Chapter 3
Business Research Design: Exploratory, Descriptive and Causal Designs

Learning Objectives

After reading this chapter, the reader should be able to:

1. Understand the meaning of research design, select and develop appropriate research design to solve the concerned management dilemma.
2. Understand the basic difference between the three research designs: exploratory, descriptive and causal research designs.
3. Identify the mode, techniques and plan for data collection for collecting necessary information to solve business research problem.

S. Sreejesh et al., *Business Research Methods*,
DOI: 10.1007/978-3-319-00539-3_3,

Chapter Overview

The objective of this chapter is to define and explain research design in detail. In this chapter, we discussed three major types of research designs, such as exploratory, descriptive and causal research designs. We also explained the mode of data used in each of these designs and the techniques to collect these data, which would ultimately helps the researcher to decide appropriate analysis technique. This chapter concludes with budgeting and scheduling of a business research project and elaborated the guidelines for writing a business research proposal. This chapter designed in such a way that the reader can appreciate these concepts by considering the examples and cartoon illustrations, which would better elicit and convince the concept understanding.

3.1 Introduction

Once the researcher has identified and established the broad approach to the research problem, the next step is to prepare a framework or blue print of the study, which specifies the procedures necessary for achieving the stated objectives in a robust manner. This framework helps the researcher to lay foundation for conducting business research project. A well-prepared framework will ensure that the business research project is conducted in an efficient and effective manner.

Research design can be defined as a framework or blue print for conducting business research project in an efficient manner. It details the procedures necessary for collection, measurement and analysis of information which helps the researcher to structure/or solve business research problems.

Typically, a good and well-planned research design consists of the following components, or tasks:

1. Selection of appropriate type of design: Exploratory, descriptive and/or causal design.
2. Identification of specific information needed based problem in hand and the selected design.
3. Specification of measurement and scaling procedures for measuring the selected information.
4. Mode of collection of information and specification of appropriate form for data collection.
5. Designing of appropriate sampling process and sample size.
6. Specification of appropriate data analysis method.

Some important characteristics of a good research design are flexibility, adaptability, efficiency, being economy and so on. A good research design should minimize bias and maximize accuracy of the data obtained and should have as few errors as possible. The most important requirement of good research design is that it should provide adequate information so that the research problem can be analysed on a wide perspective. An ideal design should take into account important factors like:

1. Identifying the exact research problem to be studied
2. The objective of the research
3. The process of obtaining information and
4. The availability of adequate time and financial resources.

Case 1: Johnson & Johnson and Cause-Related Marketing Initiatives

Product failures and litigations is not a new story for Johnson & Johnson. In September 1982, the company faced a tragedy when seven people died from ingesting Tylenol capsules that had been laced with cyanide. Soon after the

tragedy, the company stopped the advertising and recalled all Tyenol products from the market. The FDA investigations found that the tampering had been done at the retail level rather than during manufacturing. In the next 2 weeks after these deaths, the company's stocks dropped 18 % and its major competitors products Datril and Anacin-3 were in such demand that supplies were back ordered. The company was able to restore its losses and confidence among the masses via several marketing strategies. The company ran a one-time advertising that explained how to exchange Tylenol capsules for tablets or refunds and worked closely with the press, responding directly to reporter's questions as a means of keeping the public up to date. The company also placed a price reduction offer of $2.50 to any Tylenol products in newspapers across the country.

In 2002, the company introduced Ortho Evra birth-control patch, considered to be good hit in the market, because of its benefits to younger women as a convenient alternative to the pill. Time magazine quoted this as 'coolest inventions' of the year. But at the end of 2005, the first lawsuits were filed against J&J claiming that the patch cause blood clots that could lead to heart attack or stroke and that the company misled the doctors and regulators for years by withholding data on those risks. Figure 3.1 shows that there are around 40 women died after using this patch. One victim was Ashley Lewis a 17-year-old high school girl who died in 2003, leaving behind a 1-year-old son. Reports shows that of the 4,000 lawsuits the Ortho Evra patch has spawned, most have either been settled under confidential terms with admitting the liability or dismissed.[1] In response to FDA regulations, J&J strengthened the patch in several time since 2005. However, without considering these rules and regulations, the patch remains on the market, and J&J is still defending against patent lawsuits over the product.

In this context, the company decided to restore its decaling image about its product among public through introducing cause-marketing programmes. Cause-related marking is a strategy in which a 'for-profit' organization aligns itself with a worthwhile cause. There are several incentives for a company to use a cause-related marketing strategy. First, a company can improve its public image by showing that it is interested in more than just making profits. Second, a company can also increase demand for its goods and gain a competitive advantage. For instance, consumers would be more willing to purchase something from a company that they know donates a portion of their proceeds to a charity than from a company that just keeps all the profits for itself.

[1] By David Voreacos, Alex Nussbaum and Greg Farrel, Johnson and Johnson reaches a band-aid, Bloomberg Business week.

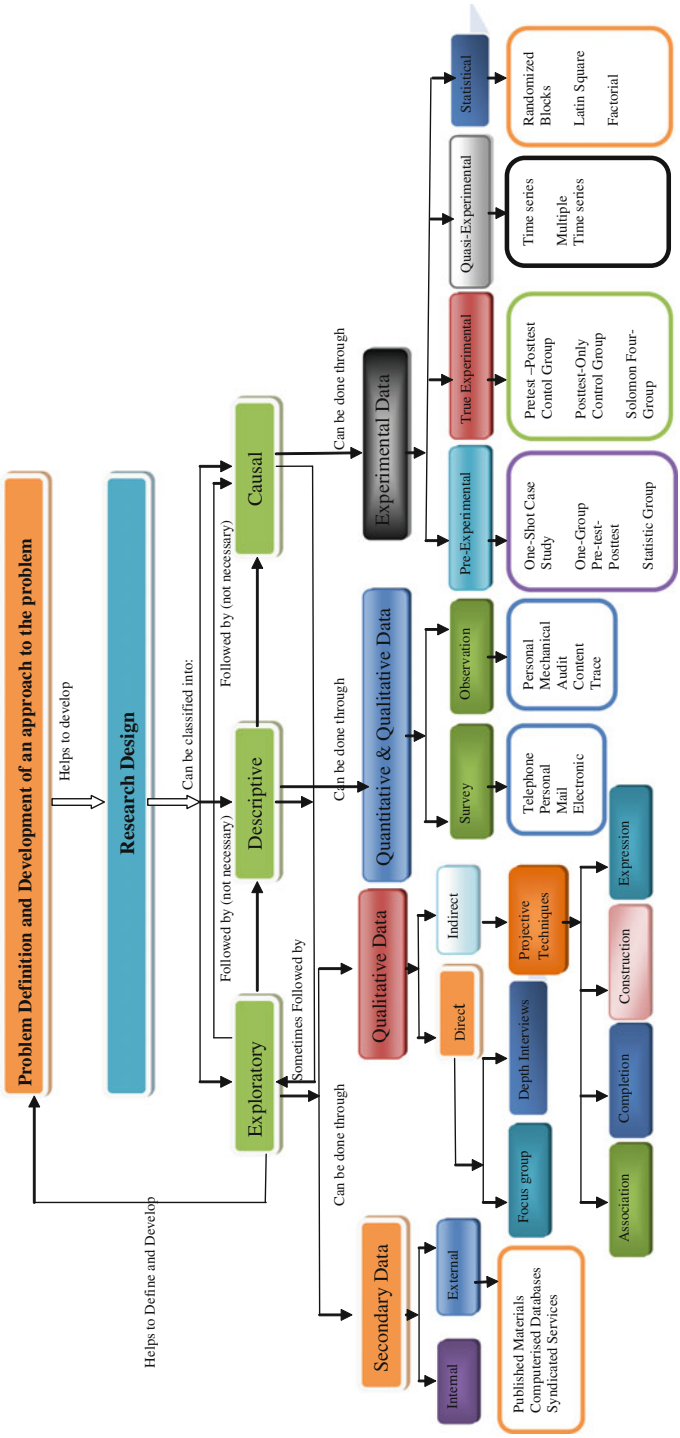

Fig. 3.1 Research design: an overview. *Source* Prepared by the Author

As part of its introduction of cause-marketing activities, the company conducted an exploratory research in the form of secondary data analysis and focus groups. The main objective behind this exploratory analysis was to identify the major factors that determine the social causes that a pharmaceutical company should be concerned about. From the exploratory investigation, the company found that the major social causes that the industry concerned about are the following: child care, drug abuse, public education, hunger, crime, the environment, medical research and poverty.

After the exploratory findings, the company decided to conduct a conclusive research that was in the nature of a descriptive cross-sectional survey. The major objective behind this survey was to understand how and why cause-related marketing influences consumers' perception of company's brand and to identify the relative importance of each attribute identified in the exploratory research. The company uses a random sample of 1,000 Indian consumers and conducted a telephonic interview. The findings of the study showed that about 50 % of the respondents stated the fact that when price and quality of the pharmaceutical products are equal, they would switch to a brand that supports good causes, protect the environment and caring about the public. The survey also support the fact that more than half of the people that the company surveyed would be able to pay a premium to those brands or products which is linked to a good cause. In short, the overall survey revealed the fact that the general public in India would give more image and greater trust to those companies and products that is linked to a good cause (see Table 3.1: Findings of the survey, Social Issues Johnson & Johnson should concern about).

After this survey, company has been working hard towards becoming more environmental friendly by: reducing generated hazardous waste, decreasing water use, and using alternative sources of energy for production. This is a smart move for Johnson & Johnson, because they were one of the first one to recognize the environmentally friendly social movement that has been happening all around the world. Another way that Johnson & Johnson is improving its image is by partnering with organizations such as UNICEF to provide medical care for women and babies in India and by contributing millions of dollars each year to humanitarian works all around the world. Even though companies that implement cause-related marketing strategy exercise their social responsibility, some critics see this as 'cause-exploitation'. This is because cause-related marketing allows a company to improve its image, increase sales and gain a competitive advantage; some companies may choose to implement this strategy not to exercising their social responsibility, but just to have its benefits.

Table 3.1 Findings of the survey, social issues Johnson & Johnson should concern about

Social issues	Relative importance
Public education	0.10
Crime	0.05
Environment	0.35
Poverty	0.05
Medical research	0.05
Hunger	0.05
Child care	0.20
Drug abuse	0.15

3.2 Part I: Exploratory Research Design

Exploratory research is carried out to make problem suited to more precise investigation or to frame a working hypothesis from an operational perspective. Exploratory studies help in understanding and assessing the critical issues of problems. It is not used in cases where a definite result is desired. However, the study results are used for subsequent research to attain conclusive results for a particular problem situation. In short, exploratory research can be used to obtain necessary information and to develop a proper foundation for conducting detailed research later. Exploratory studies are conducted for three main reasons, to analyse a problem situation, to evaluate alternatives and to discover new ideas. Consider for instance that the top management of a company has ordered the research department to evaluate the company's production pattern. This is not a clearly defined problem situation for researchers. Therefore, they will first conduct exploratory studies to understand all aspects relating to the company's production process right from purchasing raw materials, inventory management, processing them into finished goods and stocking them.

3.2.1 Exploratory Research Design: Secondary Data

A classification of secondary data at this stage will give a better understanding into the usefulness of the various sources of secondary data. Classification of secondary data is based on source, category, medium and database. A diagrammatic representation of the classification is provided in Fig. 3.2.

3.2.1.1 Classification by Source

This is the simplest way of classifying any sort of data. The source of data can be either internal or external. Internal sources of secondary data are those that are available within the organization. Examples of internal sources of secondary data are departmental reports, production summaries, financial and accounting reports

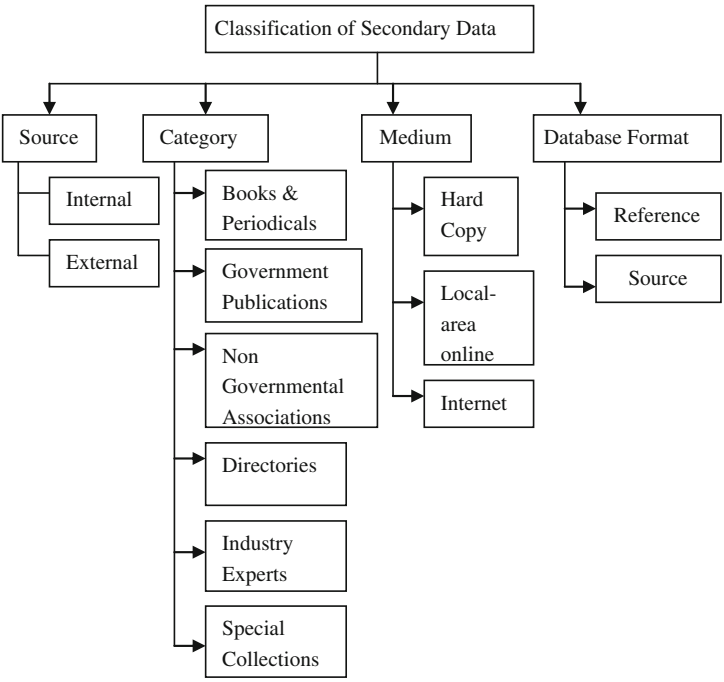

Fig. 3.2 Classification of secondary data

and marketing and sales studies. Internal sources might be the only source of secondary information in some cases, whereas in others it might just be the starting point. Internal records can be obtained from every department of the company where they are generated and stored. Sales records can be a source of valuable information regarding territorywise sales, sales by customer type, prices and discounts, average size of order by customer, customer type, geographical area, average sales by sales person and sales by pack size and pack type, trends within the enterprise's existing customer group, etc. Financial data records have information regarding the cost of producing, storing, transporting and product lines. Such data prove to be useful in the measurement of the efficiency of marketing operations and also estimation of the costs attached to new products. Miscellaneous reports that include researches conducted in the past, unique audits and outsourced information may also have significance for current researches. For example, if Hindustan Lever Limited which deals in diversified products carries out an analysis of media habits or advertising effectiveness for one of its products, then it is likely that the information will also be useful for other products appealing to the same target market. Though these data sources hold great potential, it is surprising to note that companies and researchers frequently fail to look into these valuable records.

External sources of secondary data are those that exist outside the company in the form of books and periodicals, government sources, computer-retrievable databases, trade and manufacturers' associations, publications, media sources,

commercial sources, syndicated services, directories, external experts and special collections. These sources can also provide valuable information pertaining to research.

3.2.1.2 Classification by Category

Classifying secondary data by category, we put the sources under books and periodicals, databases, government documents, publications, associations, external experts, directories, media sources, commercial sources and special collections.

Books and periodicals

Books and periodicals procured from various sources are a typical source for a desk researcher. A researcher who locates the right book pertaining to his research gets off to a good start. Journal of Business Research, Journal of Accounting Research, Journal of Marketing Research, Financial Analysts Journal are some of the professional journals that contain much needed and useful information that serve as rich sources of secondary data.

Business Week, Business World, Economist, Fortune and Harvard Business Review are some of the magazines that feature research surveys and cover general business trends both nationally and internationally. Fortune magazine brings out a list of the top 500 companies in the world in terms of sales volumes, revenues generated, best practices, etc. which are of great help to researchers in garnering vital information.

Most metropolitan areas have periodicals and journals specific to the developments in that particular area. Most business and consumer magazines can also be a boon for secondary research as they obtain updated data through their research departments and make them available in the marketplace.

Newspapers can also be a vital source for market research information. All major newspapers have a business section that brings out industry-specific information and also the general trends in the market. In India, we have newspapers like the Economic Times, Business Standard, The Financial Times, etc. which provide only business-related news. Such sources prove to be of great help for researchers in anticipating trends in various businesses.

Government publications

Government agencies and their publications can be a vital source of secondary information for the market researcher. Taking the case of our own country India, we have a number of government agencies and publications that can be a source of secondary data for research.

In India, we have the reports and publications from The Registrar General of India, The Central Statistical Organization (CSO), Planning Commission, RBI, Department of Economic Affairs, Ministry of Food and Agriculture, The Indian Labour Bureau, etc. The Registrar General of India conducts a population census for the whole country every 10 years that gives a huge report about the demographic data. Another government agency called The CSO has various publications such as 'Estimates of National Product, Savings and capital Formation'—

which come out annually and compile the estimates of national income for several years, and the 'Statistical Abstract, India'—which is also an annual publication containing economic statistics for various sectors usually for 5 years which includes additional statewise statistics for the previous year. It has also a publication called, 'Annual Survey of Industries'(ASI), which compiles detailed data on the performance of the industrial sector in terms of the number of companies in an industry, employees (workers and non-workers), productive capital employed, total production by product types, fixed and variable costs. The data collected through ASI relate to capital, employment and emoluments, consumption of fuel and lubricants, raw material and other input/output, value added, labour turnover, absenteeism, labour cost, construction of houses by employers for their employees and other characteristics of factories/industrial establishments. Another important publication of the CSO is the Monthly Statistics of the Production of

Exhibit 3.1: Useful Governmental Publications

- The Wholesale Price Index numbers by The Office of the Economic Advisor, Ministry of Commerce and Industry which is weekly and covers various products such as food articles, food grains, minerals, fuel, power, textiles, chemicals, etc.
- All-India Consumer Price Index by the Government of India.
- Basic Statistics Relating to the Indian Economy by the Planning Commission.
- Reserve Bank of India Bulletin, Currency and Finance Report, which are monthly and annual journals, respectively, by the RBI, covering currency and financial aspects in general.
- The Economic Survey, a yearly publication of the Department of Economic Affairs, Ministry of Finance. This is published on the eve of the presentation of the national budget.
- Agricultural Situation in India by the Department of Economic Affairs, Ministry of Food and Agriculture. This monthly journal compiles reports and assessments of the agricultural situations in the country.
- The Indian Labor Journal a monthly publication of The Indian Labour Bureau, which contains detailed statistics on price indices, wages and earnings absenteeism, etc.

Adapted from Beri (1989)

The Director General of Commercial Intelligence, brings out monthly statistics of foreign trade in two parts, that is, export and import. This report also contains vast past records that help researchers to learn about the changing face of India's foreign trade. The National Sample Survey (NSS) is another important source, also worth mentioning in this context, as it publishes data regarding social, economic, demographic, industrial and agricultural statistics on an elaborate and continuing basis. Some other publications that are useful to researchers are given in Exhibit 3.1.

