

## Use of Statistical Tools



**Studying this chapter should enable you to:**

- be familiar with steps in designing a project;
- apply various statistical tools in analysing a problem.

### INTRODUCTION

You have studied about the various statistical tools. These tools are important for us in daily life and are used in the analysis of data pertaining to economic activities such as production, consumption, distribution, banking and insurance, trade, transport, etc. In this chapter, you will learn the method of developing a project. This will help in understanding

how statistical tools and methods can be used for various types of analysis. For example, you may have to collect information about a product from the consumer or about a new product or service to be launched in the market by the producer or analyse the spread of information technology in schools and so on. Developing a project by conducting a survey and preparing a report will help in analysing relevant information and suggesting improvements in a product or system.

### Steps Towards Making a Project

*Identifying a problem or an area of study*

At the outset, you should be clear about what you want to study. On the basis

of your objective, you will proceed with the collection and processing of the data. For example, production or sale of a product like car, mobile phone, shoe polish, bathing soap or a detergent, may be an area of interest to you. You may like to address certain water or electricity problems relating to households of a particular area. You may like to study about consumer awareness among households, i.e., awareness about rights of consumers.

#### *Choice of Target Group*

The choice or identification of the target group is important for framing appropriate questions for your questionnaire. If your project relates to cars, then your target group will mainly be the middle income and the higher income groups. For the project studies relating to consumer products like soap, you will target all rural and urban consumers. For the availability of safe drinking water your target group can be both urban and rural population. Therefore, the choice of target groups, to identify those persons on whom you focus your attention, is very important while preparing the project report.

#### *Collection of Data*

The objective of the survey will help you to determine whether the data collection should be undertaken by using primary method, secondary method or both the methods. As you have read in Chapter 2, a first hand collection of data by using primary method can be done by using a

questionnaire or an interview schedule, which may be obtained by personal interviews, mailing/postal surveys, phone, email, etc. Postal questionnaire must have a covering letter giving details about the purpose of inquiry. Your objective will be to determine the size and characteristics of your target group. For example, in a survey pertaining to the primary and secondary level female literacy or consumption of a particular brand or soap, you will have to go to each and every family or household to collect the information.

Secondary data will provide information through published or unpublished sources (internal record of any organisation), provided it suits your requirement. Secondary sources of data are usually used when there is paucity of time, money and manpower resources and the information is easily available. If sampling is used in your method of data collection, then the care has to be taken about the suitability of the method of sampling.

#### *Organisation and Presentation of Data*

After collecting the data, you need to process the information so received, by organising and presenting with the help of tabulation and suitable diagrams, e.g. bar diagrams, pie diagrams, etc. about which you have studied in chapter 3 and 4.

#### *Analysis and Interpretation*

Measures of Central Tendency (e.g. mean), Measures of Dispersion (e.g.

Standard deviation), and Correlation will enable you to calculate the average, variability and relationship, if it exists among the variables. You have acquired the knowledge related to above-mentioned measures in chapters 5, 6 and 7.

### Conclusion

The last step will be to draw meaningful conclusions after Analysing and Interpreting the results. If possible you must try to predict the **future prospects** and suggestions relating to growth and government policies, etc. on the basis of the information collected.

### Bibliography

In this section, you need to mention the details of all the secondary sources, i.e., magazines, newspapers, research reports used for developing the project.

### SUGGESTED LIST OF PROJECTS

These are a few suggested projects. You are free to choose any topic that deals with an economic issue.

1. Consider yourself as an advisor to Transport Minister who aims to bring about a better and coordinated system of transportation. Prepare a project report.
2. You may be working in a village cottage industry. It could be a unit manufacturing *dhoop*, *agarbatti*, candles, jute products, etc. You want to start a new unit of your own. Prepare a project proposal for getting a bank loan.
3. Suppose you are a marketing manager in a company and recently you have put up advertisements about your consumer product. Prepare a report on the effect of advertisements on the sale of your product.
4. You are a District Education Officer, who wants to assess the literacy levels and the reasons for dropping out of school children. Prepare a report.
5. Suppose you are a Vigilance Officer of an area and you receive complaints about overcharging of goods by traders i.e., charging a higher price than the Maximum Retail Price (MRP). Visit a few shops and prepare a report on the complaint.
6. Consider yourself to be a Mukhiya (head of Gram Panchayat) of a particular village who wants to improve amenities like safe drinking water to your people. Address your issues in a report form.
7. As a representative of a local government, you want to assess the participation of women in various employment schemes in your area. Prepare a project report.
8. You are the Chief Health Officer of a rural block. Identify the issues to be addressed through a project study. This may include health and sanitation problems in the area.
9. As the Chief Inspector of Food and Civil Supplies department, you have received a complaint about food adulteration in the area of

- your duty. Conduct a survey to find the magnitude of the problem.
10. Prepare a report on Polio immunisation programme in a particular area.
  11. You are a Bank Officer and want to survey the saving habits of the people by taking into consideration income and expenditure of the people. Prepare a report.
  12. Suppose you are a part of a group of students who wants to study farming practices and the problems facing farmers in a village. Prepare a project report.

