



BA IN MARKETING MANAGEMENT

*COURSE MATERIAL FOR
MARKETING RESEARCH (Mktm2043)*

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CHAPTER 1: INTRODUCTION TO MARKETING RESEARCH

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1.0 Aims and Objectives

After you study this Chapter, you will be able to explain:

- what marketing research is
- types of marketing research
- characteristics of good marketing research
- ethical consideration in marketing research

1.1 Introduction

At one time, businesses were small, customers were few, and markets were mostly local. Suppliers and customers were in almost daily, close personal, contact. Bargaining was done face-to-face. The market place was the hub of economic and social life.

With large-scale industrialization and vastly improved methods of transportation and communication, entrepreneurs looked further afield for customers to buy their products. Today, technologies are dispersed over the world. New centers of production have been set up for motor cars, electronics equipment and many other products that were once viewed as the prerogative of the developed counters.

Inevitably, the gap between producer and final consumer has indeed: some firms are in danger of losing touch with the actual needs of their customers, particularly if they are thousands of miles away.

One of McKinney's leading marketing consultants has stated vigorously that in today's turbulent trading conditions; firms should build up a comprehensive and dynamic knowledge base about their markets and those who consume their products. Modern communities are knowledgeable experienced and increasingly in complexity and sophistication. New patterns of consumption are rapidly developing, often associated with the newer industries, such as computers, electronics, telecommunications, petrochemicals, pharmaceuticals as well as an ever-expanding range of financial health, leisure and other specialized services.

The management of the commercial, industrial, and many other kinds of organization which make up the mixed and advanced economies of countries seems to grow increasingly difficult as each year passes. Without valid and reliable information, management decision making would soon degenerate into some crazy game of chance. Hence, a systematic approach to the task of management is increasingly important in today's complex environment. One of the prime functions of management is to make decisions. Marketing decisions are peculiarly difficult to make and their effects are felt throughout a business and; indeed, entire industries whose products were once world famous and are now no more.

Marketing as a separate business, identifiable management function evolved from the business philosophy that recognized the importance of the customer. To be successful in the new competitive atmosphere, the needs of the customers had to be satisfied. This re-orientation of business activities demanded a more analytical and systematic approach, founded on an assessment of customer requirements, with the objective of maximizing net profits by providing customers with products and services that really fulfilled their particular needs.

Without reliable data, management cannot be expected to plan and execute all the many activities necessary for the production and distribution of a range of products involving, perhaps many months or even years of expensive development.

Managerial experience and judgment are of course, important ingredients of decision making, but they should be reinforced and expanded by objective data from systematic field investigation. This disciplined approach should appeal particularly to those working in technical and industrial markets, where rigorous standards of performance are demanded from the products and services developed.

Today management decision frequently carries considerable risks, and it is clearly prudent for management to do everything possible to minimize these. Marketing research is a fact-finding process, logical and essential for successful marketing, and adaptable to the requirements of firms and other types of organizations that aim to attract the support of customers, clients, patrons, patients, or donors. To serve, every organization has to be able to offer acceptable goods and services which satisfy the identified needs of specific kinds of people, industries, and firms. As Drucker observed 40 years ago, “Whatever a manager does he does through making decisions... management are always a decision-making process ... The important and difficult job is never to find the right answer, it is to find the right question. He goes on to say that management is essentially concerned with performance, not with accumulating knowledge for its own sake.

Marketing research should be viewed as a form of applied research that, while imposing on its parishioners the rigorous and discipline of scientific enquiry has a pragmatic purpose. Without this scientific orientation, marketing research would have little validity. It would deteriorate into subjective and biased assessment of market behavior. Hence, an objective posture and systematic methods of enquiry are vital constituents of marketing research. It has partly defined in terms of the attitude of disinterest and impersonality one must take toward the outcomes of scientific investigation ... science deals with the unembroidered fact rather than with opinion and belief.

1.2 Meaning of Marketing Research

There have been several attempts to define marketing research, and some confusion has been caused by the term ‘market research’ being rather freely used to describe the full range of activities properly covered by marketing research.

*1. The American marketing Association (AMA) has defined the term marketing **research as:***

- ***“Marketing research is the systematic gathering, recording, and analyzing of all facts about problems relating to the marketing of goods and services.***

2. The British institute of management has defined the term marketing research as:

- ***The objective gathering, recording, and analyzing of all facts about problems relating to the transfer and sales of goods and services from producer to consumer.***

3. According to Philip Kotler

Marketing research is a systematic problem analysis, mode building and fact-finding for the purposes of improved decision making and control in the marketing of goods and services.

4. The marketing research society, the leading British professional body defined as:

“Market research is the means used by those who provide goods and services to keep themselves in touch with the needs and wants of those who buy and use those goods and services”

1.3 Areas of Marketing Research

The area of marketing decisions is wide. It covers product design, pricing, distribution and promotion. It acknowledges the fact that there are many variables affecting marketing activities which cannot be controlled by suppliers to a market. These environmental variables, such as the demographic structure of the population, economic conditions, legal restrictions competitors’ activities, and the shifting tastes dictated by fashion, cause marketing decisions to be complex and difficult to make.

Every organization must make marketing decisions of some kind. Frequently, these involve large capital expenditure on the building and equipping of a new plant. Marketing decisions may result in the redirection of the resources of a business into entirely new markets, or in exploiting new technologies which have been developed by research laboratories.

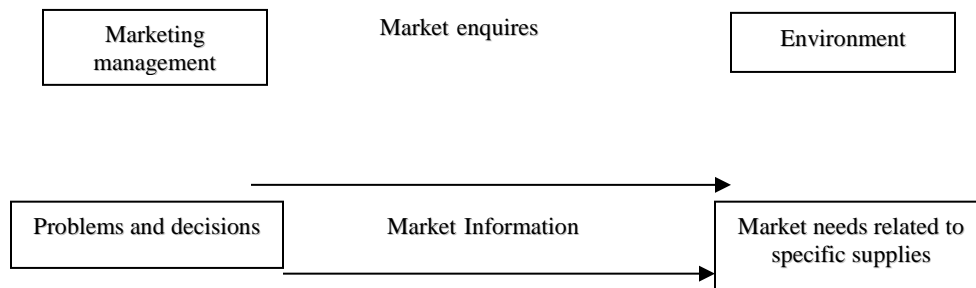
Market research enables producers of goods and services to design and deliver these products according to the informed preferences of the final consumers and so reduces the risk of costly production mistakes being made through poor market intelligence.