As in India, we also have a number of useful government publications in other countries. These publications would be useful for those companies that are planning to venture into the international markets. Taking the case of United States, we have the Internal Revenue Service (IRS) from the Department of Treasury which provides information on the IRS strategic plans for coming years, annual performance plans and other budgetary information; The Bureau of International Labour Affairs from the U.S. Department of Labour publishes The International Price Programme through Import Price Indexes (MPI) and Export Price Indexes (XPI) which contains data on changes in the prices of non-military goods and services traded between the United States and the rest of the world. Some of the major state department publications in the Unites States are 'Battling International Bribery' which is the Department of State's report on enforcement and monitoring of the OECD Convention and 'Country Reports' submitted annually to the Congress by the Department of State regarding the status of internationally recognized human rights practices.

Other government agencies in the United States which bring out useful secondary information are The Bureau of Alcohol, Tobacco, Firearms and Explosives, Bureau of Industry and Security from the U.S. Department of Commerce, The U.S. Food and Drug Administration, etc. The U.S. Environmental Protection Agency brings out the publication 'Waste management reports—selected publications related to climate change and municipal waste management' The Economic Report of the President is an annual report written by the Chairman of the Council of Economic Advisors which gives the nation's economic progress using text and extensive data appendices.

Non-governmental associations

Apart from the official publications, there are also loads of non-governmental or private organizational reports that can be useful to researchers. Various industry and trade associations are worth mentioning in this context. The Indian Cotton Mills Federation publishes statistics on the cotton textile industry. The Bombay Mill Owners' Association similarly publishes in its annual report statistics on the performance of its member units. Other non-governmental sources of publications are the annual statistics by The Market Research and Statistical Bureau of the Coffee Board, Bangalore; 'India's Production, Exports and Internal Consumption of Coir and Coir Goods' an annual publication by The Coir Board, Cochin; The Rubber Statistics, an annual report by The Rubber Board, Kottayam; the Indian Sugar Year Book by the Indian Sugar Mills Association, Delhi and a quarterly publication entitled 'Wool and Woolens of India' by The Indian Woolen Mills Federation. Apart from bringing out the latest statistics and details about the industry, these industrial and trade reports also provide an insight into the problems of the industry as a whole. The Steel Authority of India Ltd. also brings out, on a quarterly basis, a statistical publication relating to the functioning of the iron and steel industry in India.

Apart from these non-governmental associations, there exist several chambers of commerce. These include the Federation of Indian Chambers of Commerce and Industry (FICCI), Associated Chambers of Commerce and Industry of India and

the Indo-American Chamber of Commerce, which have their own periodic publications highlighting the functioning and latest trends of a specific industry and the problems it faces.

Similarly, in the United States too, there are several non-governmental associations that publish industry-related information. 'The American Statistics Index' published monthly, quarterly and annually by LexisNexis, brings out indexes and abstracts of a wide range of statistical publications produced by the US government. 'FedStats' provides access to the statistics and information produced by more than 70 US federal agencies. Other non-governmental associations in the United States which provide statistical information are 'The Digital National Security Archive' which is a collection of primary documents central to US foreign and military policy since 1945. More than 35,000 declassified documents—totalling more than 200,000 pages—have been gathered through use of the US Freedom of Information Act (FOIA). LexisNexis Statistical Indexing and abstracts for over 100,000 U.S. government and non-government statistical publications with links to selected full text documents and agency web sites are available on the Net. Selected tables can be imported to spreadsheets, etc.

The governmental and non-governmental associations mentioned here are only a few of those available and illustrate the point that an ample amount of secondary data is always available at hand. One should make good use of these sources for various research purposes

Directories

While framing its marketing strategy, a company needs to take serious note of its potential competitors and customers. As such, the company has to be aware of the latest developments and market strategies of the major players in the industry. It is possible for the company to access such information through industry-specific directories. These directories give first-hand information about the existing players, their products and strategies. Researchers often make use of directories when they are preparing sampling frames. Stock exchange directories can be a handy source for detailed information on the corporate sector. For example, The Bombay Stock Exchange Directory is unique in providing detailed data on the financial accounts, key profitability and other important ratios of listed companies. The presentation makes it easy for earlier data to be replaced with the latest data without much difficulty.

Trade show directories are another useful source of secondary data. They help in identifying trade shows linked with a specific industry, along with information on individual companies including addresses, names of executives, product range and brand names. This facilitates establishing contact with sponsors and various exhibitors who participate in these exhibitions. Some Indian directories are '121 India' (Portal with news, entertainment, matrimonials and business), 'The City as it Happens' (detailed information about major metros, people and their lifestyles, pubs, latest fashion trends, etc.) and 'Tata Yellow Pages' (Guide offering classified information of products, services and organizations in major Indian cities).

Every country has its own Yellow Pages on the Internet. Some major directories in other countries include 'The Thomas Register of American Manufacturers' (New

York: Thomas Publishing Co.) which has data on more than 150,000 companies, 'Who Owns Whom' (North American Edition) lists 6,500 parent companies and 100,000 domestic and foreign subsidiaries and associated companies.

Industry experts

Looking out for industry experts for specific information is another means of collecting secondary data. These experts specialize in their own domain and so getting information from them is often highly useful for research. These experts give expression to their expertise knowledge through published articles and through consultation services. Hence, the best way to contact them would be by tracing published information articles to their authors or contacting consultancies offering specialized services. Examples of such expertise consulting services are Price Waterhouse Coopers (PWC) that has expert financial consultants; Datamonitor's Business Information Centre which provides services to the world's largest companies in the fields of automotive and logistics, consumer markets, energy and utilities, financial services, and healthcare and technology sectors and ACNielsen for industrial services.

Special collections

Special collections consist of diverse materials that include reference books; university publications consisting of master's theses, doctoral dissertations and research papers; company publications such as financial reports, company policy statements, speeches by eminent personalities, sales literature, etc. Miscellaneous data available from organizations that publish statistical compilations, research reports and proceedings of meetings also come under special collections. Finally, there are personal, historical and other social science research reports which find an occasional place in business studies.

Classification by Medium

Secondary data classified by medium include hard copy and Internet. Hard copy refers to non-database information. This comprises of all books, magazines, journals and special collections contained in hard-copy libraries. It is very difficult to get detailed indices for all hard copies.

With the advancement in technology in recent times, huge databases and information have become available on the Internet and these facilitate the new trend of data collection over the old tradition of spending long hours in the library. In fact, there is so much data available on the net that researchers at times do not need to go to other sources. Not only does it facilitate the retrieval of online data pertaining to the research, but also helps in gathering information from respondents via e-mail. Browsers such as Microsoft's Internet Explorer and Netscape's Navigator make it possible to access sites and user groups of all those connected through the Net.

There are two reasons which keep the researchers glued to the internet—first it makes it easy for the researcher to gather information regarding the advertising, promotions and communications of various products and services from the websites created by companies, and secondly, it acts as an interface between the user groups interested in a particular subject and the researcher. There are many databases available online which contain certain research papers, articles, etc.,

and a researcher can find data relevant to his topic in some database or the other. These can be accessed for a fixed amount or on a pay-as-you see basis. These data are updated regularly by those who provide and maintain them. All governmental and non-governmental associations, companies and publishing companies have their specific websites which one can surf through at a minimum cost to gather useful data. Such online databases are a resource to be converted to useable data for improved decision-making and analysis. Each of these websites has hypertext links to other useful data for similar purposes. Some websites also offer membership options. A person wanting to be a member pays a fixed amount of money and is then able to access the information stored in the database. Another form of multimedia database is the vast number of CD-ROM business databases that interrelate audio, video and text and provide search and download capabilities.

Classification by Database Content

Classification of secondary data by database content is useful for a better insight into the subject matter. A database is a collection of information in a detailed and standard format. A classification of database by the content of information includes online, internet and offline databases. Online databases consist of a central databank accessible by a terminal via a telecommunications network. Internet databases are those that can be accessed on the net and can also be downloaded if required. Offline databases are those which make the information available on diskettes and CD-ROMs. A further classification of these three highlights two common aspects. We will now look into each of these types in detail.

Reference database

A reference database provides a bibliography of documents, abstracts or locations of original information. Since they provide online indices, citations and abstracts, they are also referred to as bibliographic databases. Wide varieties of bibliographic databases are available for a variety of business research applications. Abstract Business Information (ABI) contains 150 word abstracts and 1,300-business publications worldwide. Reference databases enable the researcher to use natural-language key words to search for abstracts and summaries of a wide range of articles appearing in various business magazines, government reports, trade journals and research papers.

Some examples of reference databases are Predicasts Overview of Markets and Technology (PROMPT), Marketing and Advertising Reference Services (MARS), Aerospace/Defence Markets and Technology (A/DM&T), PTS Newsletter Database, F and S Index, etc. These databases contain index, word abstracts and full-text records, including competitor information and emerging technologies from trade and business publications worldwide.

Source databases

Source databases usually publish numerical data, full text or a combination of both. They include full texts of various economic and financial databases. Unlike reference databases, which are limited to providing indices and summaries these databases provide complete text and numerical information. Census-based numeric databases are often found to be useful for studies dealing with market potential,

segmentation and site location evaluations. Time series data available online are also useful for tracking and forecasting.

Source databases provide data relating to economy and industries. They can be classified into full-text information sources, economic and financial statistical databases, online data and descriptive information on firms. Harvard Business Reviews Online, Hoovers Online, LexisNexis and EBSCO are good examples in this case. EBSCO facilitates access to various business databases and also special newspapers, periodicals, books and company annual reports.

3.2.1.3 Advantages of Secondary Data

Secondary data are used by managers as it is cheaper and takes less time to gather, thus saving them a lot of money and time that they would have otherwise spent in gathering primary data. Apart from these, there are other distinct advantages of using secondary data, which are as follows:

Secondary data can help identify, clarify and redefine the research problem: In situations where the actual problem in a research study cannot be defined or is defined in an ambiguous way, the use of secondary data can help clear the confusion with a clear definition of the problem to be probed into.

Secondary data might also hold a solution to the problem: Research problems might not require the gathering of primary data each time. Many a times, it happens that precise data regarding the current research is already available as secondary data that had been collected for some other research purpose. Hence, it might not be necessary to conduct a primary data collection exercise at all.

Secondary data may provide alternatives methods that can be used for primary research: Every research situation has a custom-made primary research designed for it. If such published reports are gathered from secondary sources, then it gives a push to the initial stages of the similar current research at hand by outlining the possible research alternatives.

Secondary data generate requisite information for better creativity: Secondary data can provide insights into the means to identify potential customers, industry trends and proper language usage. This prior knowledge helps in the design and progress of the current research. This provides a better chance of creativity in the research.

Although secondary data have many advantages to its credit, it has its own share of pitfalls and disadvantages. A close look at the utility of secondary data reveals the following limitations and disadvantages.

Lack of availability: Even though secondary data might be available for many research studies, it might so happen that there is no secondary data available for special cases or that the organization holding such data are not willing to make it accessible to outsiders. If a company like General Motors would like to conduct a research for the market potential of its cars in particular cities in India, then it is very unlikely that any secondary data would be available in this context.

Lack of relevance: Secondary data might be irrelevant because of the changes in competitive situation, changing trends and other variables in the research environment from the time the data were initially collected. Thus, its usage for a current research study might be limited. Relevance might be reduced due to difference in units of measurement, use of surrogate data in the secondary sources, difference in definition of classes and time.

Inaccurate data: Secondary data can be subject to doubt because of the errors that can occur in any of the steps or due to personal bias. Errors of this sort can make the secondary data inaccurate and therefore unusable. It is possible that the secondary source of data might have been custom made to avoid some specific realities and as such fail to mention the sources of error. Hence, an effort should always be made to trace the secondary data to its original source.

Insufficient data: Secondary might be available but they might not posses all the required data useful for the current research at hand.

3.2.1.4 Syndicated Data

Syndicated data are data produced by a market research firm, which provides a body of similar data compiled from a large number of sources, organized into a common format for a fee to its subscribers. This data are neither available nor can be gathered from any internal source. Such data are not client-specific, but are flexible enough to be custom made to suit particular researches. A brief classification of syndicated data has the following three inclusions that are also shown below in Fig. 3.3. Syndicated data can be collected using the following.

- Surveys
- Audits
- Panels
- Warranty cards.

Surveys

Commercial surveys undertaken by research organizations fall under three categories, that is, periodic surveys, panel surveys and shared surveys.

Periodic Surveys

These are surveys that are conducted at regular intervals—weekly, monthly, quarterly or annually. The sample respondents are different each time the survey is conducted. Though the sample population differs, the topic of the survey remains the same allowing the researcher to analyse the changing trends. This type of survey does not facilitate the study of trends at the individual level as the respondents of the survey change over a period of time. These surveys can be used to study changing trends in the competitive environment or consumer behaviour. Mail, personal interviews and telephonic interviews are some of the methods of conducting commercial surveys.

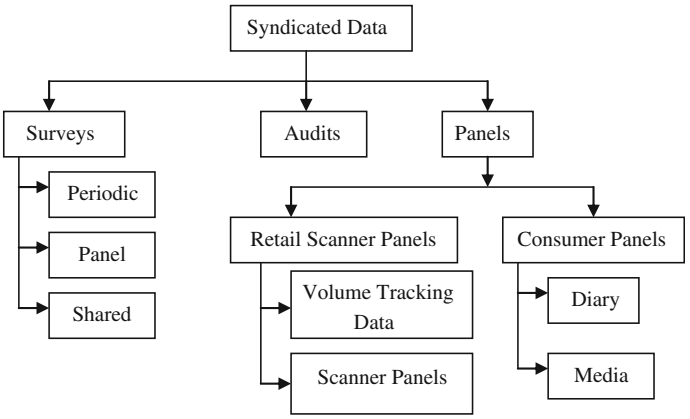

Fig. 3.3 Syndicated data

Panel Surveys

Panel surveys are those surveys that are conducted among a group of respondents who have agreed to respond to a number of mail, telephone and personal interviews over a period of time. Unlike random online surveys, panel surveys are more effectiveness as the participants' key demographics; behavioural patterns and selected product ownership information are readily and voluntarily available. This allows the researchers to have quick access to a nationally representative sample, core target audiences or both.

As the researcher can draw samples with varied specifications from the same panel, it is possible to survey the same panel members over and over again within the reference time period to find the changes in their response to various marketing stimuli. The agreement of the panel members to be interviewed repeatedly saves the researcher from the tedious task of generating new sample frames each time leading to wastage in time and resources. Thus, the panel survey method scores over random sampling. Data are collected mainly by mail, but the use of personal interviews, telephonic interviews and focus groups are also prevalent in panel surveys.

Interval panels are mostly used for cross-sectional, that is, one-time surveys where no attempt is made to replicate the conditions of the previous surveys excepting that the actual questions posed to the respondents may differ in vocabulary or meaning, and the sampling and field procedures may not be the same as in previous surveys. The essential feature panel surveys offer is that they make it possible to detect and establish the nature of individual change. A major advantage is the high response rate obtained. Various types of panels and their uses are discussed later.

Shared Surveys

Shared surveys conducted by a research firm use questionnaires that contain a pool of questions that are of interest to different clients. Hence, these are known as multi-client surveys and are sometimes called omnibus surveys. The questionnaire

features standard demographic questions along with other questions asked by each client. Clients do not have any sort of access to either the data or the questions asked by other clients. The findings of the survey are tabulated according to the needs of the client. Such surveys are mostly conducted through mail, telephone or personal interviews. Respondents are selected from interval panels or selected randomly from a larger population.

Shared surveys offer several advantages. Firstly, since the fixed cost of sample design and other variable costs are borne by many clients, the cost per question is usually low. The pricing is based on the number of questions asked by each client. The cost per question decreases as the number of questions increases. Sampling consisting of interval panel members offers extra benefits as the extensive demographic data associated with each panel member can be used in the analysis of the responses. Surveys can be generally used for market segmentation (with psychographic and lifestyle data for establishing consumer profiles), product image determination, price perception analysis and evaluation of the effectiveness of advertising.

Surveys are advantageous in that they are flexible enough to collect data from different segments of the society regarding consumers' motives, attitudes and preferences. They even help to locate intergroup differences based on demographic variables and even help to forecast the future. But their utility may be limited due to respondent bias. There may be a difference between what the respondent says and what he does, or he might be influenced to give socially desirable responses.

Audits

An audit involves an in-depth analysis of the existing situation in a firm. In business, there are many activities that can be subject to an audit. Audits are carried out by the physical inspection of inventories, sales receipts, shelf facings, prices and other aspects of the marketing mix to determine sales, market share, relative price, distribution and other relevant information. A performance audit is an objective and systematic examination of evidence in order to provide an independent assessment of the performance of an organization, programme, activity or function, so that information to improve accountability and facilitate decision-making can be made available to the parties responsible for overseeing or initiating corrective action. Audits are of different types such as store audits, product audits and retail distribution audits.

Store audits examine the quantity of a product that is being sold at the retail level. Nielsen Retail Index provides such audited data. Generally, such audits provide data on the total sales of all the packaged goods carried by the different types of retail stores sampled for auditing. The packaged goods considered for store audit include food, tobacco, pharmaceuticals, beverages, etc. Retailers and wholesalers who participate in the auditing get cash and the much-needed auditing reports as incentive. Store audits allow the marketers to measure the performance of their brands against the competitors. They can also help marketers to evaluate the main reasons for the product being off-shelf on the basis of supply/distribution problems, incorrect master data and store replenishment issues.

Product audits are similar to store audits in the information provided but focus on covering all types of outlets that store a particular product. For example, a store audit for Close-up toothpaste can help to estimate the total potential market and distribution of sales by type of outlet and various regions. The product audit for the same would include grocery stores, mass merchandisers and retail chain stores. Retail distribution audits are also similar but they differ in their mode of operation. Auditors enter a retail shop unannounced, without permission, record the stock holdings, shelf facings and collect other relevant data for selected product categories. Pantry Audits are special audits used to find out customer preferences by studying the quantity, price and type of goods being purchased by the consumer. The method studies the buying pattern of the consumers relating to which type of consumers purchased what products and could be followed by a questioning session to find the exact reasons for the purchases done by the consumers. The limitation of this method is that it is difficult to specifically identify consumer preferences through this method if used as a stand-alone method especially in cases where promotional schemes are being run.