#### SAMPLE P ROJECT

This is a sample project for your guidance. The question can vary depending upon the subject of the study.

You are a young entrepreneur who wants to setup a new retail shop and want to choose a variety of toothpaste brands to sell. A sample project based on primary source of data collection could be prepared for toothpaste.

You have to start by assuring the concerned person or party, that the information required is for survey and will not be used for any other purpose. This is done through a covering letter. All the information shall be kept confidential.

#### Data Analysis and Interpretation

After collecting the entire information you now have to organise and classify data for the purpose of choosing brands of toothpaste which you want



to sell. Hypothetical data is given below for your reference where you will now use the statistical tools such as pie diagrams, bar diagrams, mean, standard deviation, etc.

#### Area Distribution

Urban users 67%

Rural users 33%

**Observation:** Majority of users belonged to urban area.

#### Age distribution

| Age in years | No. of Persons |
|--------------|----------------|
| Below 10     | 74             |
| 10-20        | 56             |
| 20-30        | 91             |
| 30-40        | 146            |
| 40-50        | 93             |
| Above 50     | 40             |
| <b>Total</b> | <b>500</b>     |

**QUESTIONNAIRE**

1.Name

*Age (in years)No. of persons*

- |             |                      |
|-------------|----------------------|
| (a)Below 10 | <input type="text"/> |
| (b)10–20    | <input type="text"/> |
| (c)20–30    | <input type="text"/> |
| (d)30–40    | <input type="text"/> |
| (e)40–50    | <input type="text"/> |
| (f)Above 50 | <input type="text"/> |

3.Gender: Male/Female

4.Number of members in the family:

- |            |                      |
|------------|----------------------|
| (a)1–2     | <input type="text"/> |
| (b)3–4     | <input type="text"/> |
| (c)5–6     | <input type="text"/> |
| (d)Above 6 | <input type="text"/> |

5.How many earning members are there in your family?

6.Monthly family income:

- |                  |                      |
|------------------|----------------------|
| (a)Below 10,000  | <input type="text"/> |
| (b)10,000–20,000 | <input type="text"/> |
| (c)20,000–30,000 | <input type="text"/> |
| (d)Above 30,000  | <input type="text"/> |

7.Resident of: Urban/Rural area

8.Major occupation of the main bread-earner:

- |                               |                      |
|-------------------------------|----------------------|
| (a)Service                    | <input type="text"/> |
| (b)Professional               | <input type="text"/> |
| (c)Manufacturer               | <input type="text"/> |
| (d)Trader                     | <input type="text"/> |
| (e)Any other (please specify) | <input type="text"/> |

9.What do you use to clean your teeth:

- |                |                      |
|----------------|----------------------|
| (a)Toothpaste  | <input type="text"/> |
| (b)Toothpowder | <input type="text"/> |
| (c)Anyother    | <input type="text"/> |

10.Which brand of toothpaste do you use?

- |              |                      |            |                      |
|--------------|----------------------|------------|----------------------|
| (a)Aquafresh | <input type="text"/> | (b)Anchor  | <input type="text"/> |
| (c)Cibaca    | <input type="text"/> | (d)Babool  | <input type="text"/> |
| (e)Close-up  | <input type="text"/> | (f)Promise | <input type="text"/> |
| (g)Colgate   | <input type="text"/> | (h)Forhans | <input type="text"/> |

|               |                      |                         |                      |
|---------------|----------------------|-------------------------|----------------------|
| (i) Meswak    | <input type="text"/> | (j) Tea Tree Oil & Neem | <input type="text"/> |
| (k) Pepsodent | <input type="text"/> | (l) Oral B              | <input type="text"/> |
| (m) Pearl 32  | <input type="text"/> | (n) True Dent           | <input type="text"/> |
| (o) Homeodent | <input type="text"/> | (p) Sensodyne           | <input type="text"/> |
| (q) Any other | <input type="text"/> |                         |                      |