Statistical information can be gathered on the market in general, and also on particular segments that may be important, which will reveal the market standing of manufactures relative to this competitors. Analysis indicates the general trend in that market, to be compared with the movement in special areas of the market, and to the sales trends of individual supplier. The trend, evident in certain market segments may be markedly different from the overall market movement. Market research attempts to isolate these phenomena and to explain the causes underlying them.

Information for marketing decision making may be broadly classified as: (i) strategic (ii) tactical (iii) Data bank. The first type refers to information needed for strategic decisions, eg. whether to enter a specific overseas market or to diversify into new markets; the second type relates to information for tactical decisions such as planning of sales territories the third type provides essential background knowledge about, for example, competitors’ activities, market trends etc.

Marketing management information has a two-way flow. From the organization to the environment (i.e., market), and from the environment to the organization; the principle of feedback is an essential element. In rapidly changing market conditions, it is imperative for management to have an up-to-date knowledge, to be aware of the entry of new, competitive products and services, and to be able to plan ahead for emerging trends in taste. The following figure shows a two-way flow of marketing information system.

Figure 1.1 Two-way flow of marketing information system



Marketing management should, for instance, obtain a fundamental understanding of the structure of the market in which it operates or plans to enter. Management should be aware whether it is relatively simple – where only a few producers and buyers are involved or complex where many buyers and sellers are active and the product has diverse applications as with some industrial

supplied. Analysis of market structure should be perused into its constitute sectors and sub-sectors, so that the characteristics of specific types of demand are fully grasped. Underdeveloped protections of macro-demand are insufficient guides to effective marketing research.

Marketing research, as noted when discussing formal definitions of this activity, should result in thorough and detailed knowledge about all aspects of the marketing of goods and services. Following are the main division of a marketing research: product research, sales and distribution research, customer research, pricing research, promotion research, and service research.

1.3.1 Product Research

This is concerned with the design, development, and testing of new products, the improvement of existing products, and the forecasting of likely trends in consumers' preferences related to styling product performance quality of materials, etc.

Comparative testing with competitive products should be undertaken to assess realistically the values of comparative goods, particularly as perceived by customers. Included in these evaluations will be pricing studies. Strength and weaknesses need to be objectively identified across specific attributes such as quality, shelf life, ease of handling, pack acceptability, etc. The essence of handling, pack acceptability, etc. the essence of marketing research is objectivity, so any attempt to judge enquires should be strongly resisted.

The product line should be examined to ensure that it is adequate to attract custom, but also it must be economic, so that marketing efforts are not being wastefully dispersed over too wide a range, some of which may not be making an effective contribution to overall profitability. The product mix should also be analyzed, particularly with reference to competitive products, as mentioned earlier, which some products – both consumer and industrial – efficient after sales services should be carefully assessed, particularly where technical products or durable consumers' goods such as television sets or washing machines are concerned.

1.3.2 Sales and Distribution Research

Selling activities and distribution arrangements are clearly closely linked, so research is, almost inevitably, likely to embrace both functions in which some degree of overlap occurs. However, for purposes of discussion, they will be considered separately.

Sales research involves a thorough examination of the selling activities of the company. This is usually made by sales outlets and/or sales territories, and preferably analyzed so that direct comparisons can be made either published data referring to the particular industry and its products. The effectiveness of the sales force should be examined. The distribution of territories, method of operations system of remuneration, field supervision and training, all require careful analysis and assessment.

Distribution research involves not only evaluating a company's selling arrangements in relation to its competitive opportunities, but also thoroughly identifying and appraising alternative methods of distribution.

Distribution research must be constantly alert to the many changes that, in a few years have made shopping more a family expedition than it has ever been: colluder's play areas, changing rooms, snack bars, and even recreational facilities, have added to the motivation to go shopping. Many years ago a highly success stores chief told his staff never to forget that retailing had much to learn from show business people visited stores to be entertained as well as to buy goods, and if they were made to feel good, then they were more likely to become customers.

1.3.3 Customers Research

This covers investigations in to buying behavior – studying the social, economic, and psychological influences affecting purchase decisions whether these are taken at the consumer level, the trade distributional level or in the industrial field.

The complex pattern of buying influences affecting consumer purchasing is outlined in the following figure.

Consumer research, as far as retail products are concerned, includes consumer surveys to study the opinion and behavior of ultimate users of the products. This may involve national enquires using formal questionnaires with a sample carefully selected to be representative of the total

population in that consumer class. It may also cover a series of “depth influences” to analyze the motivation of people in certain buying situations.

1.3.4 Pricing Research

All businesses have to make decisions about the pricing of their goods and services. Pricing is one of the critical actors affecting business success. It is also one of the variables in the ‘marketing mix’. The fundamental inputs into a business deal, that have been termed the four Ps (Product, Price, Place, and promotion). These inputs are necessarily interrelated and an effective blend is at the heart of successful marketing.

Pricing can be approached both analytically and creatively. Costs form the plat form on which price is built and these must be known. But equally important is knowledge about the nature of demand, the level of competition, technological development that may lead to substitute materials, etc.

Pricing can be used effectively to position a product relative to competitors’ offerings. This suggests that some reliable information should be collected about competitive products specifically related to market segments. Price is an indicator of quality as well as an economic fact. Products should be analyzed for the benefits which they offer buyers, and ideally, these should have been developed from objective knowledge of the expectations of certain types of buyers or users.

1.3.5 Promotion Research

This is concerned with testing and evaluating the effectiveness of the various methods used in promoting a companies product. These activities include exhibitions, public relations campaigns, merchandising aids such as show cards and point of sales stands consumer and trade advertising, special promotional offers; etc. The variety of media available in most developed communities – television press and magazine, radio, poster, exhibition, etc. And the wide choice of media within each of these classifications makes the task of selecting the most suitable media difficult in practice so many variables affect purchasing decisions that only in very few cases can the real sales effectiveness of advertising be known with certainty.

1.3.6 Service Research

Advanced economies depend increasingly on the service industries for this efficiency and overall trading positions. The shift from growing crops to making products and their to offering services is a phenomena of what sometimes been termed the second industrial revolution.

The growth of a service economy reflects a relatively healthy society which has the major proportion of its employment in the territory or service sector. The health, education and welfare services are essential constituents of the 'mixed economy' in which public sector services and private enterprise industry and commerce work together to produce the national economic wealth.

The banking management consistency, legal insurance, and technologically based services play a progressively important role in every day life and contribute involving to the prospective of the nation. In many cases it is difficult, if not futile, to attempt to separate the value of service, from the satisfaction given by the ownership or use, of a particular product. Indeed, the very fact of selling is a service function linking buyer and product. The more sophisticated on economy becomes the greater is its dependency on the service industries.