Auditing data find their uses in:

- Assessing brand shares and competitive activity
- Identifying inventory problems
- Developing sales potential and forecasts
- Determining total market size
- Monitoring promotional budgets based on sales volume.

Audit data provide accurate information on the sale of various products at various levels. However, they have the disadvantage of limited coverage and time factors. Unlike scanner data, audit data cannot be associated with consumer characteristics and advertising expenditures.

Panels

A panel is a group of individuals or organizations that have agreed to provide information to a researcher over a period of time. This section relates to continuous panels, which consist of samples who have agreed to participate in a survey and provide specified information or report specified behaviours on a regular basis within a reference time period. Panels are of various types such as:

- Retail Scanner Panels
- Consumer Panels.

Retail Scanner Panels

Retail panels consist of sample retail outlets, and retail panel surveys provide information based on sales data from the checkout scanner tapes of a sample of supermarkets and retailers that use electronic scanner systems. Supermarkets and big retail chains carry products that have barcodes, which make it easier to capture (using scanners), the details of the products sold by the retail stores on a real-time basis. Scanner data are obtained by passing merchandise over a laser scanner that optically reads the Universal Product Code (UPC) from the packages.

Another technology related to UPC is the Electronic Point-of-Sale (EPOS) systems. These are used extensively by retailers like K-Mart, Wal-Mart, Toys'-R'Us, Food World, etc. The mode of operation in both is similar. ScanTrack (A. C. Nielsen), InfoScan (IRI) and SRI (INTAGE) are some popular scanning services available to researchers. These panels have their own samples of retail chain outlets having the requisite technology. These samples consist of super-markets, drugstores, mass merchants and other smaller retail chains.

There are two types of scanner data that are available. They are volume-tracking data and scanner panels. Panel members are selected in a systematic way so as to ensure that they are representative of the total population. Detailed data are collected and stored for each of the participating households or individuals.

Volume-Tracking Data: In volume-tracking data, the UPC of all purchases made by customers is scanned by electronic scanners. These codes are then linked to their corresponding prices held in the computer memory after which the sales slip is prepared. The data are then analysed to deliver reports on purchases by brand, size, flavour and market share as against time, area and store classification, as specified by the client. These panels focus on exclusive markets and geographic regions for specified time periods. Retail scanner panels have been able to put down deep roots because of their flexibility and efficiency. Retail chains too can make use of this data to detect price elasticities, placement of products in the store and effects of in-store advertising and merchandising.

Scanner panels: Scanner panels are a little more advanced than the retail scanner panels and are used by IRI, NPD/Nielsen. In scanner panels, each household member of the selected sample household is given an identity card that has a code specific to the individual and which can be read by the electronic scanner. Thereafter, along with the scanning of all the products purchased, the customers are required to swipe their ID cards at the checkout counters. In this way, consumer identity is linked to the purchased products along with the time and date. Some firms alternatively provide their customers with hand-held scanners. Once back home, the selected consumers are required to scan the codes of the products they purchased. But in comparison with the automatic ID scanning, this requires more effort on the part of the consumer as, apart from the scanning at home, the store name, prices and other data have to be fed in manually. This is also known to create problems as for example in the case of goods consumed before reaching home, wrong entries of prices and unscanned data due to time pressures, which can affect the accuracy of the data entered.

Consumer Panels

Continuous consumer panels are those that monitor shifts in individual or specific household behaviours and attitudes over a period of time. They are helpful in gathering relevant data pertaining to competitors' strategies or own marketing strategy efficiency. They also make use of UPC or consumer diaries. The following sections will give a better insight into each of these functionalities.

Diary Panels: A diary panel as the name suggests is a panel of households who continuously record their purchases of selected products in a diary. Records are generally maintained for products frequently purchased like food items, household

goods and personal-care products. Nielsen Household Services, MRCA and INTAGE are some of the famous suppliers of diary panel data. The number of product categories on which information is sought might vary from one service provider to another. Each panel of the vast sample of families and non-family households are required to report information on purchase of selected items, including the following data:

- Dates of purchase
- The number and sizes of the packages
- The total amount paid
- Payment mode, whether cash, credit or coupons
- Whether purchase was influenced by any promotional methods
- The store where the purchase was made.

Apart from these information sample respondents are also required to answer certain special questions that are specific for each product category. Recent developments are slowly replacing paper diaries by electronic diaries, where the sample respondents make their purchase entries online or by automatic electronic devices provided to them. Data provided by diary panels prove to be useful in sales forecasting, market share estimation, assessment of brand loyalty and brand switching and measuring advertising effectiveness. This method is not yet used extensively in India.

Media Panels: Media panels are used by researchers who are interested in knowing the media habits of their target customers. Media panels consist of sampled households whose television viewing behaviour is recorded through special electronic devices. This electronic device is a household meter wired to the TV and connected to a central computer by a telephone line. This arrangement automatically starts recording the specific channels that were being tuned to when the TV is switched on. But the limitation of this system is that the researcher cannot find out the number of viewers and their demographic characteristics.

To overcome this limitation, Nielsen Media Research came up with the Nielsen People Meter. These meters can be placed on the TV sets of the sample households which recorded two things, that is, the channel being tuned to and the person(s) watching. The operation is also simple. The meter is linked to a remote control that records the age and gender of each of the family members when they press the identifying button. The records are automatically fed into the central computer that already has the demographics of each of the family members. Thus, data for each day are stored.

Apart from these electronic meters, TV diaries and booklets are also used to collect the media habits of the households. This data are used by various service providers like A. C. Nielsen, INTAGE to estimate the number and percentage of all TV households viewing a specific show. This data are also disaggregated into various demographic and socioeconomic characteristics such as household

income, size and age of members, education levels and geographic locations as per client specifications.

This technology has also stepped into tracking home video (cable, VCR, DVD players) and Internet indexes. Data gathered from media panels serve to be useful in establishing advertising rates by TV and radio networks, the selection of appropriate programming and profiling viewer and listener groups. Diary and media panels have distinct advantages over surveys. Respondents participate due to their own willingness and as such provide more and higher quality data than sample respondents. Secondly, the use of electronic devices that records at the time of purchase and TV switching eliminates human error in both diary (recall error) and media panels, respectively. These methods also have disadvantages in the form of lack of representativeness, maturation and response bias, refusal and attrition.

Warranty Cards

These postcard-sized cards are used commonly by dealers in the consumer durables industry. The dealer sends the card to the consumers who post them back, so that the dealer can gather information about the products from them.

3.2.2 Exploratory Research: Qualitative Data

The exquisiteness of qualitative research lies in its flexibility to adapt to different situations. Not only can it help in probing the sub-conscious mind of the respondent, but it also finds extensive use in brainstorming sessions that often pave the way for embarking upon product development or solving marketing problems. The participation of the customer in the brainstorming sessions can have a deep impact on the objectivity of the research.

Increase the Value of Subsequent Quantitative Research

Qualitative research can serve as a prelude to quantitative research. A quantitative research generally has a pre-designed set of responses. A respondent has to choose from the limited answers irrespective of whether or not they represent his true feelings. Such responses may have little value for the research. A better method would be to make use of qualitative research prior to conducting a more analytical quantitative research and try to include the most relevant responses in the questionnaire.

Obtain Visceral Feedback Instead of Just Number Crunching Data

Qualitative researches, unlike quantitative ones are not data centric. In addition to the ability of generating richer data, they also have the advantage of observing the respondents (in face-to-face interviews), which helps in probing the mind of the respondents and interpreting the information given by them.

Group Dynamics Enhance Results

Qualitative researches involve group dynamics where participants can interact with one another. This interaction has the inherent tendency to draw out responses that may not have been obtained in a one-to-one confrontation with the interviewer.

Customers are People, Not Pie Charts

Unlike quantitative research, which depicts the findings in the form of graphs and charts, qualitative research strives to expose the human perspective behind the findings. This makes it easier to understand and end-users find themselves more comfortable with the reports.

Qualitative research methods can be sub-divided into the following types and classified as represented in Fig. 3.4.

- Depth interviews
- Focus groups
- Projective techniques.

3.2.3 Depth Interviews

A qualitative approach in which a trained moderator conducts interviews with individuals, rather than with groups, to obtain information about a product or brand is known as a depth interview. These interviews are primarily conducted on a one-to-one basis. Therefore, they are also known as individual depth interviews. Depth interview is simply the routing of an ordinary conversation that permits both the researcher and the interviewer to interact and explore an issue.

A depth interview can serve as a prelude to a more analytical questionnaire design for quantitative research. Therefore, such interviews are used to unravel theoretical issues at an early stage in the development of a questionnaire.

Individual in-depth interviews can be subdivided into three types depending upon the amount of guidance extended by the interviewer. These are:

- Non-directive or unstructured interviews
- Semi-structured interviews
- Standardized open-ended interviews.

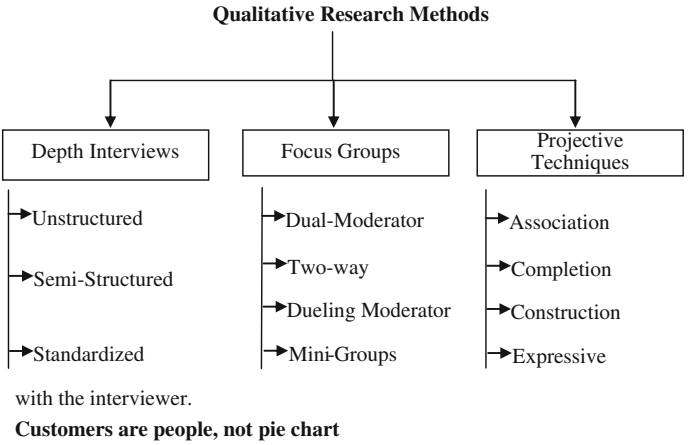

Fig. 3.4 Classification of qualitative research methods

3.2.3.1 Unstructured Interviews

Unstructured interviews take the form of a natural conversation and the interviewer brings up various topics that are of interest to him during the course of the conversation. The respondent is given the freedom to decide the direction of the conversation while expressing his opinions or narrating his experiences relating to a topic. This unstructured characteristic of the interview enables the interviewer to develop a rapport with the interviewee and understand him better. Unstructured interviews are also known as non-directive interviews as there are no pre-formulated set of questionnaires and no pre-determined paths to route the interviewee responses.

The success of a non-directive interview depends upon the interviewer's expertise in giving an informal touch to the interaction, his ability to probe into and elaborate on specific responses and in bringing back the discussion to line whenever it deviates from the relevant topic. Such interviews normally extend anywhere between an hour and two and can be tape recorded with the prior consent of the interviewee. Although flexible and responsive to individual and situational changes, this method is known to generate less systematic data and it is very difficult and time-consuming to classify and analyse such data.

3.2.3.2 Semi-Structured Interviews

These types of interviews are more structured than the non-directive interviews. While allowing some amount of flexibility to the interview, the interviewer ensures that he keeps the interview limited to the topics that are essential to the research. The interviewer at his discretion can make use of appropriate wordings and allocate a specific time for each question. This lends him sufficient flexibility to adapt to different responses. At this stage, probing techniques can be used to encourage the respondents to provide details for relevant responses. This technique is primarily used to interact with busy executives, technical experts and thought leaders. As the technique calls for interactions with experts, the interviewer must possess knowledge of the latest trends in technology, market demand, legislation and competitive activity. This will enable him to apply probing techniques better. Therefore, much depends upon the inherent skills of the interviewer.

Recording the answers may be a problem in case the interviewee dislikes it. To counter this, a group of interviewers, probably 3–4 can alternatively ask questions and note down the answers. Although advantageous in many respects, the technique is known to have no provision to permit the interviewer to probe into unanticipated issues cropping up during the interaction, which were not a part of the basic checklist. Even the flexibility regarding the choice of words of the interviewer may lend bias, leading to different responses from different individuals.

3.2.3.3 Standardized Open-Ended Interviews

This is different from the two interview methods described above with respect to the flexibility in the questionnaire. Here, the questionnaire contains a set of sequential ordered, carefully worded, open-ended questions. This reduces the differences in responses from different individuals due to the choice of words on the part of the interviewer. This technique is appropriate when two or more interviewers conduct the interviews. It minimizes the variation in the questions posed by them to different interviewees. These types of interviews enable the evaluator to collect data systematically, thus facilitating comparison of responses collected from different respondents. This method, however, limits the use of substitute questioning to probe into individual differences.

3.2.3.4 Techniques for Conducting Depth Interviews

Marketers rely on surveys, and demographic information to help them develop marketing strategies and tactics for their products. These marketers fall back on depth interviews when they do not have much knowledge about a population and desire to explore the same. This preliminary information can be gathered through three different interview techniques as recommended by Durgee. These are as follows:

Laddering

An interviewing technique that enables the interviewer to gain an insight into the subject's personal reasons for purchasing certain products is known as laddering. In this technique, the interviewer starts the interview with questions related to product attributes and slowly starts probing into user characteristics as the interview progresses. In other words, a tactful set of closely related questions probe into the product attributes, consequences and personal values behind a consumer's preferences for a product/service.

For example, a respondent may be asked to give the distinguishing features for his preference of supermarket A over supermarket B. The main motive in this technique is to trace the tangible aspects of the product/service to the intangible aspects of the respondent's mind to gain an insight into decision-making at an individual level. If the factors are 'ambience' and 'better service', the respondent is further probed on the specific ambience or service factor, to trace the linking of that factor to the sub-conscious mind of the respondent. The traceability of the tangible product attributes to the intangible aspects helps to determine the key factors in the sub-conscious mind that affect the buying behaviour of the respondent and to identify the hurdles preventing the greater diffusion of certain goods and/or services.

This technique, aims at obtaining cognitive maps, or Hierarchical Value Maps (HVMs) and is the most widely used method to uncover consumers' cognitive

structures. The interviewer needs to have expertise in specific probing techniques to enable him to read the sub-conscious mind of the interviewee and frame the questions accordingly. The key to conducting successful laddering is practice. The following steps are necessary for a laddering interview to be successful.

- Choose a brand-loyal respondent who is uniquely capable of articulating the key aspects of the product he likes most.
- Start out with questions that get the customer talking about the product. This tends to put the respondents at ease and gets them accustomed to answering your questions about the product.
- Questions should always link to the previous response given by the interviewee, to construct a ladder establishing links between the attributes, consequences and values.
- The second round of questions begins by probing why certain attributes are important. Upon a specific response, the interviewer should keep probing deeper into that consequence to find the underlying value to identify the real reason behind the purchase.

Hidden-Issue Questioning

This interview technique aims to identify significant personal views that would otherwise not be revealed by respondents during a direct approach. This technique tries to probe into the hidden issues and items like daydreams, anxieties, fascinations and hopes in peoples' lives that do not surface in their day-to-day schedule. Turner refers to these fallback thoughts as 'liminoid' or, 'the state of marginality occurring when normal structural constraints—limits imposed by work, family, ones own abilities and attributes—are removed'.

The key point here is to unravel the 'second life' captured in the liminoid condition. Respondents tend to take interest in such topics and answer questions not only with speed but also in detail. Therefore, questions like 'what would you do if you get 10 crores?' or 'How do you see yourself as a celebrity?' are typical questions in such techniques. Questions under this method probe into the respondent's attitude towards work, home, leisure pursuits and the like.

3.2.3.5 Advantages and Disadvantages of Depth Interviews

Advantages

- Depth interviews attribute independent responses directly to the respondents, unlike focus groups where it is difficult to trace responses to a particular respondent.
- Attitudes and emotions of the test persons can be explored in detail and are close to reality as there is no social pressure to conform to group responses, as is the case of focus groups.

- It is possible to determine the motivations and resistance towards certain markets, products and services.
- Mutual interaction between the interviewer and the interviewee helps to generate an informal atmosphere that facilitates the discussion of sensitive questions or 'taboo themes'.

Disadvantages

- It is difficult and expensive to find and employ skilled interviewers.
- Lack of structure in questionnaires in non-directive and semi-structured interviews introduces interviewer bias.
- Quality of the results depends on the skills of the interviewer.
- The cost and the length of the interviews combined do not permit more number of interviews to be conducted.

3.2.4 Focus Group Interview

A focus group is defined as group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research. This type of interviewing is particularly suited for obtaining several perspectives about the same topic. According to the late political consultant Lee Atwater, the conversations in focus groups 'give you a sense of what makes people tick and a sense of what is going on with people's minds and lives that you simply cannot get with survey data'. A focus group consists of a group of anywhere between 6 and 12 members. This size of the group encourages the participants to give their views on the specific issue. The very essence of the focus group as a technique lies in tapping the unexpected findings that result from an interactive session between the members of the group.

These members take part in the discussion for about 2 h, which is the normal time for a focus group interview. These members are selected from a planned sample. It should be ensured that the participants have ample knowledge and experience of the issue/topic to be discussed. Prior to conducting the focus group discussion, the participants are updated, over the phone, regarding the purpose of the focus group and the confidentiality of the members and their information. At the onset of the discussion, the moderator reiterates the same things in addition to introducing any co-moderators and explaining how and why these group members were invited to participate and stating the purpose of note taking and recording.

It should be ensured that the focus group is homogeneous with the participants having common interests, experiences, or demographic characteristics. This would

facilitate proper blending among the members resulting in a productive discussion.[2] However, in doing so, it should be ensured that people who know each other or are in some sort of command chain are not recruited into the same sessions. For this purpose, the researchers segregate the participants into different groups based on the difference in views (for or against) or some other parameters.

The effectiveness of a focus group depends on the person who moderates the discussion. A moderator should balance a directive role with that of a moderator, which calls for the moderator to be skilled in establishing and upholding group dynamics and being able to provoke intense discussion on relevant issues. This is important as the quality of data collected is directly proportional to the effectiveness with which the moderator monitors the discussion by asking questions and keeping the discussion targeted on the research objectives. A moderator external to the research organization but with sufficient expertise can also be invited to preside over and facilitate the discussions. If there are different groups then the moderator is expected to be flexible enough to customize his style to each of them.

As the group consists of a number of participants, the format of the questioning plays a major role in eliciting responses from the participants that are cumulative and elaborate than individual responses. The questions should be open-ended, clearly formatted, neutral and sequential. Close-ended questions and leading questions (questions that favour a particular response from the participants) should be avoided. Focus group questioning is not a serial interview. It is rather a discussion of a specific topic that follows from the interaction of the group members. Not only does the discussion prove to be useful in comparing the responses of the different members but also helps the researcher to know what the members think and why. The responses of the members of the group are also affected by the immediate physical surroundings. Therefore, the provision of a relaxed, informal atmosphere should be ensured.

