direct personal observation or contact of the investigator is necessary, the method of direct personal investigation should be adopted *e.g.*, it is useful in the study of living condition of illiterate agricultural workers in selected areas. If direct personal contact is not necessary or is not practicable then the method of indirect personal investigation may be suitable. If information is to be received in detail from educated persons or institutions, mailing the questionnaire will be appropriate. If the area of investigation is very wide and

most of the informants are illiterates, it will be better to appoint enumerators for filling in the schedules. If collection of data is to be carried on a regular basis, the source of local correspondents should be utilized for this purpose *i.e.*, collection of price statistics for publication in newspapers. Registration method can be adopted for obtaining regular informations at government level *e.g.*, it can be useful in the collection of vital statistics.

(2) **Scope of Enquiry**—If the scope of enquiry is limited, direct personal investigation method should be adopted. The method of indirect oral investigation is adopted if the scope of enquiry is wide. The method of indirect personal investigation is more appropriate in enquiries conducted by a committee or commission. If data are to be collected on regular basis from widely scattered areas, then the local correspondents should be appointed.

(3) **Degree of Accuracy**—The degree of accuracy desired also determines as to which of the methods of data collection will be suitable. The direct personal investigation method has the greatest degree of accuracy. The degree of accuracy generally decreases in the method of indirect oral investigation. Where information is collected through correspondents, the degree of accuracy cannot be high on account of more applicability of estimates. If schedules are filled in by the informants the degree of accuracy will be less as compared to when they are got filled in through trained and experienced enumerators.

(4) **Financial Resources**—If more finance is available, methods of direct personal investigation or schedules to be filled in by enumerators may be adopted. If the financial resources are limited, indirect oral investigation or mailing the questionnaire method may be preferred.

(5) **Time Factor**—If the available time is very short, then information can be collected through correspondents or schedules can be got filled in by enumerators. If there is no time limit, any other method for use can be decided.

(6) **Other Factors**—Besides above factors, the ability of informants, regularity of enquiry, availability of enumerators, facility of preparing and printing questionnaire, etc., also influence the selection of the method of data collection.

It is evident that only after considering various aspects of enquiry it can be decided as to which of the methods of data collection is suitable. It is also important here that success in data collection depends to a great extent upon the ability, efficiency and experience of the investigator. Dr. Bowley has rightly remarked that "In collection.....common sense is the chief requisite and experience the chief teacher."

#### DIFFERENCE BETWEEN QUESTIONNAIRE AND SCHEDULE

Questionnaires and schedules are widely used in collection of primary data. In practice, these two are used in the same sense but technically they differ as explained below:—

##### (I) Difference between Meaning and Format—

(1) **Arrangement of filling in informations**—Generally questionnaire is filled in by the informants themselves, whereas the schedule is filled in by the enumerators on the basis of information obtained from informants. In the form of definition "Questionnaire refers to a device for securing answers to questions by using a form which the respondents fills in himself. Schedule is the name usually applied to a set of questions which are asked and filled in face-to-face situation with another person."

(2) **Pattern**—The pattern of schedule is 'Blank Form', in which blank space is provided for giving answer of each item. In questionnaire there may or may not be blank space alongwith questions. If space is not provided, answers are given on a separate sheet.

(3) **Language**—The language of a questionnaire is in the form of questions, while in schedule such form is not used *e.g.*, if the marital status of the informant is to be asked, then in questionnaire there will be a question that "what is your marital status?", while in a schedule the item will be mentioned as Marital Status.....

##### (II) Difference on the basis of Method and Techniques—

(1) **Educational level of informants**—The questionnaire method can be adopted

only when informants are educated. On the contrary the schedule method can be applicable equally to both types of informants—educated or uneducated.

(2) **Interview or personal contact**—There is no need of personal contact between informant and investigator in questionnaire method, whereas interview method is used for data collection on the basis of schedule.

(3) **Degree of accuracy**—Generally, the informations remain incomplete, insufficient and inaccurate in questionnaire method but the degree of accuracy remains high in schedule on account of the 'personal contact' role of the investigators.

(4) **Despatch System**—The questionnaire is generally mailed to informants and they also return it by mailing system. In schedule system the investigator personally visits the informants and fill in the schedule after obtaining information from them.