1.4 Types of Marketing Research

Despite the difficulty of establishing an entirely satisfactory classification system, it is helpful to classify marketing research project on the basis of fundamental objectives of the research. Consideration of the different types, their applicability, their strengths and their weaknesses will help the student to select the type best suited to a specific problem.

I. On the basis of the outcome of the research: Whether the research tries to solve a particular problem or makes a general contribution to the knowledge, research can be

a) Fundamental Research:

Fundamental research is also called academic or basic or pure research. Such research is aimed at investigating or search for new principles and laws. *It is mainly concerned with generalization and formulation of a theory. Fundamental research is organized only for the attainment of knowledge and truth. With change of time and space, it is necessary to make a change in the*

fundamental principles in every branch of science; thus, this type of research also verifies the old established theories, principles and laws.

In general, fundamental research is concerned with the theoretical aspect of science. In other words it studies the laws of nature, without or regardless of the immediate application of its findings.

- E.g. The relationship between crime and economic status is an example of pure (academic) research.
 - Darwin Theory of Evolution
 - Newton's Law of Motion
 - Einstein Theory of Relativity

b) Applied research

A research aimed at finding a solution for an immediate problem facing a society, a group or industry (business organization). *The results of such research would be used by either individuals or groups of decision-makers or even by policy makers. While pure research discovers principles and laws, applied research discovers their application in solving some social, economic or any other problems.*

E.g.

- The improvement of safety in the working place
- The reduction of wastage in the working places is example of applied research.

II. On the basis of the purpose (The reason why a research is conducted) it can be-

a) Exploratory research (Pilot Survey)

It is also called preliminary research. As its name implied, such research is **aimed at discovering, identifying and formulating a research problem and hypothesis**. When there are few or no studies that can be referred such research is needed.

b) Descriptive Research

The main purpose of such research is **description of the state of nature or affairs, as it exists at present**. In social science and business research we often use the term **ex-post facto research**

for descriptive research. The main characteristic of such research is that the researcher has no control over the variables; he can only report what has happened or what is happening.

E.g.

- **What is the absentee rate in a particular office?**
- **What is the qualification of different groups of employment?**
- **Frequency of shopping**
- **Preferences of people**

Ex-post facto studies also include attempts by researchers to discover causes though they cannot control the variables.

Goals of Descriptive research

- ✚ To provide an accurate profile of a group
- ✚ To describe a processes, mechanism or relationship
- ✚ To provide a verbal or numerical picture about a phenomenon
- ✚ To find information to stimulate new explanations
- ✚ To present basic background information on a context
- ✚ To create a set of categories or classify types
- ✚ To document information that contradicts prior beliefs about a subject

c). Analytic research

Analytical research on the other hand, goes beyond simple description of the state of nature. When a researcher encounters an issue that is already known and have a description of it, you may begin to **ask “why” things are the way they are.**

Analytical research uses facts or information already available, and analyzes them to make a critical **evaluation of the material**. Not only describe the characteristics, but also it analyzes and explains **why and how it happened or is happening**. The information or facts used here can be either Qualitative or Quantitative.

Goals of analytical research

- ✚ To determine the accuracy of a principle or a theory
- ✚ To find out which competing explanation is better

- ✚ To advance knowledge about an underlying process
- ✚ To link different issues or topics under a common general statement
- ✚ To build and elaborate a theory so it becomes more complete
- ✚ To extend a theory or principle into new areas or issues
- ✚ To provide evidence to support or refute an explanation or prediction

E.g.,

- How can we reduce the numbers of complaints made by customers?
- How can we expand the range of our services?
- How can we improve the delivery times of our products?

Case studies

Case study is a type of analytical research in which a researcher examines many features of a very few *elements in-depth over duration of time*. Case can be individual, group, organization, movement, events, or geographic units. The data in case study are usually more detailed, varied and extensive. Mostly data involved are qualitative data about a few cases. In a case study a researcher may **intensively investigate one or two cases or compare a limited set of cases focusing on a several factors**.

Tracer Study

Tracer study is also known as **follow up study**. It is a type of explanatory research that aims at **investigating the subsequent development of individuals after a specified treatment or condition**. Tracer study is used to make an investigation on the direction of movements and predicts what is likely to take place to the future. Tracer study is designed to establish patterns of change in the past in order to predict future patterns or conditions by analyzing data collected about subjects and environment. Common example of such study is that a researcher may conduct a tracer study of the former graduates of the Faculty of Business and Economics to know

- Whether all of the graduates are employed or absorbed by the labor market
- Whether there is a mismatch between the training graduates received and the type of jobs they are handling

- Whether there is a new environmental trends that justify the need of change

d) Predictive research

Such research goes beyond explaining why and how things happened. It predicts (forecast) the possible (probability of happening similar situation in other places. **It tries to explain about the probability of happening similar thing in the future.**

E.g.,

- How would an increase in interest rate affect our profit margin?
- What type of packaging will improve the sales of our products?

III. On the basis of the process of research: That is, on the basis of data used in the research process research can be

a) Qualitative research:

Such research is applicable for phenomenon that cannot be expressed in terms of quantity. Things *related to quality and kind. Research designed to find out how people feel or what they think about a particular subject or institution is an example of such research.*

b) Quantitative research

Qualitative research is on the other hand is concerned with qualitative phenomenon. It is based on the **measurement of quantity or amount. It is applicable for phenomenon that can be expressed in term of quantity.**

IV. On the basis of the environment in which the research is carried out research can be

a) Field research

It is a research carried out in the field. Such research is common in social science, agricultural science, history and archeology.

b) Laboratory research

It is a research carried out in the laboratory. These are commonly experimental research.

Such researches are common in medical science, agriculture and in general in natural sciences.

V. On the basis of the time required to complete the research, research can be

a) One -time research; It is a research limited to a single time period

b) Longitudinal research

Such research is also called on-going research. It is a research carried out over several time periods.