As the focus group involves the interaction of different participants, it becomes difficult to gather the information generated during the course of the discussion. Therefore, some of the techniques that are used to keep a track of the responses of the participants in combination with manual note taking are audio/video recording and multiple methods of recording. Although videotaping is costly, if used, it can capture the details of the discussion including the facial expressions of the participants.

3.2.4.1 Variations in Focus Groups

Focus groups can be of different types depending on the subtle variations incorporated into the standard procedure. These variations are necessary as members differ widely across various groups and some amount of variation helps in eliciting

[2] Due of lack of representativeness it is not possible to compare the results from different groups in a strict quantitative sense.

a multiplicity of views and emotional processes within a group context. Some of the variations in focus groups are discussed below.

Dual-moderator group: These types of focus groups are presided over by two facilitators or moderators. There is simple division of labour between the two moderators. One of them takes charge of the smooth flow of the interactive session and the other ensures that the topics in the basic checklist are discussed.

Two-way focus group: This type of focus group consists of two groups. One of the groups discusses the relevant topics with the other group monitoring their words and responses. The second group then analyses the observed interactions and conclusions.

Duelling-moderator group: This consists of two facilitators who preside over the group discussions. The unique feature of this group is that the moderators take opposite stances against one another on the specific topics. In doing so, they ensure that all the topics in the checklist are covered during the discussion and they get to analyse both sides of a controversial issue. In taking opposite stances, they push the members to come up with more information than they would have otherwise done.

Mini-groups: These usually consist of three to six respondents with a single moderator. They may not assist the collection of as private and highly insightful data as in the case of individual depth interviews, but nevertheless, the presence of less number of members facilitates better and extensive probing into the subject matter. Therefore, they prove to be more competent when compared to larger groups, in the case of discussion of narrower issues. The duration of these discussions is usually for an hour.

3.2.4.2 Advantages and Disadvantages of Focus Groups

Advantages

- *In-depth synergism*: Focus groups can, by putting together a number of people, get information about the subjects that cannot be obtained through individual depth interviews.
- *Snowballing*: Participants not only discuss their own opinions but they also have an opportunity to react to the ideas of others. This can uncover issues that would not emerge in a one-to-one interview.
- *Hands-on*: There is also an opportunity for extensive direct investigation. Products can be tried out, concepts can be reviewed, and reactions observed and probed.
- *Timely*: Post-group debriefings with moderators and clients can create shared insight and reduce selective hearing or premature conclusions.
- *Security*: The homogeneity among the members regarding their experiences and feelings place them at a comfortable position where they willingly communicate their ideas. Ideas arise more unexpectedly in a group than in individual interviews.

- *Speed*: Interviewing a large number of people at the same time makes the data collection and analysis faster than usual.
- *Structure*: A focus group interview permits the interviewer to have in-depth discussions on varied topics.

Disadvantages

- *Misuse*: People often tend to consider focus group results a replacement for survey data. It needs to be clarified that focus group researches probe the nature of attitudes and motivations, not their frequency in the population.
- *Misinterpretation*: The spontaneous responses from the members pose a difficulty for the researchers to decide which responses can be generalized. This can lead them to use their own conclusions, resulting in bias.
- *Poorly managed group dynamics*: Conducting focus groups require skill, insight and experience. It is often difficult to find a moderator with the requisite skills.
- *Messy*: As the members answer in an unstructured manner, it becomes difficult to code, analyse and interpret the responses.

3.2.5 Projective Techniques

Every individual has a sub-conscious mind that holds a lot of attitudes and motivations that even the individual may not be aware of. Use of direct questions to unravel these attitudes and motivations are least effective. Therefore, researchers use special techniques to venture into the private worlds of subjects to uncover their inner motives. These special techniques are known as projective techniques.

The projective technique is an unstructured, indirect form of questioning that encourages respondents to project their underlying motivations, beliefs, attitudes or feelings regarding the issue of concern. The respondents are exposed to various scenarios and asked to interpret them. A close observation of the way the respondents describe a situation or a scenario reveals their own motives, attitudes, values and motivation.

Projective techniques find applications in various fields and are not limited to the exclusive study of consumer motivation. They are not used to measure (which is more the territory of other techniques such as surveys), but to uncover feelings, beliefs, attitudes and motivation that many consumers find difficult to articulate. The underlying principle of projective techniques is that the unconscious desires and feelings of the respondents can be inferred by presenting them with an ambiguous situation in which the respondent has to use the ego defence mechanism of projection.

The following are some of the projective techniques used by researchers to tap the feelings in the sub-conscious minds of the subjects.

- Association techniques
- Completion techniques
- Construction techniques
- Expressive techniques
- Sociometry.

3.2.5.1 Association Techniques

In this technique, subjects are presented with a stimulus and are asked to reveal the first word, image, or thought elicited by the stimulus. *Word association* is the most popular type of association technique used, where a respondent is asked to respond to a word spelt out with the first word or thought that comes to their mind. This is known as free word association where the subject has to share his first word of thought. Successive word association is a slight variation in which the subject shares a series of words or thoughts that strike his mind in response to the stimulus. For example, the word 'ambience' asked by the interviewer can have varied responses from individuals like 'sales men', 'building' and 'cleanliness'.

The researcher records the responses and the time taken to respond to each word. This helps in analysing the frequency in which the subject gives a particular word or thought in response to the stimulus. These responses are analysed by calculating the following:

- The frequency of the words given in response
- The time elapsed before the response
- The number of non-respondents.

Association tests are especially useful in consumer research used for discovering brand image or product attributes. Brand personification is one such area. Association tests can also be extended to measure attitudes about specific brands, their attributes, packaging and even advertisements.

3.2.5.2 Completion Techniques

These are somewhat similar to association techniques in that the subject is required to complete an incomplete stimulus. Completion techniques are of two types, that is, sentence completion and story completion.

In *sentence completion*, a subject is asked to fill up the blank in a sentence. The subject uses his/her intuitive ideas to do the job and in the process leaves clues that are traceable to his/her underlying attitudes, thought process and feelings. This technique scores over word association in that the subjects can be given more directive stimulus. These statements are usually in the third person and are somewhat ambiguous. Interpretation is usually informal and qualitative, rather than quantitative. Sentence completion is useful when time is limited, but depth of

feeling still has to be tapped.[3] A slight modification in this technique is the *paragraph completion* where the subjects are required to fill in an incomplete paragraph.

Story completion is also similar to the above two variations with the exception that the respondent is required to fill in the conclusion of the story. The story contains enough clues to direct the responses of the subject but gives no hints at the ending. The choice of words and the way the respondent concludes the story helps the researcher to form an idea about the feelings and personality of the respondent.

3.2.5.3 Construction Techniques

In construction technique, the subject is asked to construct his responses in the form of a story, description, dialogue or a picture. In construction techniques, the respondent is supplied with less initial structure that in turn requires more complex and controlled intellectual activity on his part. Construction techniques are of two types, that is, picture response and cartoons.

Picture response techniques originated from the Thematic Apperception Test (TAT) that is based on Henry Murray's Personality Theory. The participants in this technique are given one or more pictures and asked to interpret the background situation, discussion, or direction of the story from the moment the picture is captured. It is for this reason that it is also known as the picture interpretation technique. It is used to identify the unspoken thoughts of the characters.

Cartoon techniques also serve a similar purpose. Here, the statements or a thought of one of the cartoon characters is given in the box above his head. This is supposed to evoke certain responses in the mind of the other cartoon. This is exactly what the subjects have to identify. This evokes varied responses from different subjects, which in turn help the researchers to understand their unique mindset and personalities. Other variations in this technique are the third-person techniques, fantasy scenarios and personification.

3.2.5.4 Expressive Techniques

This is a technique that involves role-playing, where the respondent is given a verbal or visual situation and is asked to play the role of a specific character like a sales executive, a manager, or a political leader. The respondent, for example, is asked to assume that he is a political leader who has been invited to an interactive session with the public on TV. The people tend to pour out their woes and

[3] Green.

objections against the government. The manner in which the respondent copes with the situation, tackles the grievances and makes statements reveals a lot about the personality of the subject.

3.2.5.5 Sociometry

Sociometry is a method that was devised by Jacob L. Moreno for assessing group structure. Moreno defined Sociometry as the mathematical study of psychological properties of populations, and the results obtained by the application of quantitative methods.

Sociometry is based on the fact that people make choices in interpersonal relationships. Whenever people are in a group, they chose where to sit or whom they speak to etc. It studies patterns of affection and loyalty that bind some group members more closely than others and can be applied to situations involving study of group behaviour in business research.

3.2.5.6 Advantages and Disadvantages of Projective Techniques

Advantages

- As the respondent is aloof of the purpose of the study, he tends to give responses that would otherwise have not been possible.
- Respondents do not perceive right or wrong answers to the exercise and are encouraged to respond with a wide range of ideas. This results in an increased amount of data collection that is rich and accurate.
- Projective techniques help in generating hypotheses regarding why consumers behave as they do.
- They are useful in 'breaking the ice' in focus group discussions.

Disadvantages

- Complexity of the techniques requires trained interviewers and skilled analysts, who are difficult to find, to analyse the responses.
- The employment of highly skilled staff is expensive which makes it difficult to administer the techniques.
- Getting subjects for role-playing is difficult, as not all subjects may feel comfortable with the idea.
- The reliability of measures is difficult to establish.

3.3 Part II: Descriptive Research Design

3.3.1 Descriptive Research Design: Survey and Observation

The method of collecting information by asking a set of pre-formulated questions in a predetermined sequence in a structured questionnaire to a sample of individuals drawn so as to be representative of a defined population is known as survey research. A researcher conducting a survey has to deal with sampling, questionnaire design, questionnaire administration and data analysis. These questionnaires are administered to an individual or a group of individuals through interviews. These interviews can be either face-to-face, over the phone or through any other communication media which has to be decided in advance. Typical survey objectives involve describing or learning from an ongoing activity by studying the changes in behavioural patterns of the subjects of interest to the researcher. Thus, surveys tend to be descriptive in nature, although they are often quantitative in nature surveys also entail some qualitative aspects as in research concerning consumer satisfaction surveys and new product development.

3.3.2 Classifying Survey Research Methods

Having looked at the essential features of surveys in general, we can now classify surveys into their different types. Surveys can be classified on basis of the method of communication, the degree of structure and the amount of disguise in a questionnaire and the timeframe for data collection. The next section deals with the classification in terms of questionnaire structure, disguise and the timeframe, following which the classification based on mode of communication will follow under the section on survey methods. For a detailed classification of survey research methods, refer Fig. 3.5

3.3.3 Questionnaire Design

Questionnaire design is a vital issue in interviewing. A properly designed questionnaire can tap the necessary information from the respondent. Therefore, researchers always design a tactful set of questions to probe and prompt the interviewee to give useful answers. Questionnaires fall under various categories, such as structured, unstructured, disguised and undisguised. But in this section, we will limit our discussion to the study of structured and disguised questions.

A structured question is one that has a specified number of responses. Hence, the interviewee has to choose from among the alternatives given. Structured interviews are for the most part, orally administered questionnaires. Such

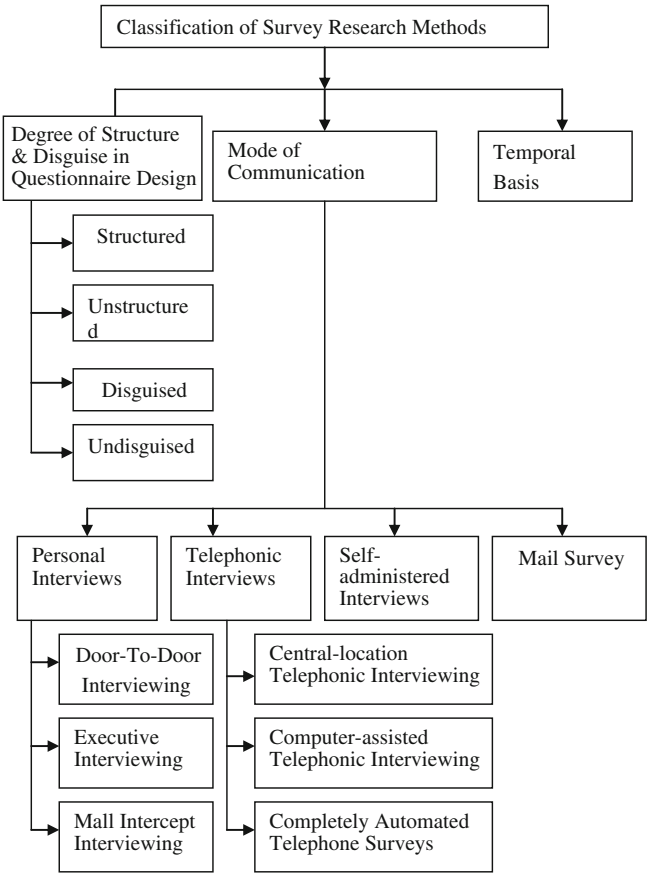

Fig. 3.5 Classifications of survey research methods

questions restrict the interviewee from giving his own answers and require him to choose from among the alternatives given. This saves a considerable amount of time as the respondent is quick to choose from among the options given to him. Thus, rather than going off the track, the interviewer takes the interview in the required direction. The structured questionnaire makes the interview somewhat 'funnel' shaped, wherein the interviewer consciously guides the interviewee through a sequential, pre-formulated set of tactful questions to extract the 'factual' responses without any influencing factors. This leads to the goal of the interview being accomplished. Some common features of structured interviews are as follows:

- A common vocabulary for all interviewees.
- Question formats have the same meaning for all.
- All respondents are interviewed in exactly the same way.

- The questions are set in advance with their order and the range of possible responses the same for all respondents.

These features enhance the effectiveness of a structured questionnaire in the following ways:

- Structured questions are easy and the interviewee can answer them quickly.
- Similar questions and a uniform format make the answers easy to decode and analyse.
- The factual information has a high degree of reliability.
- The possibility of any interviewer bias is reduced.

Although structured questionnaires help the researcher in eliciting programmed responses, they fail to probe into the actual motives of the respondent. This drawback can be overcome by including some unstructured questions in the questionnaire. Unstructured questionnaires are usually open-ended and try to probe into the mind of respondent, allowing the interviewee to express his own thoughts rather than restricting him to the available response options.

Sometimes, it might happen that a questionnaire has a set of personal and sensitive questions to which the respondent might give incorrect answers. These are a set of questions to which the interviewee might take offence or questions that might threaten his ego or prestige. In such situations, interviewee may knowingly give the wrong information. To nullify such instances of deliberate falsification, the interviewer frames the questions in a disguised manner. These disguised questions framed in a tactful manner help to elicit the right information from the respondent in an indirect manner, thus leading to the accomplishment of the research objective.

Depending upon the degree of structure and disguise involved, questionnaires can be further categorized as structured-undisguised, unstructured-undisguised and structured-disguised.

However, these classifications have a number of limitations. Firstly, the variance in the degree of structure and disguise in the questions makes them less straightforward and liable to misunderstanding by the respondent. Secondly, since the number of responses is limited, interviewees feel forced to choose one even if it does not divulge their true feelings. Thirdly, since surveys have a mix of personal and general questions they tend to adopt a hybrid style of questionnaire format including structured, unstructured, disguised and undisguised questions. This leaves no alternative other than response bias to creep into the research data.

Since some research projects have a limited purpose, the data required can be gathered in a single survey. However, there are other research studies that require multiple surveys for a consensus on data and conclusions to be reached and hence extend over a longer period of time. Classifying research surveys based on the time period over which they extend, we have cross-sectional and longitudinal studies, which are discussed below.

3.3.4 Cross-Sectional and Longitudinal Studies

Most cross-sectional surveys gather information at a single point in time. Most surveys fall into this category. In this type of survey, the total target population is divided into various segments, and then data are collected from all these segments using a sampling method. Data collected are then analysed to define the relationship between the various variables based on cross tabulation.

For example, a study designed to establish the relationship between ethics of parents and their views on internet filtering is likely to bring in varied responses from different sections of society who are studied at the same time.

The advantages of cross-sectional surveys lie in the fact that they are more representative of the population. These surveys can be used to study the differences in the consumption levels or trends in income, job changes and buying behaviour of individuals hailing from various groups and sub-groups of the population. But when it comes to defining the same research objectives over a period of time, cross-sectional studies cannot be used. Here, longitudinal studies are required.

Longitudinal studies are those research studies that use multiple surveys to gather data over a period of time. They help in monitoring the behavioural changes taking place in the population that is of interest to the researcher. This type of survey is flexible and can over a period of time, interview different respondents provided the new subjects are also from the same group or sub-group originally interviewed. Hence, longitudinal surveys are essential not only to learn about current social situations, but also to measure their variation over a time period.

A number of different designs are available for the construction of longitudinal surveys. They are:

- Trend studies
- Panel surveys
- Cohort panels.

Trend Studies: Longitudinal surveys consisting of a series of cross-sectional surveys conducted at two or more points in time, with a new sample on each occasion are known as trend studies. But it should be ensured that the new sample is from the same category or segment of population originally surveyed, as trend studies focus on the changing patterns of a particular population. Since each survey brings out the existing trend at a particular point of time, data from several cross-sectional studies of the same population can be integrated and a time trend analysis can be established into the longitudinal survey. This can be done by using consistent questions in each of the cross-sectional studies.

Panel Surveys: A longitudinal survey that involves collecting data from the same sample of individuals or households across time is called a panel survey. The selected sample is called a panel. Panel surveys enable the researcher to detect and establish the nature of changes occurring in the population over a period of time. These changes can be traced to the level of the individual as the surveys are

conducted on the same panel over a period of time. A particular sample of interviewees might respond or react to an impulse in a certain way, which might differentiate them from others over a period of time. The very basis of longitudinal surveys lies in detecting these changes. Although they provide highly specific information, they have certain drawbacks. They are time-consuming, expensive and are also known to have high attrition rates as people often drop out of the study.