11. The price paid for each 100 gram pack of the toothpaste:

12. Do you find the product costly?Y es/No

13. Do you examine the date of manufacturing and expiry of the product?Y es/No

14. Do you check the standardisation mark (like – ISI)?Y es/No

15. Do you check the ingredients used?Y es/No

16. Are you satisfied with the quality of the product?Y es/No

17. Do you complain to the shopkeeper in case of dissatisfaction?Y es/No

18. Has your complaint been timely attended?Y es/No

19. Did you ever go to a consumer court in case of dissatisfaction regarding the product?Y es/No

20. Was your complaint attended to your satisfaction?Y es/No

21. How did you come to know about the product?

| <i>Advertisement</i> | <i>Families Influenced</i> |
|----------------------|----------------------------|
| Television           | <input type="text"/>       |
| Newspaper            | <input type="text"/>       |
| Magazine             | <input type="text"/>       |
| Cinema               | <input type="text"/>       |
| Sales representative | <input type="text"/>       |
| Exhibits - stall     | <input type="text"/>       |
| Radio                | <input type="text"/>       |

22. Is the advertisement of the product persuasive?Y es/No

23. Were you attracted by promotional offers like rebates, free tooth brush, buy one get one free, etc.?Y es/No

24. Do the children influence purchase of particular toothpaste?Y es/No

25. If a new toothpaste is launched in the market will you buy it?Y es/No  
If yes, then with what considerations? Kindly mention.

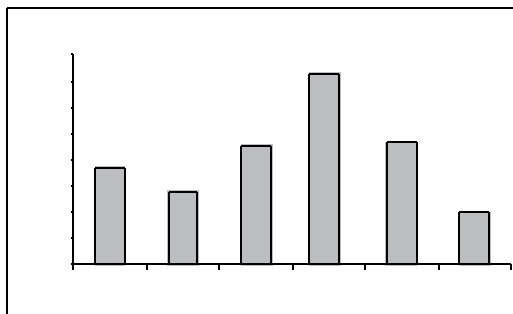


Fig. 9.1: Bar diagram

**Observation:** Majority of the persons surveyed belonged to age group 20–50.

### Family Size

| Family size | No. of families |
|-------------|-----------------|
| 1–2         | 20              |
| 3–4         | 40              |
| 5–6         | 30              |
| Above 6     | 10              |
| Total       | 100             |

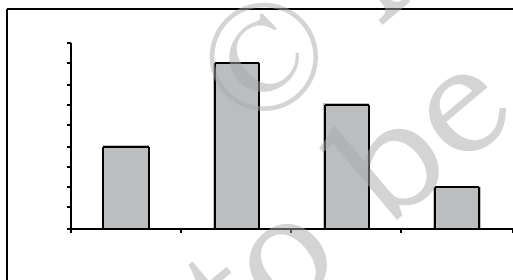


Fig. 9.2: Bar diagram

**Observation:** Majority of the families surveyed have 3–6 members.

### Family monthly Income status

| Income        | No. of Households |
|---------------|-------------------|
| Below 10,000  | 20                |
| 10,000–20,000 | 40                |
| 20,000–30,000 | 30                |
| Above 30,000  | 10                |

Bar Diagram and Histogram respectively are indicating the level of families income.

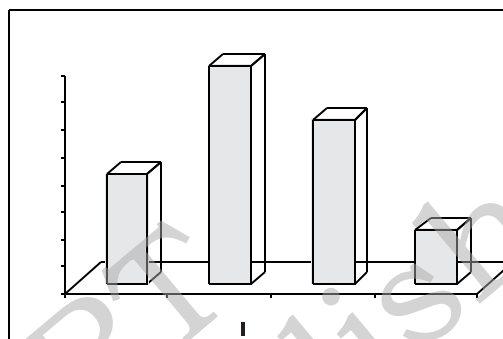


Fig. 9.3: Bar diagram

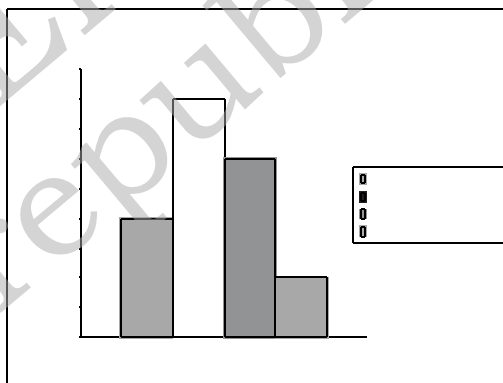


Fig. 9.4: Histogram

**Observation:** Majority of the families surveyed have monthly income between 10,000 to 30,000.

### Monthly Family budget on toiletries

| Items         | Expense (in Rs) |
|---------------|-----------------|
| Toothpaste    | 60              |
| Soap          | 45              |
| Shampoo       | 140             |
| Shaving cream | 25              |