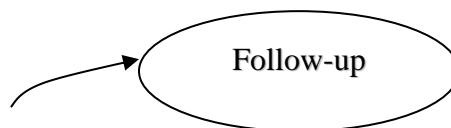
1.5 The Marketing Research Process

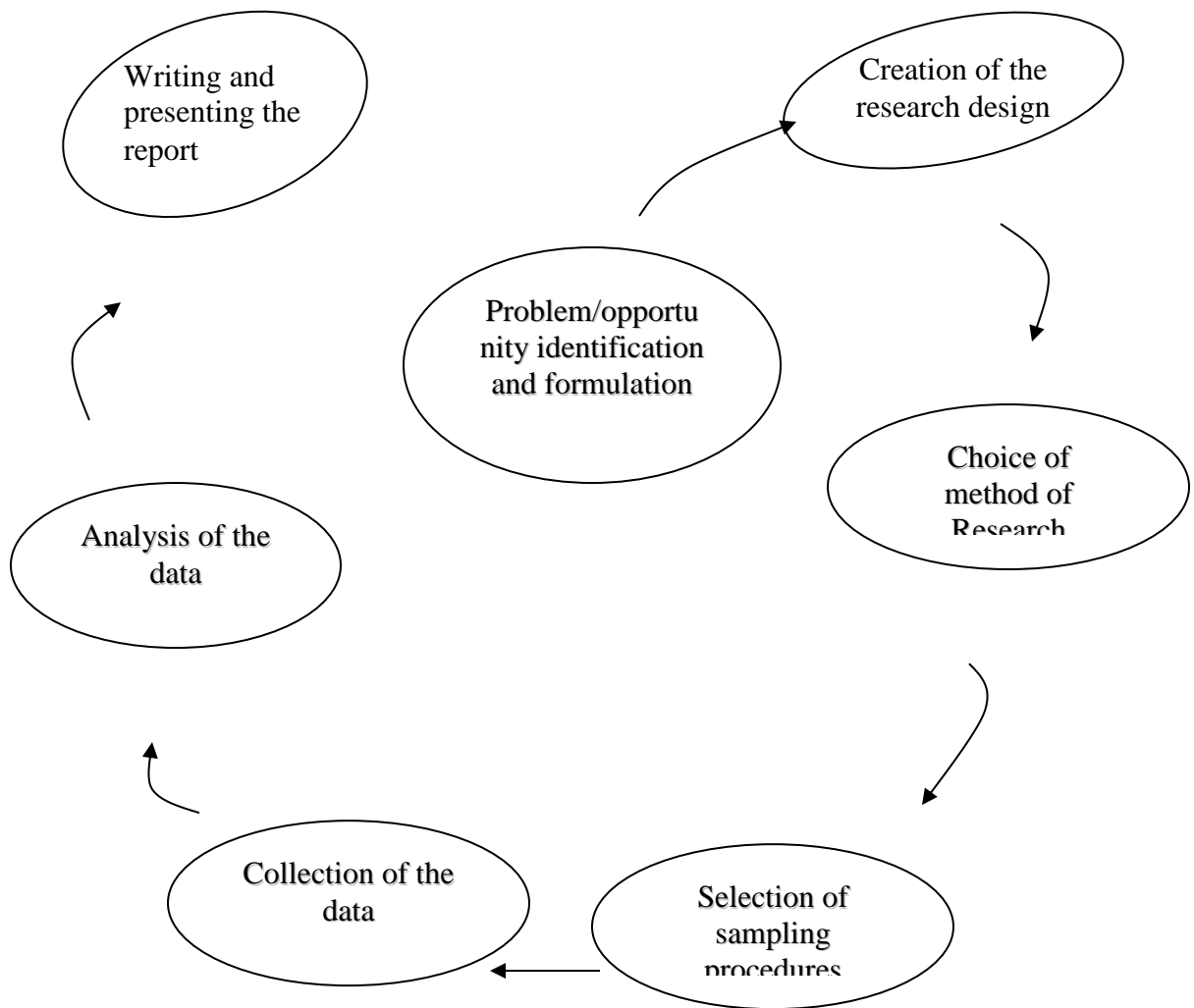
The research process begins with the recognition of a marketing problem or opportunity. As changes occur in the firm's external environment, marketing managers are faced with the questions. "Should we change the existing marketing mix? If so, how? Marketing research may be used to evaluate product, promotion, place (distribution), or pricing alternatives. In addition, it is used to find and evaluate new market opportunities.

The research process builds a foundation for the remainder of the text. The process begins with the recognition of a marketing problem or opportunity.

Once a problem has been sensed, the marketing researches come into the picture. The first responsibility of the researcher, whether from an internal staff or outside consulting firm, is to work with the marketing manager to precisely define or in cover the problem whose symptoms have been observed. Certainly, no area of marketing research requires more insight and creativity than the process of problem definition. It is the first step in arriving at a solution. It is also the most critical part of the marketing research process. Proper definition of a problem also provides a guidance and direction for the entire research process. Truly, a well defined problem is "half the battle" of conducting research.

Figure 2.2 The Marketing Research Process





1.5.1 Definition of the Research Objectives

The culmination of the problem/opportunity formulation process is a statement of the research objectives. These objectives are stated in terms of the prices information necessary and desired to solve the marketing management problem. Well formulated objectives serve as a road map in developing the research project. They also serve as a standard which enables managers to evaluate the quality and value of the work were the objectives met and do the recommendations flow logically from the objectives and the research findings? Objectives must be a specific and unambiguous as possible. Remember that the entire research effort in terms of time and money is geared toward achieving the objectives.

Research objectives are basically a restatement in research terms of what management needs to know to make a decision. Often researchers state research objectives in the form of a hypothesis. A hypothesis is a conjectural statement about a relationship between two or more variables that can be tested with empirical data. Hypothesis are tentative statements that are considered to be plausible given the available information. A good hypothesis will contain clear implications for testing stated relationship.

1.5.2. Creating the Research Design

The research design is the plan to be followed to answer the research objectives or hypotheses. In essence, the researcher develops a structure or framework to solve a specific problem. There is no single, best research design. Instead, the investigator faces an array of choices, each with certain advantages. Ultimately, tradeoffs are typically involved. A common tradeoff is between research costs and the quality of decision –making information provided.

Generally speaking, the more precise and error free the information obtained, the higher the cost. Another common trade of is between time constraints and the type of research design selected. In summary, the researcher must attempt to provide management with the best information possible subject to the various constraints under which he or she must operate.

- **Descriptive Studies:**

The researcher's first task is to decide whether the research will be descriptive or casual. Descriptive studies are conducted to answer who, what, when, where and how questions. Implicit in descriptive research is the fact that management already knows or understands the underlying relationships of the problem area.

- **Casual Studies:**

A variable is simply a symbol or concept that can assume any one of the set of values. In casual studies the researches investigates whether one variable causes or determine the value of another variable. A dependent variable is a variable expected to be predicted or explained. An independent variable is a variable in an experiment that the market researcher can to some extent, manipulate, change or alter. An independent variable in a research project is a presumed cause of

the dependent variable, the presumed effect. For example, does the level of advertising (independent variable) determine the level of sales (dependent variable).