Cohort Panels: A cohort is defined as those people within a geographically or otherwise delineated population who experienced the same significant life event within a given period of time. Cohort panels can be considered as a specific form of panel study that takes the process of generation replacement explicitly into account. Thus, one or more generations are followed over their life course. The study usually probes into the long-term changes and the individual development processes. If in each particular generation the same sample people are investigated, a cohort study amounts to a series of panel studies whereas, if a new sample of respondents is drawn in each generation, in each period of observation, a cohort study consists of a series of trend studies.

3.3.5 Survey Methods

Surveys are conducted through interviews and are generally classified based on the method of communication used in the interview. The following are some of the common methods of conducting surveys.

- Personal Interviews
- Telephonic Interviews
- Self-Administered Interviews
- Mail Surveys.

3.3.6 Personal Interviews

Based on the respondents to be interviewed and the means to contact them, the different methods of personal interviews can be classified into the following types:

- Door-to-door Interviewing
- Executive Interviewing
- Mall Intercept Surveys.

Personal interviews are characterized by the presence of four entities, that is, the researcher, the interviewer, the interviewee and the interview environment. The first three participants have some inherent and acquired characteristics specific to each of them. As such, they are able to influence the interviewing process in some way or the other. The choice of the fourth entity, that is, the interview environment is chosen by

the researcher based upon the type of data to be collected. Before we move on to discuss the various personal interviewing methods classified according to the interview environment, it would be prudent to look at the advantages of personal interviews.

3.3.6.1 Advantages of Personal Interviews

Face-to-face personal interviews have a number of inherent advantages over non-personal interviews. These advantages are discussed below.

Feedback Opportunities: The opportunity to clarify the doubts of the interviewee is one of the features that put personal interviews ahead of other methods of gathering data. A respondent hesitant to provide sensitive information can be assured of the confidentiality of the information provided.

Probing: The interviewer, in a personal interview, has the advantage of probing the respondent for complex answers. A respondent might reveal her likes/dislikes for a certain soft drink which is of no use to the researcher. But with the interviewer present, the actual reason can be traced back to any of the product attributes. The interviewer, by asking further questions, can probe respondents to zero-in on the specific product attribute that they like/dislike. This kind of information is more useful to the researcher.

Length of Interview: *As compared to other survey methods, the length of interview is appreciably better in personal interviews. This is so because* it is easy for a reluctant respondent to hang up the phone or not respond to a mail rather than avoid someone in a face-to-face interview. Hence, the chance of the respondent answering all the questions is greater as compared to other non-personal survey methods. Some respondents, though reluctant to participate in a non-personal survey method, feel comfortable about sharing information with an interviewer present right in front. This leads to an increase in the length of the interview and an improvement in the quality of response in the case of personal interviews.

Door-To-Door Interviewing

This traditional survey method, supposedly the best, involves consumers being interviewed in their homes. There are a number of reasons why this method is considered the best. Firstly, door-to-door interview involves a direct, face-to-face contact with the interviewee. Therefore, it has the inherent advantages of instant feedback and explanation of complex and difficult tasks. Secondly, special questionnaire techniques requiring visual contact to improve data quality can be used in this method. Thirdly, where complex product concepts are to be explained to the customer, door-to-door interviewing is an obvious choice. Fourthly, it is also helpful to the interviewer since as the customer being at home is at ease and is likely to reveal factual information.

Another advantage is that it provides a sample that is more representative of the population as compared to mail questionnaires. Even people who do not have a telephone or whose numbers are not listed in the telephone directory can be reached by door-to-door interviewing. It is the best possible way for in-home product tests, which require either establishing facts about the product or

explaining complex product features to the customer. Since it involves direct face-to-face interaction, it reduces the chances of non-response error. However, owing to the large number of drawbacks involved, there has been a slow decline in the usage of door-to-door interviewing. Some of its drawbacks are listed below.

i. The number of potential respondents is low in a population where both adults work outside the home.
ii. Unsafe areas, distance and lack of accessibility pose a hindrance in reaching the desired sample.
iii. Dearth of qualified interviewers.
iv. Fluctuations in weather conditions, vehicle breakdown or sickness are also factors that might pose a hindrance to reaching the target samples.
v. It might not be possible to interview individuals who reside in high-rise apartments or are too busy to entertain personal interviews. Hence, these individuals have to be excluded from the list.

Although door-to-door interviewing does not enjoy the status it once had, yet it will remain in use for the variety of reasons for which it is particularly useful.

Executive Interviewing

Executive interviewing is similar to door-to-door interviewing with the only difference that it is specific to workplace respondents. Executive interviewing is concerned with finding out information related to some industrial product or service and hence requires the interviewing of business people who use these products in their offices.

If an ERP solutions provider seeks to identify the latest user preferences, then it should at first identify and get in touch with the end users of its ERP products. After making a list of suitable names, the interviewer should contact the respondents over the phone asking them to spare some time for the interview. The process is expensive but it is worth it. This is because the users more often than not, make time for the interview, as they too are interested in expressing their opinions and learning more about the products and services they use at work. The interviewer should ensure that he reaches the venue on time. Often, the interviewees are busy at work and the interviewer might be required to wait for the meeting; at other times, the appointment might be postponed due to time constraints. Since executive interviews are similar to door-to-door interviews, they share the same advantages and disadvantages as door-to-door interviews.

Mall Intercept Surveys

Marketing practitioners and advertising researchers base vital business decisions on available market research information. The concept of mall interviewing (a predominant type of personal interview in the United States today) has become a popular way to collect survey data. The technique gained popularity in early 1960s when big, enclosed shopping centres attracted a large number of people from various sections of society (something of an ideal sample for researchers).

Mall intercept interviews are often viewed as an inexpensive substitute for door-to-door interviews. Shopping *mall intercept* interviewing involves exactly

what the name implies—stopping or intercepting shoppers in a *mall* at random, qualifying them if necessary, asking whether they would be willing to participate in a research study and conducting the interview right on the spot or taking them to the research agency's interviewing facilities located in the mall. Prior to the mall intercept, surveys were conducted in other places having a high concentration of people, such as supermarkets, discount stores, theatres and railway stations.

Since its inception, mall intercept surveys have come a long way. The present period is witnessing huge developments and advancements in mall intercept surveys with enterprising researchers opening permanent offices and test centres in malls. Today, some mall research facilities are equipped with complete food preparation/storage facilities for conducting taste tests, focus group facilities, video tape equipment, etc. Since each mall has its own customer characteristics, the chances of deriving biased information is more as compared to door-to-door sampling.

Mall intercept interviews are useful when the chances of demographic influences are negligible or the target group is a special population. It comes in handy for surveys that require coordination and timing such as cooking and tasting food products and for products that need to be demonstrated. Purchase intercept technique is a special case of mall intercept interviewing. This technique involves an in-store observation and in-store interviewing, where consumers are intercepted and interviewed while buying a specific product. The interviewer then probes into the reasons for selecting the particular product. Mall intercept surveys score over other modes of survey interviews in the following respects: cost of research and degree of control, time taken for execution and the quality of information collected. Mall intercept interviews have the following advantages:

- Depth of response is greater for mall intercept interviews than for any other face-to-face interview.
- The interviewing environment is controlled by the researcher.
- Interviewer can notice and react to the non-verbal indications of the interviewee.
- Various types of equipment are available to analyse the responses.
- The memories about the shopping experience are fresh, and hence, the situation is conducive for studying purchase behaviour.

Although the advantages of mall intercept interviews are considerable, yet their adoption without recognition of their shortcomings is not prudent. Some of the drawbacks of mall intercept interviews are as follows:

- Getting personal information from respondents is not easy and involves many problems.
- Social desirability effect.
- Interviewer bias.
- Shoppers and respondents who are in a hurry might respond carelessly leading to wrong information.
- Samples drawn may not be representative of the population.
- Lower completion rates of questionnaires.
- Inapplicability of probability-based sampling techniques.

- The respondents might be in a hurry to leave the mall.

Disadvantages of Personal Interviews

Although personal interviews have a number of advantages, they are also known to have some disadvantages such as high cost, lack of anonymity of respondent and necessity for callbacks. These points are discussed below.

Cost: As compared to mail, internet and telephonic surveys, personal interviews are generally expensive. The costs are directly related to the number and the quality of the workforce employed; the reach of respondents; the length and complexity of questionnaires and also the extent of non-response due to non-availability and ignorance.

Lack of Anonymity of Respondents: A respondent in a personal interview may hesitate to provide the right information as his identity is known to the interviewer. Questions like smoking habits during driving and extra marital affairs are sure to fetch falsified answers. Thus, the interview suffers from social desirability bias. To overcome this issue, interviewers spend a lot of time in framing questions in the best possible way so as to be able to prompt the true responses from the interviewees even for sensitive issues.

Necessity for Callbacks: We have already discussed that the characteristics of those who remain at home like (non-working women and retired people) are different from those who go to work. Hence, it becomes necessary to recontact people who were unavailable at the first call. This requires a systematic procedure and often turns out more costly than interviewing the individual in the first call itself.

3.3.7 Telephonic Interviews

Telephonic interviews, once thought of as 'quick and dirty', providing less reliable or valid data, have finally come of age and are currently judged as one of the best cost-effective alternatives to face-to-face interviews and mail surveys. The shift of focus to telephonic interviews of late has happened for several reasons, prominent among which are:

- Plunging response rates in face-to-face interviews in certain urban areas.
- Lower cost of telephonic interviews as interviewer travel time and mileage are eliminated.
- Introduction of random digit dialling as a remedy to previous problems (cited below) of telephonic interviews and
- Adoption of new technology in telephonic interviewing in the form of computer-assisted telephone interviewing (CATI) and computer voice activated telephonic interviewing.

The use of random digit dialling as a sampling procedure eradicated many problems associated with telephonic interviews. Instead of sampling from existing telephone directories, it used sampling via a random number procedure. This

ensured that even those individuals in the sample who had shifted or changed their telephone numbers could be included. But the sampling frame for telephonic interviews is not restricted only to directories. Researchers are also known to make use of student registers, hospital and clinic records, census tract information and employee lists of corporations as sampling frames for telephonic interviews. Before we move on to discuss the various developments in telephonic interviewing, we take a quick glance at the advantages and disadvantages of telephonic interviewing.

3.3.7.1 Advantages

- Speed in data collection.
- Potential to produce a high-quality sample through improved techniques.
- Increased co-operation and quality of data as individuals reluctant to respond to face-to-face interviews feel more comfortable with telephonic interviews.
- Ability to interview respondents in high-crime areas, which is a limitation for face-to-face interviews.
- Facilitation of collection of socially undesirable responses which is a drawback in face-to-face interviews.
- Making callbacks is easier.

3.3.7.2 Disadvantages

- The absence of face-to-face contacts which results in the inability of the interviewer to display products, concepts and advertisements, or to judge the respondent on demographic characteristics.
- Time length of interviews is less and it is easy for a reluctant respondent to hang up the phone rather than avoid someone in a face-to-face interview.
- Interviews on sensitive topics, although they may exceed the expected length of time give rise to doubts regarding the quality of data.
- Greater tendency among respondents to give shorter answers generating 'not ascertained' responses as compared to face-to-face interviews.
- Absence of face-to-face contact also results in the respondent continuing to speak without realizing that the interviewer is still engaged noting the previous response.
- Uses of screening devices such as Caller ID and answering machines have increased the non-response rates for telephonic interviews, with respondents more willing to participate in a legitimate survey rather than entertaining callers who wish to sell products.
- Samples are usually not representative when the interest group consists of the general population, and directories are used as sampling frames.

Adoption of advanced techniques in telephonic interviews has helped interviewers to overcome many of the problems associated with this method. These advanced techniques are discussed below.

3.3.7.3 Central Location Telephone Interviews

For central location telephone interviews, the interviewers make calls from a centrally located marketing research facility to reach and interview respondents. Wide-Area Telecommunications Service (WATS) lines are used for making the calls. These lines facilitate unlimited long distance calls throughout the country or geographical area at fixed rates. The superiority of CLTI can be attributed to one factor, that is, control. The whole interviewing process can be monitored by supervisors using special monitoring equipment. This means that interviewers who do not conduct the interview properly can either be corrected or removed. This also facilitates editing and checking interviews for quality on the spot. Interviewers can be appraised of any deficiencies in their work. Finally, since interviewers report in and out of the workplace, it helps to scrutinize and control their work hours.

3.3.7.4 Computer-Assisted Telephone Interviewing

The process in which the telephonic interview responses can be directly entered into the computer is known as computer-assisted telephone interviewing. Here, the telephonic interviewer is seated at a computer terminal while interviewing qualified respondents. The questions are usually close-ended. The questions along with their possible response options appear on the computer screen (one at a time) in front of the interviewer. The interviewer reads out the questions and enters the corresponding answers of the interviewee into the computer. Once the answer to the question is entered, the computer automatically skips to the next question. Since the interview consists of close-ended questions with possible options for each, the questionnaire needs to be highly structured.

The processing of the CATI has become much easier with the use of latest technology. This technology includes telephone management systems that take care of everything, starting from selecting telephone numbers at random to dialling them. Another call management feature is automatic callback scheduling where the computer is programmed to make the necessary recalls as per the desired timings. Thus, timings can be set to recall ‘busy numbers’ after 15 min and ‘no-contacts’ after 1 h. The computer can also be programmed to fill a certain quota and to deliver daily status reports according to the quota. Even though this process can be done in the traditional way using pencil and paper, there are many advantages attached to CATI. A separate step of editing is not required as data can be edited with their subsequent data entry. Moreover, tabulations, which would require a week or more to compile in the traditional way, can be done at the click

of a button using CATI. This speed in tabulations also proves to be advantageous in indicating clearly whether certain questions need to be deleted or added to the existing questionnaire to make it more specific.

3.3.7.5 Completely Automated Telephone Surveys (CATS)

This process that combines computerized telephone dialling and voice-activated computer messages makes use of Interactive Voice Response (IVR) technology to record the responses of the interviewees. The need for an interviewer is eliminated since CATS involves a voice-synthesized module controlled by a microprocessor. The questions are highly structured and close-ended with response options. The functioning of the technique is explained as follows.

The computer uses the recorded voice of a professional interviewer to ask the questions. Interviewees are required to answer by choosing from the options available and then pressing a number button on their telephone sets to mark their choice of options. The options selected are thus recorded by the computer. The system is so designed that if a respondent does not answer the first couple of questions the computer moves on to dial the next respondent. The use of CATS is handy for short, simple questionnaires. CATS technology is known to produce quality data at good speed and is also considered to be much economical compared with other telephonic methods. Since the computer handles the entire interview, CATS shares the same advantages as CATI. The flexibility of the system extends its usability to various research needs such as customer satisfaction surveys, monitoring service quality, in-home product testing and electoral polling.

The Direct Computer Interview is another related method. This is very similar in functioning to the other computer-assisted interviewing methods with the only difference being that the interviewee is intercepted in a mall, made to sit in front of a terminal in the mall and given basic instructions as to the filling of the questions. Here, however, the interviewee enters the answers instead of the interviewer.

3.4 Self-Administered Interviews

An interview where the questionnaire is filled out by the respondent without the intervention of an interviewer is known as a self-administered interview. Respondents of such interviews are not assisted by interviewer or the computer. These self-administered interviews are mostly conducted in shopping malls, supermarkets, hotels, theatres and airlines as these locations provide captive audiences. Passengers and regular customers are given brief questionnaires to enquire about their views of the quality of service offered in an airline or hotel. The absence of the interviewer, however, results in a limitation, namely clarifications on responses to open-ended questions cannot be obtained. A customer might just indicate his/her liking as a reason for buying a particular product/brand,

which is of no utility from a managerial perspective. The absence of the interviewer thus makes it difficult to trace the buying decision of the customer to any of the product/brand attributes. Even the quantity of information generated is limited. However, the absence of the interviewer proves to be a boon in disguise as it eliminates the possibility of interviewer bias.

The use of kiosks is another recent improvement in self-administered interviews. Kiosks are multimedia, touch-screen computers contained in freestanding cabinets. The capacity of these pre-programmed computers to administer complex surveys is enhanced by their ability to display full-colour scanned images, play stereo sound clips and show videos. These kiosks having been successfully tested at trade shows are now being tried in retail stores due to their numerous applications. Kiosk interviewing is less expensive and is known to derive more honest results than methods that involve an interviewer.

3.5 Mail Surveys

A survey where questionnaires are sent to qualified respondents by mail or e-mail is known as a mail survey. Two types of mail surveys are used in business research. They are ad hoc mail surveys and mail panels. The only difference between the two is that there is no prior contact in the case of ad hoc mail surveys. A questionnaire is just sent to a sample selected from an appropriate source and responses are awaited. The selected sample is used only for a single project.

The functioning of mail panel surveys is explained below.

- The process starts with obtaining mailing lists from various sources after ensuring that they have the current, complete address of potential participants. It should be ensured that the list of participants is closely related to the group under study.
- The next step involves contacting the sample participants through mail, postcards, letters or telephone. The purpose of their participating in the panel survey is explained to the participants. If the participants contacted agree to take part, they are required to fill in an initial questionnaire pertaining to their background and demographic details, which may be used to determine whether the participant qualifies for inclusion in the survey.
- On successful selection, the panel participants are sent questionnaires from time to time.
- Participants are thereafter contacted by various means to remind them to mail back the completed questionnaire.

An essential feature in mail panel surveys is that it is a type of longitudinal study where the same respondents are surveyed at different points of time to note specific changes pertaining to the topic of research. The advantages are similar to those of self-administered interviews. The method is cost-effective as the need to recruit, train, monitor and pay the interviewers is eliminated. The questionnaire

can be administered from a single location for better control. It is even possible to contact respondents who are hard to reach. Respondents can spend as much time as they like answering the questionnaires and can complete them at their convenience. Thus, the respondents tend to give more detailed responses. However, the absence of a qualified interviewer gives rise to the same limitations in mail surveys as for self-administered interviews. Mail surveys are, however, characterized by a high rate of non-response. Typical ways to cope with non-response in mail surveys are outlined below.

- Monetary incentives
- Stamped, self-addressed return envelope with a persuasive covering letter
- Premiums such as pen, pencil and other small gifts
- Promise of contributions towards charity
- Entry into drawings for prizes
- Emotional appeals
- Reminder that the respondent participated in previous surveys.

3.5.1 Factors Determining the Choice of Survey Research

The choice of the survey method is influenced by a number of factors. An ideal survey method should provide the researcher with the required data with the specified quality at the lowest possible cost. The various factors that come into play in the choice of a survey method are outlined below.