(5) **Economy**—The questionnaire method is economical, while the schedule method becomes costly on account of expenditure on investigators.

(6) **Scope and Use**—The individual researcher gives priority to questionnaire method in case of wide area of investigation, while the schedule method is generally used in the investigations carried on by institutions.

(7) **Need of Data**—There is problem of lack of proper response in questionnaire method. Hence, schedule method is suitable where data are to be collected in respect of every unit of the universe, e.g., population census.

#### ESSENTIALS OF A GOOD QUESTIONNAIRE OR PRECAUTIONS TO BE TAKEN IN DRAFTING A QUESTIONNAIRE

To draft a questionnaire is a specific art and the success of statistical investigation depends to a large extent upon careful and tactful drafting of questionnaire. The fact is that it is very difficult to elicit correct information from human factor in the form suitable for scientific analysis because every person has his own whims and feelings of desire, pride and prejudice and all these influence the answers of questionnaire. Therefore, the size, language and questions of a questionnaire should be designed very carefully so that the informations required for investigation may be obtained with reasonable accuracy and completeness. In this context, the following general points may be borne in mind:—

(1) **Proper Size and Limited Questions**—The size of the questionnaire should be optimum, keeping in view the nature, objectives and scope of the enquiry and the number of questions should be restricted to the minimum. If there are unnecessary and more questions in the questionnaire, it would be more time-consuming and respondents may not take proper interest in their replies. However, it does not mean that the number of questions should be restricted at the cost of sufficient and necessary information. If there are more questions due to nature of enquiry, then the questionnaire should be divided into various sections or parts.

(2) **Simplicity and Clarity**—The language of questions should be simple, clear and courteous in tone. As far as possible, highly technical word or words having multiple meaning and vague concept should be avoided.

(3) **Logical Sequence**—The questions should be arranged in a natural logical sequence. In other words, the order of the questions should be such as to facilitate the answering of each question in turn. For example, in a survey relating to use of T.V. the logical sequence of questions would be:—Do you own a T.V. ? When did you purchase it ? What is its mark ? How much did it cost you ? Is it working satisfactorily ? Have you ever got it serviced ? etc.

(4) **Selection of Nature of Questions**—From the view of answering, the questions may be of different types. Hence, the nature of questions should also be determined carefully. On the basis of nature the questions may be broadly classified into two groups:—(a) **Shut Questions** and (b) **Open Questions**. In shut questions possible answers are suggested in the questionnaire and the respondent is required to select from these answers. Shut questions may be of two types:—(i) *Alternate questions*—In such



questions, the respondent has to choose between two clear cut alternatives like 'Yes or No', 'True or False', etc. For instance, Do you own a T.V. ?—Yes or No. (ii) *Multiple choice questions*—In such questions various possible answers are given and the respondent is required to tick one of them. For example,

- (A) Do you smoke ?
- |                     |                          |                 |                          |
|---------------------|--------------------------|-----------------|--------------------------|
| (i) Yes (regularly) | <input type="checkbox"/> | (ii) No (Never) | <input type="checkbox"/> |
| (iii) Occasionally  | <input type="checkbox"/> | (iv) Seldom     | <input type="checkbox"/> |
- (B) How do you make preparation for examination ?
- |                        |                          |                   |                          |
|------------------------|--------------------------|-------------------|--------------------------|
| (i) Text-books         | <input type="checkbox"/> | (ii) Class-notes  | <input type="checkbox"/> |
| (iii) Question-answers | <input type="checkbox"/> | (iv) Guess papers | <input type="checkbox"/> |
- (C) What is your monthly income ?
- |                     |                          |                        |                          |
|---------------------|--------------------------|------------------------|--------------------------|
| (i) Below Rs. 1,000 | <input type="checkbox"/> | (ii) 1,000—1,999       | <input type="checkbox"/> |
| (iii) 2,000—2,999   | <input type="checkbox"/> | (iv) Rs. 3,000 or more | <input type="checkbox"/> |

It is worth mentioning that multiple choice question method can be used when only a selected few alternative answers exist to a particular question.