Descriptive research can tell us that two variables seem to be somehow associated, such as advertising and sales, but cannot provide reasonable proof that the high levels of advertising cause high sales. Because descriptive research can shed light on association or relationships, it helps the researcher in selecting variables for casual study.

A casual study might involve changing one independent variable (for example, the number of direct mailing over a six-month period to target customers) and then observing the effect on the dependent variables (sales). Given that the sales go up when the number of promotional mailings are increased, there is an appropriate casual order of events – the effect follows closely the hypothesized cause. This sequence of events is called temporal sequence. The concept of temporal sequence is one criterion for casualty that must be met.

A second criterion for casualty is concomitant variation. The degree to which a cause (direct-mail promotion) and effect (sales) occur together or vary together is called concomitant variation. If direct-mail promotions are considered a cause of increased sales, then when the number of direct-mail promotions goes up, sales should go up, and when the number of promotion falls, sales should fall. If, however, an increase in direct-mail promotions does not result in an increase in sales, the researcher must conclude that the hypothesis about the relationship between the increase in direct-mail promotions and sales is not correct.

The third issue of casualty is to recognize the possibility of spurious association. This means that other variables might possibly cause changes in the dependent variables. The ideal situation would be one in which the researcher demonstrates that there is a total absence of other casual factors. In the real world of marketing research, it is very difficult to identify and control all other potential casual factor.

The researcher may lower spurious associations by holding constant other factors that could influence sales, for example, prices, newspapers and television advertising coupons, discounts, and dealer inventory levels. Alternatively, the researcher may look at changes in sales in similar socio economic areas.

1.5.3 Choosing a basic method of Research

A research design, either descriptive or casual, is chosen according to a projects objectives. The next step is to select a means of gathering data. There are three basic research methods: survey, observation and experiment. Survey research is often descriptive in nature, but can be causal. Experiments are almost always casual, whereas observation research is typically descriptive.

i) Survey

Survey research involves an interviews interacting with respondents, either in person or by mail, to obtain facts, opinions, and attitudes. A questionnaire is used to provide an orderly and structured approach to data gathering. Face-to-face interviews may take place within the respondent's home, in a shopping mall, or in a place of business.

ii) Observation

Observation research is a research that monitors respondents' actions without direct interaction. The fastest growing form of observation research involves the use of case registers with scanners, which read tags with war codes to identify the item being purchased.

iii) Experiments

Experiments are the third method researchers use to gather data. An experiment is a research in which the investigator changes one or more variables – price, package, design, shelf space, advertising them, or advertising expenditures – while observing the effects of those changes on another variable (usually sales). The objective of experiments is to measure causality. The best experiments are those in which all factors are held constant except the ones being manipulated.

2.3.2.4. Selecting the sampling procedures

The sample is actually part of the research design but is a separate step in the research process. A sample is a subset from a larger population. Several questions must be answered before a sample is selected. First, the population or universe of interest must be defined. This is the group from which the sample will be drawn. It should include all the people whose opinions, behavior, preferences, attitudes, and so on will aid the marketer's decision making.

A probability sample is characterized by every element in the population having a known non-zero probability of being selected. Such samples allow the researcher to estimate how much sampling error is present in a given study.

Non probability samples include all samples that cannot be considered probability samples specifically; any samples in which little or no attempt is made to ensure that a representative cross section of the population is obtained can be considered a non-probability sample. The researchers cannot statistically calculate the reliability of the sample: that is, they cannot determine the degree of sampling error that can be expected.

1.5.4 Collecting the Data

Most data collection is done by marketing research field services. Field service firm, found throughout the country, specialize in intervene for data collection on a subcontract basis. Typical research study involves data collection in several cities and requires working with a comparable number of field service firms. To ensure that all subcontractor do everything exactly the same way, detailed field instructions should be developed for every job.

Besides interviewing, field service firms provide group research facilities, mail intercept locations, test product storage, and kitchen facilities to prepare test food products.

1.5.5. Analyzing the Data

After the data have been collected the next step in the research process is data analysis. The purpose of this analysis is to interpret and draw conclusions from the mass of collected data. The marketing researcher may use techniques beginning with simple frequency analysis and ultimately culminating to complex multivariate techniques.

1.5.6. Preparing and Writing the Report

After completing the data analysis, the researcher must prepare the required to present both written and oral reports on the project. When preparing and presenting these reports, the researcher should keep in mind the nature of the audience. The report should begin with a clear, concise statement of the research objectives, followed by a complete, but brief and simple, explanation of the research design or methodology. A summary of major findings should come

next. The report should end with a presentation of conclusions and recommendations for management.

1.5.7. Follow up

After a company has spent a considerable amount of effort and money conducting marketing research and preparing a report, it is important for the findings to be used. Management should determine whether the recommendations were followed and why or why not. One way to help ensure that the research will be used is to minimize conflict between the marketing research department and other departments.

1.6 Characteristics of a Good Research

Research means obtaining information about a subject so that you know something that you did not know before. Research is a process which enlists the assistance of the scientific method in solving puzzling problems and resolving unanswered questions. Research provides an analytical framework for subject-matters of investigation. It establishes the relationship between different variables – the independent and dependent. It involves collection of data from primary and secondary sources and expresses them in the way conducive to decision makers.

All thoughts and communication concept is a bundle of meanings or characteristics associated with certain events, objects, conditions, situations and the like. It is created by classifying and categories objects or events that have common characteristics beyond the single observation source.

Good research uses the scientific method of approach in bringing about good results. The following are the characteristics of the research.

- i) The purpose of the research should be clearly defined while avoiding ambiguity. That is, the statement of the research problem should include analysis in its simplest elements, its scope and limitations, and precise specifications of the meanings of all words significant to the research.

- ii) The research procedures used should be described in a sufficient detail. To permit another researcher to revise and continue with the research. It should reveal the sources of data and the means by which they were obtained.
- iii) The procedural design of research should be well planned to give the maximum results. That is:
 - a) When sampling the population for instance, the report should incorporate the representatives of the sample.
 - b) Questionnaire may not be used when more reliable information can be extracted from secondary sources.
 - c) Bibliographic searches must be done thoroughly
 - d) Experiments should have satisfactory controls.
- iv) The researcher should report with complete honesty, problems encountered in procedural designs and their effect on the findings. Because, some of the imperfections may have little effect upon the validity and reliability of the data; others may invalidate it entirely
- v) The method of analysis should be appropriate and significant. That is,
 - a) The probability of error should be indicated when statistical methods are applied
 - b) The probability of error should be indicated when statistical methods are applied
 - c) The validity and reliability of data should be checked properly.
- vi) A good research is warranted by the experience of the researcher, his reputation and integrity.
- vii) Conclusion should be confined to those justified by the data of the research.