3.5.1.1 Sampling Precision

The required level of sampling precision varies from research to research. Therefore, the researcher can select a research survey that suits the accuracy needs of the research. For example, if the researcher requires the results of the sampling survey to be very accurate he can select central location telephone interviewing. On the other hand, mail surveys can be used when there is not much emphasis on the accuracy of the data. A central location telephone interviewing employing a random digit dialling sampling procedure is more likely to deliver a better sample than a mail survey. Hence, the trade-off between the costs and accuracy of a sampling procedure that a researcher is willing to make plays a major role in the selection of the survey method.

3.5.1.2 Budget

The financial resources available to the researcher to conduct the research have a direct impact on the selection of survey method. A research project supported by

huge amounts of funds can include an appropriate survey method irrespective of its costs. Thus, when a low budget is set apart for the survey, the researcher cannot employ a costly survey method like door-to-door interviewing. In some cases, even if accuracy of the data is important, the researcher may have to settle for a telephonic interview rather than door-to-door or mail surveys to minimize the cost of the research.

3.5.1.3 Quality of Data

The validity and reliability of the data required plays an important role in the choice of survey methods. Validity refers to the research surveys ability to produce results that are relevant to the researcher. Reliability refers to the consistency with which the results are produced under the same conditions with the same or comparable populations. Quality of data in a survey is affected by factors like choice of questionnaire design, sampling methods, scaling techniques and interviewer qualification and training. It is also affected by the inherent pros and cons of the selected survey method.

For example, an exploratory research study involving an open-ended questionnaire would rather prefer a door-to-door interview over a mall intercept since people on a shopping spree would not be interested in answering open-ended questions.

3.5.2 Need to Expose the Respondent to Various Stimuli

Surveys that need to expose the respondent to certain marketing stimuli like product concepts, components and demonstrations have no better option other than to choose a face-to-face survey method. For example, when a cola major wants to test its customers' response to a new soft drink flavour it is planning to launch, a taste test is necessary and this requires the researcher to select a face-to-face survey method. Similarly, researches aimed at product testing, advertising research, shopping behaviour, etc. require direct contact with the customer. Thus, the type of stimulus that is to be provided to the interviewee as part of the interview decides the type of survey method required to conduct the interview.

3.5.3 Incidence Rate

The percentage of households or persons out of the total population that fit the qualifications of people to be interviewed in a particular study is known as the incidence rate. It might so happen that the incidence rate for a research study is very low. Hence, the researcher cannot afford to employ expensive methods like door-to-

door interviewing where the cost of searching the respondents would exceed the costs incurred for actual face-to-face interviewing. Hence, the choice here would be definitely a combination of survey methods that could provide desired results at a reasonable cost. People might be screened using telephone or mail surveys, and later, an interviewer can be sent to meet the selected respondent in person.

3.5.4 Accuracy of the Resultant Data

The accuracy of the data collected by the survey methods can also influence the choice of survey method in a business research. It might be happened that the questionnaire involves sensitive questions or the involvement of the interviewer might bring in some interviewer bias. Personal interviews may not be the right choice in these cases. Mail and self-administered survey methods would be more appropriate. CATI or CATS might also be a choice option since the interviewer would not be in direct face-to-face contact with the interviewee.

3.6 Errors in Survey Research

Technological advancements have led to remarkable improvements in survey techniques and standards. A proper evaluation of the research methodology employed coupled with the standard techniques can give precise results. But survey research can still result in errors in findings and their application. The different types of possible errors in a research study are shown in Fig. 8.2. The two major sources of survey error are

- Random sampling error
- Systematic error.

3.6.1 Random Sampling Errors

Random sampling error is the error caused by a particular sample not being representative of the population of interest due to random variation. Sampling as an integral part of any survey process exposes a representative cross-section of the target population. Even though a representative sample is taken, there is always a minimal deviation between the true population value and the sample value. This is due to statistical error as the sample selected is not perfectly representative of the test population due to chance variation. Therefore, a small random sampling error is evident. This error cannot be altogether avoided, but it can be brought under acceptable limits by increasing the sample size.

3.6.2 Systematic Errors

Errors that occur due to the nature of the research design and the precision of execution are known as systematic errors. The use of wrong techniques or wrongly calibrated instruments leads to systematic errors. When the results of a sample show consistent deviation, in a direction away from the true value of the population parameter, it is known as a sample error or bias. There are many sources of systematic errors, which can be classified under two broad categories, that is, administrative errors and respondent errors. The following section contains the discussion of these errors.

3.6.3 Administrative Errors

An error caused by improper administration or execution of the research task is known as administration error. These are caused due to sample design error or due to other factors on the personal front such as carelessness, confusion, negligence, omission, etc. The different types of administrative error are given below:

- Sample Selection Error
- Sample Frame Error
- Population Specification Error
- Data Processing Error
- Interviewer Error.

3.6.3.1 Sample Selection Error

A systematic error that occurs because of an inaccuracy in either the stage of sample design or the execution of the sampling procedure resulting in an unrepresentative sample is known as sample selection error. It can even surface in cases involving a proper sample frame with the population correctly defined. Non-adherence to appropriate sampling procedures and use of incomplete or improper sampling procedures are the main reasons for errors in sample selection. For example, mall intercept interviewers may choose to interview only those customers who they think are neatly dressed or only families with children. As a result, they might not take the opinions of other potential customers or respondents. A political leader during a election campaign in a potential area might wrongly select telephone numbers at random and corresponding names for a door-to-door campaign, rather than ensuring that he pays a visit to all the registered voters in that area. In this case, the leader might miss out on several potential and eligible voters.

3.6.3.2 Sample Frame Error

The list of population elements or members from which units to be sampled are selected is known as the sampling frame. A sampling frame error is said to occur when this list of members does not correspond exactly with the target population. For example, if the target population is defined as 'all the supermarkets in Hyderabad' and the sample frame does not list all the supermarkets, then it would result in a frame error.

3.6.3.3 Population Specification Error

An error that results from an incorrect definition of the universe or population from which the sample chosen is known as a population specification error. For example, a small electronic car manufacturer trying to estimate the market potential for its cars in Hyderabad might select only other small car users for interviewing. This is a case of population specification error where the actual population should have been all car users in Hyderabad. In this case, the mistake is made, because of uncertainty as to whether only small car users will switch to the new electric car segment. It might happen that with the rising price of petrol or due to personal preferences, other classes of car users might also choose to buy the new electronic car. If other classes of car users who are very different in terms of their interests are excluded then it will result in biased sample results.

3.6.3.4 Data Processing Error

An error that occurs because of incorrect data entry, incorrect computer programming or any other error during data analysis is called data processing error. Data entry into the computer is usually done manually. Hence, there are chances of errors creeping in during the transfer of data from the document to the computer. Programming too is done manually. Hence, the accuracy of data processing by a computer depends on the accuracy of data entry and programming. Data processing error can be minimized by a meticulous verification of each step in the data entry and processing stage.

3.6.3.5 Interviewer Error

Interviewer error is an administrative error caused by mistakes committed by the interviewer while administering the questionnaire or recording the responses. This is due to the interaction of the interviewer with the respondent. Different interviewers differ in their characteristics and abilities. The respondent might be influenced by the interviewer to give untrue or inaccurate data. It might also happen that an interviewer is unable to record the answers correctly as his/her

writing speed is not very good. Selective perceptions of the interviewer might also influence the way they interpret and record them. It is possible that the interviewer might record the view of a respondent in the way he understands (specific to his attitudes and perceptions), leading to an error. Tone of voice and verbal cues from the interviewer can also influence telephone respondents. These errors are caused due to improper selection and training of the interviewers. Interviewers should be trained to remain neutral throughout in order to collect answers that are devoid of any influence by the interviewer. Cases of interviewer cheating have become another major cause of survey errors. This is particularly prevalent in door-to-door interviews, where the interviewer in order to save time or avoid asking sensitive questions, deliberately skips questions or fills in the answers to certain questions, resulting in wrong information. Some might even submit false reports of having visited the respondents. This can be checked by forewarning the interviewers that a small number of respondents will be called upon to confirm the authenticity of the answers and whether the interviewer visited them.

3.6.4 Respondent Error

Respondent error as the name suggests are those errors that are observed on the respondents' side. A survey requires the respondents' cooperation in giving answers that contain the correct information. In practice, it is very difficult to get the interviewees to cooperate with the interviewer or reveal their true opinions. Hence, the two common types of respondent errors that arise are non-response error and response bias.

3.6.4.1 Non-Response Error

It is very difficult for any survey to achieve a 100 % response rate. The statistical difference in results between a survey that includes only those who responded and a perfect survey that would also include those who failed to respond is known as non-response error. A non-response occurs when a person is not at home both at the time of preliminary call and the subsequent callback. This problem, rampant in mail and internet surveys, is also confronted in telephonic and door-to-door interviews. The number of 'no contacts' is on the rise with the increased usage of caller ID and answering machines. Refusals in telephonic, mail and face-to-face interviews are also prevalent and occur due to personal preference or due to the respondents being too busy with other important engagements. Fear is assumed to be the main reason behind people refusing to participate in a survey.[4] Concealing privacy and sensitive issues are among other reasons for refusing to participate in a

[4] See Ref. Sudman (1980).

survey. One way of measuring response bias is to compare the demographics of the sample with that of the target population. If a certain group of the population is underrepresented, then additional efforts are put into gather data from the underrepresented categories through personal interviewing rather than telephonic interviewing.

The success of mail surveys is dependent on the extent to which the respondent is involved in the survey. This is referred to as self-selection bias. Thus, a customer who has had good or bad experience with the service of any particular airlines is more prone to fill up a self-administered questionnaire on board or at the airport counter than a person who is indifferent about the airline's service.

3.6.4.2 Response Bias

A survey error that results from the inclination of people to answer a question falsely, either through deliberate misrepresentation or unconscious falsification is known as response bias. Thus, response bias can occur in two basic forms, that is, deliberate falsification and unconscious misrepresentation.

Deliberate Falsification: It might be difficult to reason out why people knowingly misrepresent or give false answers to questions when they are not certain about facts. But there are many reasons why this happens. People might tend to give false answers in order to appear intelligent or to conceal information they consider personal or embarrassing. Time pressure, social desirability bias, courtesy bias and uninformed response errors are among other reasons why a respondent would knowingly provide wrong information.

For example, a respondent might remember the number of times he visited a supermarket in the last 6 months, but he might not be able to exactly recollect which supermarkets he visited and how many times to each of them. Thus, rather than to say a clear cut 'Don't Remember', the respondents might provide details banking on their memory. Such responses are also prevalent in employee satisfaction surveys where the employees might conceal their true responses towards the efficiency of their unit or the supervisor. They put themselves in a safe situation thinking that revealing the truth might put them in a difficult situation. This type of respondent behaviour is the result of their urge to be perceived as person with opinions in close proximity to that of the average person.

Unconscious Misrepresentation: Unconscious misrepresentation is a situation where a respondent gives wrong or estimated information due to ignorance and forgetfulness even though he has no intention of doing it. Such situations can arise due to question format, content, etc. It might happen that respondents misunderstand a question and give a wrong or biased answer in the process. Prior inexperience to a subject or activity is also a reason why unconscious misrepresentation on the part of the respondent occurs. Some respondents may also consider it to be a prestige issue and try to answer every question thrown at them in the best possible way rather than admitting that they do not know the answer to a question. A response bias may also pop up when a respondent is taken aback by an

unexpected question by the interviewer. Thus, we see that there might be misrepresentation of answers consciously or unconsciously due to a number of factors. These factors are a by-product of different types of biases in the nature of the respondent such as:

Acquiescence Bias. It might arise from the respondent's inclination to be of the same/opposite mind as that of the interviewer and tend to say a 'yes' or a 'no' respectively to everything that the interviewer says.

Extremity Bias. These are individuals who either use extremes to answer questions, or who tend to remain neutral in all answers. But this depends on individual characteristics and differs from person to person.

Interviewer Bias. This occurs due to the interaction between the interviewer and the respondent, where the presence of the interviewer influences the respondent to give untrue or modified answers. The physical characteristics of the interviewer like facial expressions, age, gender, tone, etc. also play a role in inducing interviewer bias into the survey.

Social Desirability Bias. Social desirability is the tendency for respondents to give answers that are socially desirable or acceptable, which may not be accurate. A social desirability bias may occur either consciously or unconsciously to gain prestige or build a socially acceptable image. Information about educational qualification and salary might be overstated to gain prestige. Here, the respondent tries to create a favourable image or 'save-face' and prefers to give a socially desirable answer rather than the correct information.

3.7 Observation Methods

Unlike the methods discussed earlier, observation methods do not involve any verbal communication with the respondents. Observation methods involve recording the behavioural patterns of respondents without communicating with them. Some of the most popular observation methods used by researchers are discussed below.

3.7.1 Direct Observation

Direct observation is a method where the observer tries to gain an insight into the behaviour of a shopper in a tactful manner so as not to be noticed. This has applicability in studying merchandising effects in a supermarket and compliance to traffic rules by motorists. In tracking the behaviour of a shopper in a supermarket, the observer can either remain in a passive state as a silent observer (structured) or disguise himself as another shopper and engage in a shopping spree in close association with the subject (unstructured). In both the cases, the observer notes down certain specific behaviours related to the subject. This makes it possible for

the observer to find the appealing factors in the buying behaviour and service problems faced by the subject. This is a highly subjective task and requires the observer to record certain noticeable behavioural features useful for the study. It can often be a rapid and economical way of obtaining basic socio-economic information on households or communities.

Be it structured or unstructured, it is imperative for the observer to ensure that he is not identified; else it would lead to an alteration in the behaviour of the subject and introduce subject bias. Various ways that facilitate in direct observation are one-way mirrors and disguised and hidden cameras. However, while using one-way mirrors or hidden cameras, it should be ensured that there is no invasion into the privacy of the subject. Direct observations make it possible to identify the exact timing and length of continuation of an activity. There is instantaneous recording of the observations, which eliminates the necessity of having to recall later. This method is, however, prone to observer bias where the observer may wrongly assign a specific demographic characteristic to the subject.

3.7.2 Contrived Observation

An observation in which the subject under study is unaware of being scrutinized for specific behaviour is known as a natural observation. The subjects under study have little knowledge that they are being observed for specific behavioural aspects and demographic characteristics. This method uses more of a disguised observer who inconspicuously records the specific behaviour he has to scrutinize. This method of natural observation has little relevance for researchers who desire to analyse special behaviour, which may be rare among individuals operating in natural circumstances.

Here, in the concept of contrived observation, the subjects in this case have some advanced knowledge of being participants in the observation study. Although the subjects are aware of their involvement in the study, they still have no idea as to which aspects of theirs are being scrutinized and observed. However, it may be advantageous, the artificial setting and the awareness of the subject that he is being observed can bring in respondent bias.

A corollary concept to contrived observation is mystery shopping. Here, the main motive of the observer is to analyse the behavioural aspects of participants primarily, in the service sectors. The following are some situations, where this concept is used.

Pizza Hut claims to deliver orders for home-delivery within 30 min. The company may authorize any person to pose as a customer and place an order to observe the timeliness in the delivery process. Similar procedures can be applied to analyse the quality of service offered in hotels and banks.

An observer may desire to analyse the variety of responses that can be available to a set of questions. For example, an observer pretending to be an airline

passenger throws unnatural questions at an executive at the enquiry counter to notice and analyse the set of responses he gets in return.

3.7.3 Content Analysis

Written materials like advertising copies and news articles, and TV and radio programmes have many implicit and explicit meanings. Therefore, their content has to be thoroughly analysed for any mismatch or misrepresentation in communications. This is where the technique of content analysis comes into play. These written materials need to be analysed, based on words used, themes, characters and space, to enable the smooth flow of the intended communicational aspects. This helps the management to introduce the required changes in the communication process, as may be deemed necessary to generate a better response rate.

3.7.4 Physical Trace Measures

Physical trace measures refer to exposure to advertisements, computer cookie records, records of credit card usage and dirt on the floor to determine store traffic patterns. In other words, it is the process of looking systematically into the immediate surroundings for any evidence of human interaction with one another or the environment. This method usually helps in unravelling the space usage patterns of people. Two types of traces are observed and measured. They are:

- Erosion traces are shown by deterioration or wear and tear that provides a look at the usage pattern. This refers to the traces of selective wear and tear of certain parts or things in a space that shows evidence of being used.
- Accretion traces are a build-up of a residue or an interaction. Traces of lumps of dirt in close proximity reveal the piling up of shoes. Similarly, a number of glasses together reveal their use for drinking purposes.

3.7.5 Participant Observation

A process in which a researcher establishes a many-sided and long-term relationship with individuals and groups in their natural setting, for the purposes of developing a scientific understanding of those individuals and groups is known as participant observation. At the first look, it may seem as a process concerned with looking, listening, experiencing and recording the same. However, in reality, it is more demanding and analytically difficult. This method of observation requires the researcher to be involved in the day-to-day activities of the subjects or the social

settings that are under investigation. This involvement can be categorized into three types depending upon the degree of involvement of the researcher. These are as follows:

Complete participant: The researcher immerses himself fully in the activities of the group or organization under investigation. It supposedly produces accurate information, as the intensions of the researcher are not disclosed to the subjects or social settings under investigation and is least likely to guide researchers to enforce their own reality on the social world they seek to understand.

Participant as observer: The researcher in this case keeps the group informed about his intensions, but does not actively involve himself in the social settings.

Complete observer: The researcher is uninvolved and detached, and merely, passively records behaviour from a distance.

The presence of the researcher can cause some initial sparks of discomfort. Language and cultural dissimilarities can pose barriers in this method. This requires the researcher to negotiate access into the social settings after a thorough study of the power relations within the setting, the relations of people to their physical environment, as they perceive it, and the social openings and barriers. The compatibility of observation and interviewing in this method makes it highly flexible. Apprehensions about observations pave the road to questions that are later clarified during interviews to understand the significance of the observations. The interview in this case is highly unstructured.