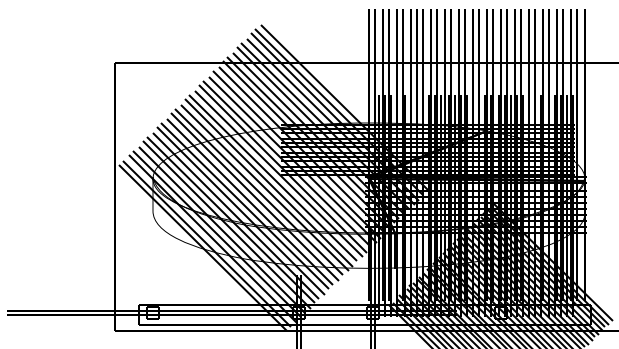


Fig. 9.5: Pie diagram

**Observation:** Toothpaste accounted for significant expenditure in family budget amongst toiletries.

### Major Occupational status

| Family Occupation          | No. of families |
|----------------------------|-----------------|
| Service                    | 30              |
| Professional               | 15              |
| Manufacturer               | 10              |
| Trader                     | 40              |
| Any other (please specify) | 15              |

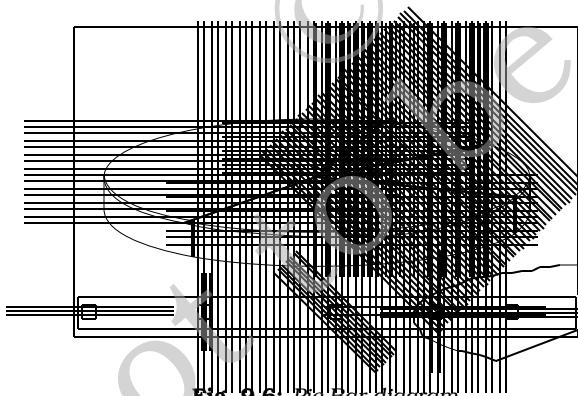


Fig. 9.6: Pie Bar diagram

**Observation:** Majority of the families surveyed were either service class or traders.

### Preferred use of toothpaste

| Brand     | Units | Brand      | Units |
|-----------|-------|------------|-------|
| Aquafresh | 5     | Anchor     | 5     |
| Cibaca    | 10    | Babool     | 2     |
| Close-up  | 15    | Promise    | 10    |
| Colgate   | 20    | Forhans    | 0     |
| Meswak    | 5     | Tea tree   | 8     |
|           |       | oil & Neem |       |
| Pepsodent | 25    | Oral B     | 11    |
| Pearl     | 32    | True Dent  | 10    |
| Homeodent | 6     | Sensodyne  | 8     |
| Any other | 0     |            |       |

**Observation:** Pepsodent, Colgate and Close-up were the most preferred brands.

### Price of the toothpaste

| Prices of Toothpaste<br>For 100 gram pack (Rs) | No. of<br>Households |
|------------------------------------------------|----------------------|
| 20-25                                          | 20                   |
| 25-30                                          | 40                   |
| 30-35                                          | 30                   |
| 35-40                                          | 10                   |
| Total                                          | 100                  |

Calculate the mean and dispersion on the basis of the above information.

Calculation of Mean,

| Price of<br>Toothpaste<br>For 100 gm<br>pack (Rs) | No. of<br>Households<br>f | Mid<br>Points<br>m |
|---------------------------------------------------|---------------------------|--------------------|
| 20-25                                             | 20                        | 22.5               |
| 25-30                                             | 40                        | 27.5               |
| 30-35                                             | 30                        | 32.5               |
| 35-40                                             | 10                        | 37.5               |
| Total                                             | 100                       | 2900               |

$$\bar{X} = \frac{\sum f \cdot m}{\sum f} = \frac{2900}{100} = 29$$



**Observation:** The average price of toothpaste across all brands is Rs 29.

Use of other statistical tools,

| Prices of<br>Toothpaste<br>For 100 gm<br>pack (Rs.) | No. of<br>Households<br>Points(m) | Midd'= $\frac{\sum fd'}{N}$ |
|-----------------------------------------------------|-----------------------------------|-----------------------------|
| 20-25                                               | 2022.5                            | 1-2020                      |
| 25-30                                               | 4027.5000                         |                             |
| 30-35                                               | 3032.513030                       |                             |
| 35-40                                               | 1037.522040                       |                             |
| Total                                               | 100                               | 3090                        |