**Open questions** are those which leave the door open to any answer. These questions may also be of two types:—(i) **Specific information questions**—The answers of such questions are very specific and certain, viz., what is your monthly income ? How many children do you have ?, etc. (ii) **Comprehensive information questions**—In such questions informants are expected to give answer in detail viz., what drawbacks do you feel in examination system ? How the programmes of rural development may be more effective and successful ? etc. It should be noted that in case of open questions it becomes difficult to classify and tabulate diverse opinions and responses.

(5) **To avoid sensitive and personal nature questions**—Such questions should not be included in questionnaire which might hurt self-prestige or personal, religious or social feelings of an informant e.g., Do you evade taxes ? Would you like to take dowry in the marriage of your son ? Do you bribe government servants for getting your work done ?, etc.

(6) **Cross check**—The questionnaire should be so designed as to provide cross checks on the accuracy of information and reliability of the respondent. For example, the question 'What is your age ?' can be supplemented by the question. 'What is your date of birth ?'

(7) **Questions according to ability**—The ability of informants should also be considered at the time of designing the questionnaire. For example, if general persons are asked questions related to blood pressure and blood group, etc., perhaps they may not be in a position to give correct answer of these questions. Similarly, such questions should also be not asked which require tedious mathematical calculations or tax the respondent's memory unnecessarily.

(8) **Attractive and appealing get-up**—The questionnaire should be made attractive by proper lay out and appealing get up by the use of proper paper and printing because it indicates the level of investigation and motivates the respondents.

(9) **Mode of tabulation and analysis**—The method to be used for tabulation and analysis of information should be determined before the final draft of the questionnaire is made. If the information obtained through questionnaire is to be computerized it will be desirable to consult the computer experts before finalising the draft.

(10) **Pre-testing and rectification**—After the finalisation of questionnaire but before formal beginning of enquiry it is desirable that the questionnaire be tested on a small scale. If certain shortcomings or problems are faced by the investigator in this testing, necessary improvement or modifications can be made in the questionnaire.

(11) **Instructions and footnotes**—Precise and definite instructions should also be given to informants. e.g., how the questionnaire is to be filled in and at what address and upto what date it is to be returned ? If there is need of clarification of some specific questions, it should be given in footnotes.

**(12) Covering letter**—Usually a covering letter is also sent with the questionnaire explaining the importance and scope of investigation and requesting respondents to extend their co-operation. The last date and address for returning the questionnaire after duly filled-in is also mentioned in this letter. If the questionnaire is mailed it will be advisable to enclose a self-addressed stamped envelope for enabling the respondents to return the questionnaire conveniently after completing it. It is also assured through this covering letter that informations furnished by respondents will be kept completely secret and they will not be used for any other purpose and in any other manner.

### EXAMPLE OF A QUESTIONNAIRE

**Q.** Prepare a questionnaire for studying the expenditure of students of degree colleges in Agra city.

#### Survey of Expenditure Trend among the students of Degree Colleges in Agra City

[**Note:** The objective of this questionnaire is to collect data related to monthly expenditure of students of degree colleges. The information supplied by you will be treated as confidential and it will be used in this investigation only.]

1. **Name of Student:** .....
2. **Sex :** Male/Female
3. **Class :** Degree/Post-graduate
4. **Faculty :** Arts/Science/Commerce/Law.
5. **Name of the College :** .....
6. **Permanent Residence** (name of village or city).....
7. **If you are not a resident of Agra, what is the arrangement of accommodation ?** Hostel/Rental Room/stay with relative or familiar/Daily up-down.
8. **Age :** .....years.....months.
9. **Father's Name :** .....
10. **Father's Business :** .....
11. **Income of other members of family** (if any).....
12. **Student's monthly income** (if any).....
13. **Amount available to student for monthly expenditure :**
  - (a) From family .....
  - (b) From personal income .....
  - (c) Scholarship .....
  - (d) Other receipts .....

14. **Monthly expenditure of the student :**

Item	Amount (Rs.)
(a) College Fee	.....
(b) Books & reading material	.....
(c) Hostel Expenses. :	
(i) Rent	.....
(ii) Food	.....
(d) Bus/Rail Fare & other Travelling Expenses	.....
(e) Sports' good	.....
(f) Entertainment	.....
(g) Other Exp.	.....

15. Is the amount available to you for monthly expenditure sufficient ? If not what more amount you require ?
16. Can you save some amount in your monthly expenditure ? If yes, the name of items and expected amount of saving.
17. Any other information.....