3.7.6 Behaviour Recording Devices

Human observation is prone to deficiencies or errors. To overcome such errors, machine observers in the form of behaviour-recording devices are used. This sort of mechanical observation include

- On-site cameras in stores and at home for eye-tracking analysis while subjects are shopping or watching advertisements using coulometer to identify what the subject is looking at and pupil meters to measure how interested the viewer is.
- Electronic checkout scanners that record the UPC on the products as those used by A.C. Nielsen and INTAGE. These are used to record purchase behaviour of the subjects under investigation or in general (refer this chapter on 'Secondary and Syndicated Data').
- Nielsen People Meter for tracking television station watching (refer this chapter on 'Secondary and Syndicated Data').
- Voice pitch meters that serve to measure emotional reactions.
- Psycho galvanometer that measures galvanic skin response.

It may be easier for these machines to record the behaviour of the subjects, but measuring the precise level of arousal and reaction through them is questionable. Therefore, calibration and sensitivity is a limitation with the mechanical devices.

3.8 Part III: Causal Research Design

3.8.1 Causal Research Design: Experimentation

The basic aim of causal studies is to identify the cause and effect relationship between variables. For instance, studying the effect of price, advertising and marketing on sales comprise causal studies. It is therefore essential for researchers to have a thorough knowledge of the subject area of research. The basic premise of the causal relationship is that when we do a particular thing (cause), it gives rise to another thing (effect). It is highly impossible to prove a causal relationship scientifically. Researchers develop evidence to understand causal relationships. For instance, if researchers want to establish a relationship that good nutrition (cause) leads to intelligence (effect) among children, they should then be able to prove that good nutrition precedes intelligence.

3.8.2 Causal Relationships

The causal analysis is the process of determining how one variable influences the change in another variable. As far as business research is concerned, the cause and effect relationship is less explicit. Three types of possible relationships can arise between two variables—symmetrical, reciprocal and asymmetrical.

3.8.2.1 Symmetrical

A symmetrical variable is one in which two variables fluctuate together. However, it is assumed that the changes in either variable are not due to changes in the other. Symmetrical conditions usually occur when the two variables become alternate indicators of another cause or independent variable. For instance, the low attendance of youth in martial art clubs and active participation in discotheques and parties is the result of (dependent on) another factor such as lifestyle preferences.

3.8.2.2 Reciprocal

When two variables mutually influence or reinforce each other, we can say that there is an existence of a reciprocal relationship. For instance, a reciprocal relationship exists when a person goes through a particular advertisement, which leads him to buy that brand of product. Later, after usage, it consequently sensitizes the person to notice and read the successive advertisements of that particular brand or company.

3.8.2.3 Asymmetrical

Asymmetrical relationship exists, when changes in one variable (independent variable) are responsible for changes in another variable (dependent variable). There are four types of asymmetrical relationships,

(1) *Stimulus response relationship*. It represents an event that results in response from some object. For example, an increase in product price may lead to fewer sales.
(2) *Property–disposition relationship*. A property is the enduring nature of a subject, which does not depend on circumstances for its activation. A disposition is an inclination to respond in a certain way under certain circumstances. For instance, family status, age, gender, religion and so on can be considered personal properties. Attitudes, opinions, values, etc. are part of disposition. For property–disposition, examples include the effect of age on attitude with regard to savings, gender and its impact on attitude towards social issues, etc.
(3) *Disposition–behaviour relationship*. Consumption patterns, work performance, interpersonal acts, etc. are part of behaviour responses. Examples include a person's perception about a brand and its purchase, job satisfaction and productivity, etc.
(4) *Property–behaviour relationship*. The family life cycle and purchase of goods, social class and family saving patterns, etc. are some examples.

3.8.3 Experimental Designs

An experiment refers to the process of manipulating one or more variables and measuring their effect on other variables, while controlling external variables. The variable, which is manipulated, is called the independent variable and the variable whose behaviour is to be measured after experimentation is called the dependent variable. For instance, if a company wants to test the impact of advertising on product sales, researcher conducts the experiment by manipulating the advertising frequency to study its impact on product sales in a particular region. Here, the variable, which is being manipulated, is advertising, and therefore, it is the independent variable. The impact of change in advertising frequency on product sales is measured and analysed. Thus, a product sale is the dependent variable.

The aim of experimentation is to establish and measure the causal relationship between the variables studied. A well-executed experiment can depict the causal relationship between variables by controlling extraneous variables.

In this chapter, we will discuss the experimentation process. First, we will study various aspects to be considered by the researcher while conducting an experiment. Then, we will look at experimental validity and the threats to it. Later, we will move to experimental environments and the pros and cons of laboratory and

field experiments. Finally, the chapter ends with a brief note on different types of experimental designs that are widely used by researchers.

3.9 Issues in Experimentation

To make an experiment successful, a researcher has to take decisions regarding various aspects. There are four key issues a researcher has to consider while conducting an experiment. They are the following:

- Treatment of independent variable
- Experimental groups and control groups
- Selection and measurement of the dependent variable
- Control of extraneous variables.

Let us now discuss them in detail.

3.9.1 Treatment of Independent Variable

An independent variable is a variable over which the researcher is able to exert some control for studying its effect upon a dependent variable. Experimental treatment refers to the manipulation of the independent variable. For example, consider a company planning to test a change in package design in terms of its impact on product sales. To test the relationship between package design and sales, it has decided to expose customers to packs of three different designs, A, B and C. These packs are placed on the shelves of select outlets. The consumer's response is measured. Here, package design is the independent variable, which is manipulated, and there are three treatment levels (A, B and C) of the variable.

3.9.2 Experimental Groups and Control Groups

In a simple experiment, a researcher uses two groups—the experimental group and the control group. The *control group* is a group of test units that are not exposed to the change in the independent variable. The *experimental group*, on the other hand, is exposed to a change in the independent variable. In the package design example discussed above, a group of supermarkets (experimental group) are selected and each package design is displayed for a month. Another group of supermarkets (control group) continue to carry the regular package design for that particular period. Then, the sales of the product are measured in each case, and the difference between the measurement (sales) in the experimental group and the control group is analysed to determine whether the design change has affected sales.

3.9.3 Selection and Measurement of the Dependent Variable

Selection of the dependent variable and its measurement is another important decision the researcher has to take. The dependent or response variable is the variable whose behaviour is to be measured as a result of an experiment. Dependent variable is the variable that may change due to the manipulation of independent variable.

By using the same example of package designs, the sales volume of the product is considered as the dependent variable. Selecting a dependent variable may not be easy in all cases. For example, if a company wants to do research to evaluate the effectiveness of various advertising programmes, the dependent variables can be brand-image, brand awareness and product sales. The researcher has to select the dependent variable depending on the purpose for which the experiment is being conducted. Proper problem definition will help the researcher select the appropriate dependent variables.

3.9.4 Control of Extraneous Variables

Other extraneous variables, which influence the dependent variable, have to be controlled to determine the real effect of manipulation in the independent variable on the dependent variable. The presence of these variables in the experiment will put the researcher in dilemma as to whether the change in dependent variable is due to the change in the independent variable or due to extraneous variables. This is why extraneous variables are also called confounding variables. Researchers use various methods to control extraneous variables. They are randomization, physical control, matching, design control and statistical control.

Randomization is the most popular method to control extraneous variables. Randomization refers to the process of assigning test units randomly to experimental treatments and assigning experimental treatments randomly to test units. This process helps researchers to spread the effects of extraneous variables equally over the test units.

Another approach is to physically control the extraneous variables. This is achieved by keeping the level of extraneous variables constant throughout the experiment.

Another variant of the physical control approach is matching. In this method, the researcher adopts judgmental sampling to assign test units to both the experimental group and the control group. This ensures that both the groups (experimental and control groups) are matched in terms of characteristics of test units.

Design control is another approach to control extraneous variables. Selecting appropriate experimental designs to conduct the experiment helps researchers to control particular extraneous variables that affect the dependent variable.

Statistical control can also be used to control the effect of extraneous variables. Here, extraneous variables that are affecting the dependent variable are identified

and measured using appropriate statistical tools like analysis of variance. Then, the effects of extraneous variables on the dependent variable are adjusted statistically, cancelling out the effects of extraneous variables.

Exhibit 3.2 shows the required characteristics that a good experiment should have.

3.10 Experimental Validity

Validity is the extent to which a research process is accurate and reflects actual market conditions (i.e. it is free from systematic error). There are two types of validity that are considered in experimentation—internal validity and external validity. Internal validity measures to what extent the change in a dependent variable can be explained by the independent variable. External validity measures to what extent the inferences derived from experiments can be generalized to the real environment.

Adapted from ASQ Statistics Division Newsletter (2000)

Exhibit 3.2: Prerequisites for Conducting Experiments

There are certain characteristics that a good experiment should possess.

- The experiment's objectives need to be well defined. This means that problem definition, the independent variable(s) and their treatment levels, dependent variable, the experimental design and process should be clearly defined.
- The effect of independent variables should not be influenced by extraneous variables. The experiment needs to be designed in such a way that the influence of extraneous variables is minimized.
- The experiment should provide a measure of precision (experimental error), unless it is known from previous experimentation. Replications provide the measure of precision while randomization assures the validity of the measure of precision.
- The expected precision of the experiment should be sufficient to meet defined objectives. There generally is a trade-off between the expense of additional experimentation and the

3.10.1 Internal Validity

Internal validity refers to 'the approximate validity with which we infer that a relationship between two variables is causal or that the absence of a relationship implies the absence of cause'.[5]

[5] See Ref. Cook and Campbell (1979).

In other words, internal validity indicates to what extent the change in dependent variable in an experiment is caused by the manipulation of independent variable or due to extraneous variables. If extraneous variables have an influence on the dependent variable, then establishing the causal relationship between the dependent and independent variable becomes difficult. Any findings or conclusions drawn from experimentation in the absence of internal validity will be superficial and deceptive. Hence, while developing experimental research designs, researchers should take adequate care to include the influence of extraneous variables to improve the experiment's internal validity. Let us now examine six major types of extraneous variables that are sources of threat to internal validity. They are the following:

- History
- Maturation
- Testing
- Instrumentation
- Selection bias
- Statistical regression
- Mortality.

3.10.1.1 History

History here means something different from the general sense. History here refers to a specific event in the external environment that is historic (rare occurrence) in nature and occurs at the same time an experiment is being conducted. Such events may impact the dependent variables. Consider a situation where a company conducts an analysis to market new farm equipment in a south Indian state. If the major agricultural belt in that state is affected by flash floods, the results of the test will be influenced by this historic event. Similarly, an experiment aimed at assessing the impact of a new promotional campaign for a car may be influenced by the steep spurt in petrol prices due to a historic event like the Iraq war. An occurrence of an event, which is beyond the control of the researchers, will have an impact on the dependent variable (sales in this case).

3.10.1.2 Maturation

The maturation effect refers to the change in the test units, not due to the influence of independent variable but due to the passage of time. During the course of the experiment, people may become older, hungrier or tired. For example, if a pharmaceutical company is conducting drug trials on a sample of patients over a longer period of time, there may be some difference in the effect of the drug on patients due to physiological changes in them. This impacts the experiment's internal validity.

3.10.1.3 Testing

Another extraneous variable that affects experimental results is the testing effect. This refers to the subjects becoming alert when they are exposed to experimentation. For example, when employees are made to answer a questionnaire that tests their knowledge and skills before attending a training programme, they are alerted that they are being studied. This prompts them to pay more attention to the training modules. Thus, they obtain better scores in the test conducted after the training programme. Thus, there will be change in experimental results between the first test and the second test.

3.10.1.4 Instrumentation

A researcher can vary the measuring instrument used for pre-testing and post-testing to minimize the test effect. However, this may lead to the introduction of a new effect called the instrumentation effect. This refers to the effect on experimental results due to change in the measurement instrument, measurement values or the researcher's process of recording measurements during the course of the experiment.

For example, a researcher has to record observations from morning till evening. During the morning hours, the researcher will record observations enthusiastically and the measurements will be accurate. In the evening, due to fatigue, he or she may not show the same interest in recording the observations. Such an instrumentation effect will impact experimental results.

3.10.1.5 Selection Bias

Selection bias refers to improper assignment of respondents to treatment conditions. Selection bias occurs in two ways. One is the wrong selection of test units in experimental group. As a result, it does not represent the population from which the test units are drawn. Another is that test units assigned to experimental groups differ from test units assigned for the control group. The difference will result in selection bias. For example, a company may have included more heavy users of the product in the experimental group and moderate and light users in the control group. The outcome of the experiment may be favourable to the company as a result.

3.10.1.6 Statistical Regression

Statistical regression refers to the phenomenon where extreme values of the sample tend to converge near the mean value of the sample during the course of the experiment. This can be either positive extreme values or negative extreme

values. Consider an experiment aimed at ascertaining consumer perception on the customer service levels of a financial institution. In a pre-test measurement, some consumers may rate the customer service as highly exceptional, and some may rate it as very poor. However, in a post-treatment (a pilot launch of a new customer service initiative) measurement, these extreme scores tend to get closer to the mean of the sample. This is known as the statistical regression effect. This can be attributed to a continuous change in consumer attitudes. Thus, subjects who display extreme attitudes may change their perception during the course of the experiment. This will affect experimental results as the change in scores is due to statistical regression and not due to the treatment (a pilot launch of a new customer service initiative)

3.10.1.7 Mortality

Mortality effect refers to the loss of subjects or test units in experiments, thus affecting experimental results. Suppose an educational researcher is conducting an experiment on the impact of television viewing on IQ scores on 100 students. In the course of the experiment, 15 students have dropped out from the experiment. Such a reduction in subjects or test units may impact experimental results.

3.10.2 External Validity

External validity refers to the 'the approximate validity with which we can infer that the presumed causal relationship can be generalized to and across alternate measures of the cause and effect and across different types of persons, settings and times'.[6] External validity examines to what extent the experimental findings can be generalized to the population from which test units are drawn. We can infer from the definition that experiments that are conducted in natural settings offer a greater external validity compared with those conducted in controlled environment. So a field experiment provides greater external validity compared with a laboratory experiment.

Experiments are conducted either in a laboratory environment or a field environment. The former means the experiment is conducted under artificial conditions. Field environment refers to conducting an experiment in real conditions. Both these environments have their advantages and disadvantages. The researcher has to analyse which environment will suit his requirements.

[6] See Ref. Cook and Campbell (1979).

3.10.2.1 Laboratory Environment

Laboratory experiments refer to experiments conducted in controlled conditions. Examples include showing advertisements or products to select consumers in controlled conditions and blind taste tests.

Conducting experiments in laboratory settings have many advantages over field experiments. The primary advantage is that the conditions can be controlled. Thereby, the effect of extraneous variables on dependent variables can be minimized. A controlled environment is also effective in eliminating the history effect.

The isolation achieved in laboratory settings will also help researchers achieve similar results, if the experiments are repeated number of times with the same test units in similar conditions. Laboratory experiments, therefore, provide more internal validity.

As the test units and resources required for laboratory experiments are less, it also helps researchers conduct the experiment in shorter time and cost effectively. This is why companies conduct laboratory experiments during the initial stages of product development, as costs and risks associated with experiments can be minimized. Apart from cost-effectiveness, laboratory experiments also help a company to lessen the risk of information about products or ideas being passed on to competitors. The risk is more in field experiments.

However, there are some drawbacks in laboratory experiments. One is that laboratory experiments are conducted in artificial conditions, and the results may not hold up well in actual conditions (in the market). So these experiments provide less external validity.

Also, the results of laboratory experiments are influenced by the testing effect, where the test units are aware that they are being tested, and so may not respond naturally.

3.10.2.2 Field Environment

Field experiments refer to experiments conducted in natural settings. These include launching products in select regions, observing consumer behaviour regarding a POP display in supermarkets and analysing customer response to trial offers. As field experiments are conducted in natural settings, they have a high degree of external validity. The disadvantages in field experiments are that as the researcher has no control over external variables, these experiments will have a low degree of internal validity. Field experiments also require greater time and effort and are expensive.

3.11 Type of Experimental Designs

With the basic understanding of experimentation concepts that we have gained, let us now examine the various types of experimental design. Experimental designs are classified into four key categories—pre-experimental designs, true experimental designs, quasi-experimental designs and statistical experimental designs.

In pre-experimental designs, there is no proper control mechanism to deal with threats to internal and external validity. True experimental designs allow researchers to randomly select test units for experimental groups and also assign treatments randomly to the experimental groups. Quasi-experimental designs do not allow researchers to fully manipulate the independent variable but provide a limited flexibility in assigning the treatments randomly to experimental groups. Statistical experimental designs have statistical control mechanisms to control extraneous variables. Exhibit 3.3 describes the notations used in explaining experimental designs.

Let us examine each type of experimental design in detail in the following section.

3.11.1 Pre-experimental Designs

Pre-experimental designs lack proper control mechanisms to deal with the influence of extraneous variables on experimental results. There are three prominent pre-experimental designs used by business researchers. They are

- One-shot design (after only design)
- One-group pre-test–post-test design
- Static group design.

Exhibit 3.3: Notations used in Experimentation

Following are the common symbols used in the experimental research

X = exposure of a group to an experimental treatment or independent variable

O = observation or measurement of the dependent variable on the test units. O_1, O_2, O_3 … are the various observations or measurements of the dependent variable taken during the course of the experiment

R = random assignment of test units to experimental groups

EG = experimental group, which is exposed to the experimental treatment

CG = control group of test units involved in the experiment. However, this group is not exposed to experimental treatment

You need to note that the notation used in experimental designs assumes a time flow from left to right

3.11.1.1 One-Shot Design (After Only Design)

One-shot design involves exposing the experimental group to treatment X after which the measurement (O_1) of the dependent variable is taken. This can be shown symbolically as follows:

EG:	X	O_1

For example, a company may launch a sales promotion initiative in select supermarkets in a city for a month to ascertain the impact of sales promotion on sales. Then, it might measure the sales registered in that particular month. The higher sales may prompt the company to extend the sales promotion offers to other cities where it has a presence.

There are some drawbacks associated with this study. The test units are not selected randomly. Instead, their selection is based on the researcher's judgment.

The results might not reflect the experimental treatment's impact completely as various extraneous variables influence the dependent variable including history, maturation and mortality. As this study lacks proper control mechanisms to deal with extraneous variables, the internal validity of the experiment is affected. Moreover, we cannot infer results based on the measurement O_1, as there is no other measurement against which O_1 can be compared with.

Due to these limitations, one-shot design is not used for conclusive research. It is used more for exploratory research.