In summary, a good research must possess the following points: Research begins with a question in the mind of the researcher; the problem should be properly identified and should be stated clearly by avoiding vague terms. Research should be properly planned. Research should focus on

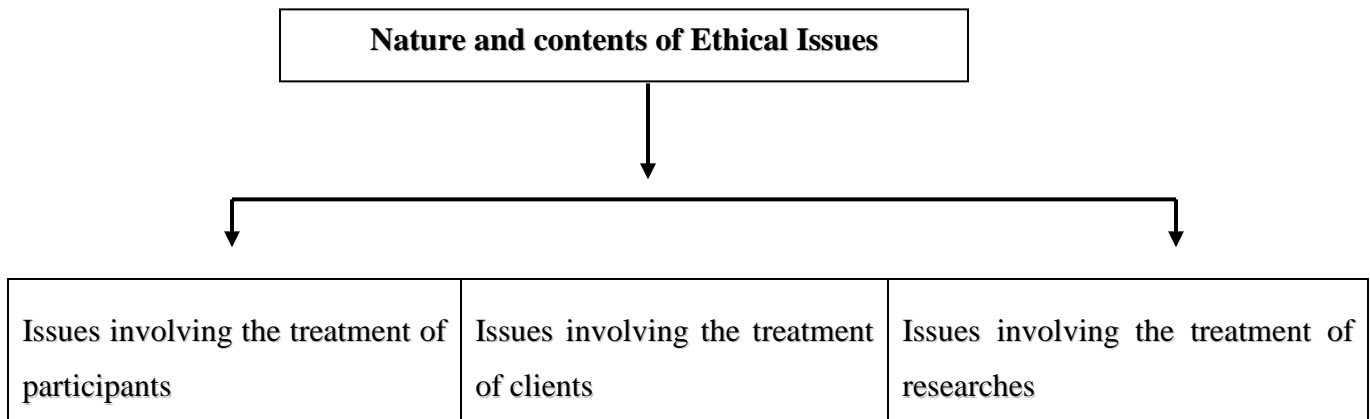
the main problem. Research seeks direction through appropriate hypothesis. Research deals with facts; etc.

1.7 Ethical Issues in Marketing Research

Over the past two decades the use and impact of marketing research has been one of the tremendous growth. There has been a general consensus that marketing research exerts a significant influence over our marketing and social systems, for information gleaned from research efforts has led to increasing a consumer’s ability to make better choices and to widening the range of choices. For instance, through the use of marketing research, one can determine what information or knowledge consumers lack in the buying process and thereby supply the appropriate information so that they can make a wise purchase. Although through research efforts one can learn what needs are insufficiently satisfied, then marketers can introduce new products and services to satisfy these needs. In fact, some view a product advance as making an important contribution to a valued lifestyle increasing the range of choice and standard of living. Thus marketing research allows consumers to express their needs and interests which are then converted into marketing action.

However, during the rapid rise of a research as a form of marketing intelligence researchers have been forced to examine and scrutinize the ethical aspects of their activities. In fact, few issues in marketing research have become as sensitive as ethical standards and practices. In most dictionaries and in common usage, ethics is typically associated with morality, and both concern matters of right and wrong. The following figure depicts the structuring of an ethical issue.

Figure 1.2 Structuring of an ethical issue



<ul style="list-style-type: none"> • Purpose should not be to sell merchandise • Anonymity must be protected • Ultraviolet ink • Hidden tape recorders • One way mirror • Fake long distant calls • Right to safety • Right to be informed • Right to privacy • Right to choose 	<ul style="list-style-type: none"> • Methods used results should be accurately reported • Confidentiality • Unqualified researcher • Proprietary information • Unnecessary Research 	<ul style="list-style-type: none"> • Should not provide insignificant conclusions that are inconsistent with date. • Should not solicit designs and deliver to another for execution • Exercise request • Availability of funds
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1.7.1 Ethical Issues Involving the Treatment of Respondents/Subjects

The AMA code addresses the areas knowing participants:

- a) The activity must be research and not have as its real purpose the sales of merchandise to the respondent with regard to this issue, the Federal Trade commission has spent considerable effort in controlling the practice of selling under the presence of research by issuing cease and desist orders to numerous firms.
- b) If it has been agreed to or promised, the participants’ anonymity must be protected.

Also, if revealing their survey responses would injure the participants in any way, adherence to this norm becomes even more important. A respondent may be considered anonymous when the researches cannot identify a given response with a given respondent.

However, these two aspects just scratch the surface of ethical issues pertaining to participants. Some insights into the ethical prospective were given in one of the study. In this study a series of questions posed in which parishioners where to approve or disapprove the action.

The study indicated that there was a fairly strong disapproval in the use of ultraviolet link, hidden recorders, and one-way mirrors, but strong approval in the use of fake-long distance calls and fake research firms. One should use caution in interpreting the result of the study. The researcher cautions in his report that responses often reflect what a person think is “acceptable” to society or peers when in reality he or she may respond in ways considered unacceptable. That is, people tend to respond in “normative” ways to questions about ethics.

In a recent article, it was argued that participants in marketing research studies have not been subject to high enough ethical standards by researchers. Using codes from the sociological and psychological professional associations, they have suggested that participants should have the following rights.

i) Right to Choose

Subjects have the freedom to choose whether or not to participate in a study. The researchers should make the subject aware of this right. In the same vein, the subject should be given enough information so that he or she can decide whether to participate.

ii) Right to Safety

This includes the protection of the subject’s anonymity as well as protection from psychological and physical harm. Researchers rarely conduct studies that are likely to result in physical harm.

iii) Right to be Informed

The subjects have a right to be informed of all aspects of the research. However, there are instances where complete knowledge is likely to bias data. Therefore, information may be withheld until the data are collected. Then a debriefing should follow to provide subjects with information about the study. Also, subjects have, if desired, a right to be informed of the research findings.

iv) Right of Privacy

Of all the ethical issues related to marketing research activities, the right to privacy seems to be one of the most critical. Basically, we are talking about intrusion on an individual's solitude, or his seclusion. Marketing research often represents an intrusion in to the lives of people. Interviewers knock on the door or the arrival of a questionnaire in the mail signals the beginning of an activity that the respondent has not requested and one that may require a significant amount of his or her time and effort. Such participates in marketing surveys or an experiment represents a disruption in the respondent's regular activities.