Applying the formula of SD

$$\sigma = \frac{\sum fd'}{N} \times C$$

$$= \frac{1037.522040}{100} \times 5$$

$$= 51.876102$$

**Observation:** Price of the most toothpaste ranged between Rs 25-35

#### Basis of selection

| Features                 | Family members |
|--------------------------|----------------|
| Liked the advertisement  | 15             |
| Persuaded by the Dentist | 5              |
| Price                    | 35             |
| Quality                  | 45             |
| Taste                    | 20             |
| Ingredients              | 10             |
| Standardised marking     | 50             |
| Tried new product        | 10             |
| Company's brand name     | 35             |

**Observation:** Majority of the people choose to buy the toothpaste for Standardised markings, quality, price and company's brand name.

#### Taste and Preferences

| Brand                 | Satisfied | Unsatisfied |
|-----------------------|-----------|-------------|
| Aquafresh             | 5         | 15          |
| Cibaca                | 1         | 05          |
| Close up              | 1         | 51          |
| Colgate               | 2         | 01          |
| Meswak                | 5         | 15          |
| Pepsodent             | 2         | 55          |
| Anchor                | 5         | 10          |
| Babool                | 2         | 0           |
| Promise               | 1         | 01          |
| Forhans               | 0         | 0           |
| Tea tree oil and Neem | 8         | 10          |
| Oral B                | 1         | 15          |
| True Dent             | 1         | 05          |
| Sensodyne             | 8         | 3           |
| Pearl                 | 3         | 24          |
| Homeodent             | 6         | 2           |

**Observation:** Amongst the most used toothpastes the percentage of dissatisfaction was relatively less.

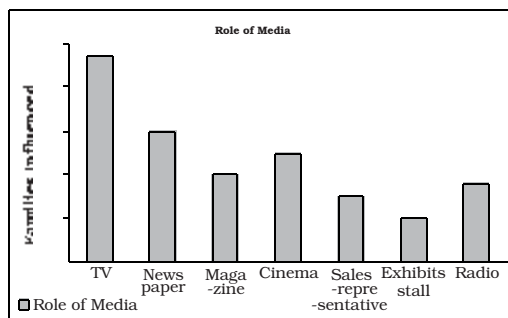
#### Ingredients Preference

|                              |    |
|------------------------------|----|
| Plain toothpaste             | 15 |
| Gel toothpaste               | 5  |
| Antiseptic toothpaste        | 35 |
| Flavoured toothpaste         | 25 |
| Caries protective toothpaste | 40 |
| Gum toothpaste               | 10 |

**Observation:** Majority of the people preferred caries protective and antiseptic based toothpastes over the others.

#### Media Influence

| Advertisement        | Families Influenced |
|----------------------|---------------------|
| Television           | 47                  |
| News paper           | 30                  |
| Magazine             | 20                  |
| Cinema               | 25                  |
| Sales representative | 15                  |
| Exhibits - stall     | 10                  |
| Radio                | 18                  |



**Fig. 9.7:** Bar diagram

**Observation:** Majority of people came to know about the product either through television or through newspaper.

#### CONCLUSION/P ROJECT R EPORT

Majority of the users belonged to urban area. Most of the people who were surveyed belonged to age group 25

years to 50 years and had an average 3–6 members in a family. The monthly income of these families ranged between Rs 10,000 to Rs 30,000 and their main occupations were services and trading. Expenditure on toothpaste accounted for a major share in their family budget amongst toiletries.

Pepsodent, Colgate and Close-up were the most preferred brands in the households surveyed. By calculating the mean it was found that the price of an average toothpaste would be Rs 29 approximately for 100 grams. People preferred those brands of toothpaste which has either a caries protection or antiseptic base. A lot of people get influenced with advertisement and the most popular medium to get across through people is television.

#### Recap

- The objective of the study should be clearly identified.
- The population and sample has to be chosen carefully.
- The objective of survey will indicate the type of data to be used.
- A questionnaire/interview schedule is prepared.
- Collected data can be analysed by using various statistical tools.
- Results are interpreted to draw a meaningful conclusion.