3.11.1.2 One-Group Pre-test/Post-test Design

This type of design involves exposing an experimental group of test units to experimental treatment (X). Measurements are taken before and after experimental treatment. This can be symbolically expressed as:

EG:	O_1	X	O_2

O_1 represents the measurement of the dependent variable before the experimental group is exposed to the treatment. O_2 represents the measurement of the dependent variable after the experimental group is exposed to the treatment. So the difference between O_1 and O_2 will be the impact of treatment on the dependent variable. For example, an HR manager may plan a training programme for employees and measure the productivity change. First, he may measure the productivity of employees. Then, the training programme will be conducted. After the training, employee productivity is again measured.

However, just like the one-shot design, this experimental design too lacks proper control mechanisms to limit the influence of extraneous variables. These include history, maturation, testing effect, statistical regression effect, selection bias and mortality effect.

3.11.1.3 Static Group Design

In static group design, two groups of test units, the experimental group and the control group, are involved in the experiment. The experimental group is exposed to the experimental treatment. The control group is not exposed to the experimental treatment.

The measurements are taken for both groups after the experiment. This can be symbolically expressed as follows:

EG:	X	O_1
CG:		O_2

We may note that O_1 is the measurement of the dependent variable of the experimental group after exposing it to the treatment and O_2 is the measurement of the dependent variable of the control group, which is not exposed to the treatment. The difference between these two measurements, that is, $O_1 - O_2$ will be the effect of treatment.

Various extraneous variables do influence experimental results—primary being selection bias. The non-random selection of test units may result in differences between the units assigned to the experimental group and the control group. Another extraneous variable that will influence the results is the mortality effect. Some test units may drop out from the experiment. This is more so for the experimental group if the treatment is strenuous.

3.11.2 True Experimental Designs

As discussed earlier, true experimental designs use randomization to control the influence of extraneous variables. Randomization refers to the assignment of test units to either experimental groups or control groups at random. Such selection of test units will reduce the differences between the groups on whom the experiment is being conducted. Apart from the use of the randomization technique, true experimental designs also use one or more than one control groups to reduce the effect of extraneous variables.

Following are prominent true experimental designs widely used in business research:

- Pre-test/post-test control group design
- Post-test only control group design
- Solomon four group design.

3.11.2.1 Pre-test/Post-test Control Group Design

In this design, two groups of test units, that is, experimental group and control group are considered for the experiment. The test units are assigned to these two groups randomly. Pre-test measurements of dependent variable are taken for the two groups. Then, the experimental group is exposed to the treatment. The post-test measurements of the dependent variable are taken for the two groups. It can be shown symbolically as below:

EG:	R	O_1	X	O_2
CG:	R	O_3		O_4

O_1 and O_2 are the pre-test measurement and post-test measurement of dependent variable of the experimental group. R represents that the assignment of testing units to each group is done on a random basis.

O_3 and O_4 are the pre-test and post-test measurement of dependent variable of the control group. We know that the control group is not exposed to experimental treatment.

The treatment effect (TE) can be calculated as follows:

$$TE = (O_2 - O_1) - (O_4 - O_3)$$

For example, a fertilizer company is launching a new fertilizer. To test its efficacy, the company has decided to conduct an experiment. For this, it has divided an agricultural field into a few parts. These parts are randomly assigned to the experimental group and the control group. Then, the pre-test measurements (productivity) of the fields are taken. The parts in the experimental group are treated with fertilizer and the parts in the control group are not exposed to the fertilizer treatment. The post-test measurements are taken. The differences between the pre-test and post-test measurements are analysed.

This design addresses most of the extraneous variables. Hence, it provides accurate results. However, this design may not control the testing effect. This is because pre-test measurements are taken, and such measurements will sensitise test units. This may have an impact on post-test measurements.

3.11.2.2 Post-test-Only Control Group Design

In this design, both the experimental and control groups participate in the experiment. The first is exposed to the experimental treatment and the second is kept unexposed. The post-test measurement of the dependent variables is taken for both groups. This can be shown symbolically:

EG:	R	X	O_1
CG:	R		O_2

The treatment effect (TE) can be obtained as follows:

$$TE = (O_2 - O_1)$$

To illustrate, a personal product company has claimed that the use of its new hair oil formulation will reduce hair fall by 50 % compared with other hair oils. To support this claim, the company has conducted an experiment by randomly assigning consumers who use a competing coconut oil brand to both the experimental group and the control group. The experimental group consumers are provided with the company's hair-oil formulation for 6 months, while the control group continues to use the competing hair-oil brand. Measurements are taken after 6 months.

This type of design will address most of the extraneous variables.

3.11.2.3 Solomon Four-Group Design

This type of design involves conducting an experiment with four groups, two experimental groups and two control groups. Six measurements are taken, two pre-test and four post-test. This study is also known as the four-group, six-study design. The design can be symbolically represented as follows:

EG:	R	O_1	X	O_2
CG:	R	O_3		O_4
EG:	R		X	O_5
CG:	R			O_6

Though the design addresses all extraneous variables, it is expensive and consumes time and effort. The design provides various measures, which can be analysed

They are:

$O_2 - O_1$
$O_4 - O_3$
$O_2 - O_4$
$O_6 - O_5$

3.11.3 Quasi-Experimental Designs

Quasi-experimental designs are used when it is not possible to assign test units randomly to experimental treatments or assign experimental treatment randomly to test units. In such cases, quasi-experimental designs help control extraneous variables, though not as effectively as true-experimental designs. It is better than pre-experimental designs. Prominent quasi-experimental design used by researchers is time-series design.

3.11.3.1 Time-Series Designs

In time-series designs, a series of measurements are taken before and after the test unit is exposed to the experimental treatment. This can be symbolically represented as follows:

EG:	O_1	O_2	O_3	X	O_4	O_5	O_6

Time-series designs are used for experiments performed over a longer period. For example, if a company wants to determine the impact of price changes on the sales of a product, the company takes a series of observations before the price is changed and trends are identified. Then, another series of observations are taken after changing the price. The trends after the treatment (post-price change) are compared with trends before the treatment (pre-price change) to determine whether they are similar or not. If there is an increase in sales levels after the price change, the researcher can conclude that the treatment had a positive effect on the dependent variable.

However, these experiments may not give absolutely accurate results. This is because of threats to internal validity. The history and instrumentation effects are key threats to internal validity. The simultaneous occurrence of events like boom or bust in global economy, or any calamity might affect experimental results. Another threat is the instrumentation effect, where there can be change in measurement units or the process followed by researcher to make measurements.

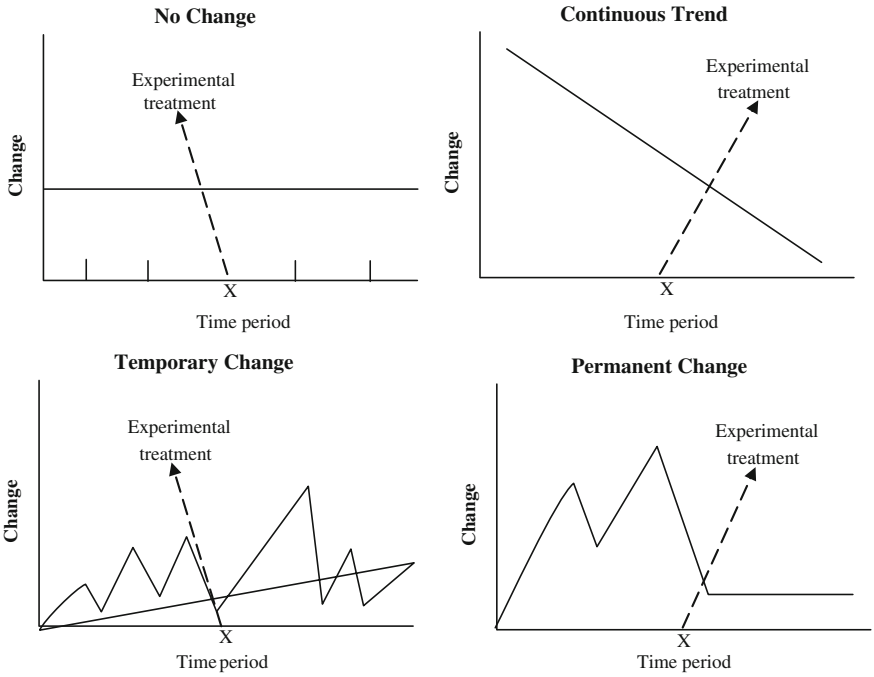

Fig. 3.6 Time series results. Adapted from Zikmund (2003), p. 281

The advantage of time-series design is that it aids in identifying permanent trends and temporary trends. This helps to design long-term and short-term business strategies. Various patterns that emerge from time-series experiments are shown in Fig. 3.6.

3.11.4 Statistical Designs

Unlike pre-experimental and true experimental designs, statistical designs aid in measuring the effect of more than one independent variable. Using these designs will help researchers to conduct a single experiment to analyse the effect of more than one independent variable, instead of conducting a series of experiments for each independent variable. It is also helpful in isolating the effects of most extraneous variables, thereby providing better experimental results. Four prominent experimental designs in this category are

- Completely randomized design
- Randomized block design
- Latin square design
- Factorial design.

Let us discuss each of these in detail.

3.11.4.1 Completely Randomized Design

Completely randomized design is used when the researcher has to evaluate the effect of a single variable. The effects of extraneous variables are controlled using the randomization technique. The key difference between completely randomized design and other statistical experimental designs is that the latter use the 'blocking' principle, which completely randomized design does not.

This design involves randomly assigning test units to treatments. For example, there are '*n*' test units and '*k*' experimental treatments. Then, the '*n*' test units are assigned to '*k*' treatments randomly. Later, the post-test measurements are evaluated.

This can be shown symbolically:

EG_1:	R	X_1	O_1
EG_2:	R	X_2	O_2
EG_3:	R	X_3	O_3

EG_1, EG_2 and EG_3 are three experimental groups, which are exposed to various experimental treatments.

X_1, X_2 and X_3 are three experimental treatments assigned to experimental groups.

For example, a researcher at a pharmaceutical company plans to evaluate the efficacy of a weight loss drug made by a particular company. For this, the researcher has selected a sample of 40 consumers. These consumers are assigned randomly to two treatment levels, 25 consumers to treatment 1 and 15 to treatment 2. Consumers under treatment 1 are asked to take the drug for 1 month. Consumers with treatment 2 are not given any drug. After the experiment, measurements are taken for both groups. Differences, if any, are analysed to see whether the drug is effective in weight control.

CBD has some drawbacks. The design is applicable only when test units are homogeneous. It can be used only in situations when a single variable is being evaluated. Another drawback is that this design can be used only when extraneous variables can be controlled.

3.11.4.2 Randomized Block Design

Randomized block design is used when the researcher feels that there is one major extraneous variable that will influence experimental results. In this design, the test units are blocked or grouped based on the extraneous variable, which is also called the blocking variable. For example, a company is testing the effect of price change on the sales of a product, and it has identified that advertising is a major influencing variable. In such cases, advertising is considered an extraneous variable. The

Table 3.2 Example for randomized block design

	Store type		
Price change	Drug stores	Supermarkets	Hypermarkets
Rs 10	Store 1	Store 6	Store 7
Rs 12	Store 3	Store 2	Store 8
Rs 14	Store 4	Store 5	Store 9

experimental group and the control group are matched according to the extraneous variable (advertising, in this case), ensuring that the effect of the extraneous variable is distributed equally to both groups. To illustrate further, a consumer products company wants to examine the impact of price change on the sales for its newly developed health drink. The company has decided to conduct the experiment using three different price levels Rs 10, Rs 12 and Rs 14, in nine retail outlets, namely Store 1, Store 2, Store 3, Store 4, Store 5, Store 6, Store 7, Store 8 and Store 9. The company has identified that the store type will also influence the product sales. For instance, drug stores may register higher sales compared with supermarkets and hypermarkets. Therefore, we can apply RDB in such situations. The retail outlets are segregated according to store type. Store 1, Store 3 and Store 4 are drug stores, Store 6, Store 2 and Store 5 are supermarkets and Store 7, Store 8 and Store 9 are hypermarkets. Then, treatment levels (price) are assigned randomly to each test unit (retail outlets).

This is shown in Table 3.2.

Using this design, two effects can be determined, the *main effect* and the *interaction.* The main effect refers to the average effect of a particular treatment on the dependent variable, regardless of extraneous variables. The interaction effect refers to the influence of the extraneous variable on the effect of treatment. In this example, the main effect is the direct effect of price change on the product sales. This can be achieved by determining the average impact of each treatment on each block. The interaction effect is the influence of the store type on the effect of price change. This can be obtained by determining the customer response to each price change for each store type.

3.11.4.3 Latin Square Design

Latin square design is used in situations where the researcher has to control the effect of two non-interactive external variables, other than the independent variable. It is done through the blocking technique as used in random block design. For example, a researcher wants to examine the impact of three different ads on sales. However, the researcher feels that pricing and income levels of consumers will also impact sales. So researcher wants to isolate the effect of the two extraneous variables—pricing and consumer income levels.

In this design, the blocking or extraneous variables (pricing and income levels) are divided into an equal number of levels and so is the independent variable (advertising programs). The table is then developed with levels of one extraneous variable representing the rows and levels of the other variable representing the

Table 3.3 Example for Latin square design

	Income levels		
Pricing levels	Low income	Middle income	HIGH income
Rs 10,000	Ad-B	Ad-A	Ad-C
Rs 12,000	Ad-C	Ad-B	Ad-A
Rs 14,000	Ad-A	Ad-C	Ad-B

columns. The levels of the independent variable (or treatments) are exposed to each cell on a random basis so that there should be only one treatment in each row and column. Then, the treatment effect is determined. Based on the results, it can be analysed which treatment level influences the dependent variable more.

In the advertising program example, we have created a 3 × 3 table where each extraneous variable has three blocks and so does the independent variable. The advertisements programmes that are to be tested are Ad-A, Ad-B and Ad-C. The pricing levels are Rs 10,000, Rs 12,000 and Rs 14,000. The income levels are low-income, middle-income and high-income groups. In the table, income levels are represented in columns; the pricing levels are represented in rows. The advertising programmes Ad-A, Ad-B and Ad-C are assigned to each cell. Table 3.3 depicts this.

However, there are some assumptions in this design. It assumes that there is negligible or no interaction effect between the two extraneous variables. As a result, we cannot examine the interrelationships between pricing, income levels and the advertising programmes. Another assumption is that the number of levels of all three variables are equal.

The Latin square design has some drawbacks. The assumption that all variables should have the same number of levels (the two extraneous variables and the independent variable) is not possible in all cases. So, in situations, where any of the variables does not have the same number of levels as that of the other two variables, this design is not valid.

This design also assumes that there is no interaction effect between the extraneous variables. Interaction effect refers to the measurement of the amount of influence the level of one variable has on another variable. The interaction effect exists between two variables when the simultaneous effect of two variables is different from the sum of the individual effects of both the variables. In situations, where there are inter-relationships between the variables, this design cannot be applied.

3.11.4.4 Factorial Design

Factorial design overcomes the drawbacks of the Latin square design regarding the interaction effect. It can be used in cases where there is interrelationship between the variables. Factorial designs are used to examine the effect of two or more independent variables at various levels.

Table 3.4 Example for factorial design

In-store promotion variable	Pricing variable		
	Rs 50	Rs 60	Rs 70
POP-display	C	A	F
Trial packs	D	E	B

Factorial design can be depicted in tabular form. In a two-factor design, the level of one variable can be represented by rows and the level of another variable by columns. Each test unit is assigned to a particular cell. The cell is exposed to a particular treatment combination randomly. This design enables a researcher to determine the main effect of each independent variable as well as the interaction effect between them.

For example, a market researcher plans to study the effect of in-store promotions on the sales of a product and the impact of price change too. The researcher has decided to use two types of in-store promotions—POP display and trial packs, and three price levels—Rs 50, Rs 60 and Rs 70. Six stores, namely A, B, C, D, E and F, have been selected for the experiment.

Using factorial design, we can develop Table 3.4, with rows containing in-store promotions variable and columns containing pricing variable. We assign test units (supermarkets) to each cell randomly. The test unit (supermarket) in each cell is then exposed to a particular treatment combination (see Table 11.3). So supermarket A is exposed to POP-display and Rs 60 price level and supermarket B is exposed to trial packs and Rs 70 price level. Post-test measurements are taken. The outcome of this experiment can help the researcher to understand three key aspects:

- The impact of pricing on the sales of a product
- The impact of in-store promotions on the sales
- The sales-effect interrelations between in-store promotions and pricing.

3.12 Questions

1. In an experimental design, the primary goal is to isolate and identify the effects produced by the…

   a. Dependent variable
   b. **Extraneous variable**
   c. Independent variable
   d. Test unit

2. An experiment has high… if one has confidence that the experiential treatment has been the source of change in the dependent variable.

   a. **Internal validity**
   b. External validity
   c. Internal and external validity
   d. Internal and external reliability

3. Which of the following is a threat to internal validity of an experimental design

   a. Maturation
   b. Interaction of setting and treatment
   c. **Interaction effects of pre-testing**
   d. Reactive effects of experimental design

4. Which of the following effect in internal validity occurs when test units with extreme scores move closer to the average score during the course of the experiment

   a. **Statistical Regression**
   b. Selection bias
   c. Maturation
   d. Instrumentation

5. Which of the following statement is incorrect with respect to 'An experimental design is a set of procedures specifying

   a. **How to test units (subjects) are divided into homogeneous sub samples**
   b. What independent variables or treatments are to be measured
   c. What dependent variables are to be measured
   d. How the extraneous variables are to be controlled

6. Randomization of test units is a part of…

   a. Pre-test
   b. Post-test
   c. Matching
   d. **Experiment**

7. A characteristic that distinguishes true experiments from weaker experimental designs is that true experiments include

   a. **Random assignment**
   b. Matching
   c. Repeated measurements of the dependent variable
   d. Random sampling

References

ASQ Statistics Division Newsletter (2000), vol 19(issue 2)
Beri GC (1989) Marketing research, 1st edn. Tata McGraw-Hill, New Delhi
Cook T, Campbell D (1979) Quasi experimentation: design and analysis issues for field settings. Houghton Mifflin Company, Boston
Sudman S (1980) Improving the quality of shopping centre sampling. J Mark Res 17:423–431
Zikmund WG (2003) Business research methods, 7th edn. Thomson South-Western, Singapore, p 281