1.7.2 Ethical Issues in the Treatment of Buyers/Clients

The AMA code of ethics discusses three areas in which researchers have obligations to their clients:

1. The methods used and the results obtained must be accurately represented.
2. The identity of the survey sponsor and/or the ultimate client for whom the survey is being done as well as the information obtained will be held in confidence.
3. Research should not be undertaken for competitive clients when such studies would jeopardize the confidential nature of client/researches relationship.

However, there are additional issues of concern

v) Confidentiality

There will be times when the researches will have intimate knowledge of a client's operations in the natural conduct of a project. The client using a researches and/or research firm has the right to expect that what is revealed to the researches as part of the project is confidential.

vi) Unqualified Researches

If a client requests research that is beyond the expertise of the researches or the research organization, ethics obligate the researches to indicate that the project requires methodology and/or techniques that are outside the area of his or her expertise.

vii) Proprietary Information

The client has the right to expect that any data generated for a project, and the interpretation and conclusions from those data, are the exclusive property of the client.

viii) Unnecessary Research

A physician and a lawyer are ethically prohibited from prescribing unwarranted medicine and/or treatment or legal action. The research industry does not have an ethical postulate on this issue. The unethical researches could profit from recommending a project that is economically and problematically unjustified.

1.7.3 Ethical Issues Relating to the Treatment of Researchers

Discussions of research ethics have emphasized primarily the researchers' obligations to subjects and clients. However, there have been many instances in which researchers have been victims of questionable practices by clients. In any discussion of ethical behavior, we should therefore, discuss the rights of researchers. The AMA's code of ethics addresses two aspects relating to users' obligations.

1. The first of these obligations is that the users shall not knowingly disseminate conclusions that are inconsistent with or not warranted by the data. Misstatements or misrepresentations of findings in promotion are the most common breach of this ethic. The distortion of results not only misleads the audience but is potentially damaging to the researches and the firm as well.

1. It is unethical for users to solicit unique designs or concepts not commonly available and then to deliver it to another researches for execution. Researchers regard these techniques as being proprietary and rightly so. Another possibility is that the client will utilize the information obtained from proposals and incorporate the researcher's ideas to protect that will be carried out by his or her own staff. Others include.

i. Excessive Requests

The contract signed by both parties usually enumerates the obligations of the researches to the client. However, the client often makes unreasonable demands on the researcher.

ii. Reneging on Promises

Another problem that can arise once the project is underway is that the client may have promised the researcher access to certain data, such as sales and cost data. However, when the time comes to supply such information, the client does not provide what was originally agreed upon. This aspect makes it difficult for the researcher to complete the project as promised in the original agreement, and if it is finished, the conclusion would be suspect without the needed data promised by the client.

iii. Availability of Funds

There is an obligation to give bidders for a particular project some idea of any budget constraints, without such an idea as to the availability of funds, the researcher may develop a proposal that may be out of line if the client has a maximum budget that would only be enough to conduct a project on a much smaller scale. In this case, the client would be wasting the researcher's time and efforts if the budget constraints were not known beforehand.

1.7.4 Code of Ethics

The American Marketing Association, in furtherance of its central objective of the advancement of science in marketing and in recognition of its obligation to the public, has established these principles of ethical practice of marketing research for the guidance of its members. In an increasingly complex society, marketing management is more and more dependant upon marketing information intelligently and systematically obtained. The consumer is the source of much of this information seeking the cooperation of the consumer in the development of information, marketing management must acknowledge its obligation to protect the public from misrepresentation and exploitation under the guise of research. The field interviewers who are the point of contact between the profession and the consumer will also find guidance in fulfilling these vitally important roles. Members of the American Marketing Association will be expected to conduct themselves in accordance with the provision of this code in all of this marketing research activities.

A) For research users, practitioners, and interviewers

1. No individual or organization will undertake any activity which is directly or indirectly represented to be marketing research, but which has as its real purpose to attempted sale of merchandise or services to some or all of the respondents interviewed in the cause of the research.
2. If a respondent has been led to believe, directly or indirectly, that he is participating in a marketing research sunny and that his anonymity will be protected, his name shall not be made known to anyone outside the research organization or research department or used for other than research purpose.

B) For Research Practitioners

1. There will be no intentional or deliberate misrepresentation of research methods or results. An adequate description of methods employed will be made available upon request to the sponsor of the search. Evidence that field work has been completed according to specification will, upon request, be made available to buyers of the research.
2. The identity of the survey sponsor and/or the ultimate client for whom a survey is being done will be held in confidence at all times unless this identity is to be revealed as part of the research design. Research information shall be held in confidence by the research organization or department and not used for personal gain or made available to any outside party unless the client specifically authorizes such release.
3. A research organization shall not undertake marketing studies for competitive clients when such studies would jeopardize the confidential nature of client-agency relationship.

C) For users of Marketing Research

2. A user of research shall not knowingly disseminate conclusions from a given research project or service that are inconsistent with or not warranted by the data.
3. To the extent that there is involved in a research project a unique design involving techniques, approaches, or concepts not commonly available to research practitioners the prospective user of research shall not solicit such a design from one practitioner and delivers it to another for execution without the approval of the design originator.

D) For Field Interviewer

1. Research assignments and materials received, as well as information obtained from respondents, shall be held in confidence by the interviewer and revealed to no one except the research organization conducting the marketing study.
2. No information gained through a marketing research activity shall be used directly or indirectly, for the personal gain or advantage of the interviewer.
3. Interviews shall be conducted in strict accordance with specifications and instructions received.
4. An interviewer shall not carryout two or more interviewing assignments simultaneously unless authorized by all contractors or employees concerned.

Check Your Progress

1. Discuss in brief the characteristics of a marketing research?

2. Explain in brief the types of a marketing research?

3. Explain in brief the areas of a marketing research?

4. What is code of ethics? Explain

Chapter Two: Formulation of Research Problems and Hypotheses

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2.9.3 Difficulties in the formulation of Hypothesis

2.9.4 Source of Hypothesis

2.9.5 Forms of Hypothesis

2.0 learning Objectives

After you study this Chapter, you will be able to explain:

- what research problem is?
- the steps in formulating a research problem/topic
- the sources of research problem
- the criteria of a good research problem
- how to formulating and stating the problem
- research hypothesis

2.1 Introduction

Dear students, can you distinguish between problem and research problem?

Research forms a cycle; it starts with a problem and ends with a solution to the problem and a possible implication for future research. Perhaps the most important step in the research process is selecting and developing the problem for research. A problem well stated is a problem half solved. Many students, far along in their research, find that their research

problems are too long, indefinite, trivial or not really researchable. These and many other hazards are likely to stem from poorly selected and stated problems.

2.1. What is Research Problem?

A research problem is any significant, perplexing and challenging situation, real or artificial, the solution of which requires reflective thinking. It is the difficulty experienced by the researcher in a theoretical or practical situation. A research problem is the situation that causes the researcher to feel apprehensive, confused and ill at ease. It is the determination of a problem area within a certain context involving the, who, what, where, when and the why of the problem situation.

Elements of a research problem: the elements of research problems are

1. Aim or purpose of the problem for investigation. This answers the question ‘why’ why is there an investigation, inquiry to study.
2. The subject matter or topic to be investigated. This answers the question what.
3. The place/local where the research is to be conducted. This answers the question where? Where the study to be conducted?
4. The period or time of the study during which the data are to be gathered. This answers the question when.
5. Population/universe from whom the data are to be collected. Answers the question who or from whom.

Examples of research problems: to determine the performance of Micro and small scale enterprises in Tigray region during the year 1995-2002 E. C.

- ✓ Aim or purpose-to determine the status/performance
- ✓ Subject matter-MSE
- ✓ Place-Tigray region

- ✓ Period-period 1995-2002
- ✓ Respondents-implied

2.2 Necessary Conditions for Formulation of Research Problems

We can list some of the conditions that experience has proved to be conducive to the formulation of significant research problems.

I. Systematic Immersion in the subject Matter through First-hand Observation.

The researcher must immerse himself thoroughly in the subject-matter area within which he wishes to pose a specific problem. For example, if the researcher was interested in the general area of juvenile delinquency, it would serve him well if he visited remand homes, juvenile centers, juvenile courts, the families of the delinquents and the locality where the incidence is high. This process is known by various names, e.g. Pilot survey, preliminary survey, or exploratory study.

II. Study of Relevant Literature on the subject

The researcher must be well equipped to experience some difficulty or challenge to be able to pose a problem. This in turn would depend upon the researcher being well-conversant with the relevant theories in the field, reports and records etc. This is also an aspect of exploration.

III. Discussions with persons having rich practical experience in the field of study.

This is often known as an experience survey, which again is an exercise at exploration. Administrators', social workers, community leaders, etc. are persons who have a rich practical experience in different fields of social life.

2.3 Steps in Formulating a Research Problem/Topic

There are several steps to follow in formulating a Research problem

1. *Identify broad fields of study.* In which area are you most interested? E.g. Management, Logistics, Accounting, Economics or Marketing
2. *Dissect the broad area into sub-areas,* E.g. HRM, Motivation, and Leadership
3. *Select the sub-areas* which you are most interested within the subject by considering your knowledge, time, budget...etc
4. *Raise research questions* in questionnaire or interview guides.
5. *Formulate research objectives:* Research objectives are drive from research questions. Research objectives and research questions are the same except the way they are written.
 - Research questions are written in the form questions.
 - Research objectives are written in the form of affirmative statement by using action-oriented words, such as “to examine, “to ascertain”, “to measure”, “to investigate” etc.
6. *Assess objectives-* evaluating the objectives in the light of the time, budget, technical and professional expertise about the subject and other related resources.
7. *Double check-* go back and make sure that you have sufficient interest, time, resource and expertise, if you are happy, then you jumps to next step.

Example: steps in formulating of a research problem

Step1: identify Alcoholism

Step 2: dissect

- ✓ Profile of alcoholism
- ✓ The cause of alcoholism
- ✓ The process of becoming alcoholism
- ✓ The effect of alcoholism on a family
- ✓ Community attitude towards alcoholism

Step 3: select the effect of alcoholism

- Step 4:** raise question
- 1.what is the impact of alcoholism on family
 2. How does it affect the various aspects of children's?
 3. What are the effects on the family finance?

Step 5: formulate objective

Main objectives

1. To find out the effect of alcoholism on a family

Specific objectives

1. To ascertain the impact of alcoholism on maternal relation.
2. To determine the ways in which alcoholism affect the children life.
- 3 .To measure the effect of alcoholism

Step 6: assess the objective in the light of -The work involved, the time available, the finance resource, Your and research advisor technical expertise in that area

- Step 7:** double checking
- 1.That you are interest
 2. That you agree with objective
 3. That you have adequate resource
 4. That you have the technical expertise to undertake the study

2.4 Consideration in formulating a Research Problem

There are a number of aspects to be considered in formulating a research problem/topic.

- ☞ **Interest-** sufficient interest must be achieved internally by the researcher to proceed.
- ☞ **Magnitude** - narrow the topic down in to manageable, clear and specific problem.
- ☞ **Measurement Concepts-** to reduce confusion among the response, every respondent must be clear with questions and measurement concepts to achieve the problem's objective.
- ☞ **Level of expertise-** the level of knowledge is required to carry out the research work.
- ☞ **Availability of data-** you should have to determine whether you will get sufficient data or not.
- ☞ **Availability of resource-** time frame and budget and human resource.

- ☞ **Ethical consideration** (adverse effects)- the objective of the research is to solve the problem.
- ☞ **Relevance**- either to fill a research gap or its importance for policy formulation.

2.5 Sources of Research problem

The research problems may be selected from the following sources:-

1. **Theory of one's own interest:** A research may select a problem for investigation from a given theory in which s/he has considerable interest. In such situations the researcher must have thorough knowledge of what theory and should be sufficiently inquisitive to explore some unexplained aspects of that theory.
2. **Daily problems:** Research problem can also be selected on the basis of *daily experience* of a researcher.
3. **Technological changes:** Technological changes in a fast changing society are constantly bringing forth new problems and new opportunities for research.
4. **Unexplored areas:** Research problems can be both abstract and applied interest. These may also be selected from those areas which have not been explored so far, such areas may be theoretical or empirical in nature.
5. **Discussions with supervisors:** Sometimes the researcher while discussing the interests with the proposed supervisor may come across a problem that can be researched by the investigator. Many research articles suggest problems for further investigation that may prove fruitful.

2.6 Criteria of a Good Research Problem

A number of criteria in the form of conditions might be listed for guidance in the selection of a topic.

I. Novelty-or-Originality: - It should be sufficiently original so that it does not involve objectionable duplication. Originality is the basic credit point of any research. Ignorance of prior studies may lead a student to spend time on a problem already investigated by some other worker. Moreover the study should employ the most recent data.

II. Interesting: - The problem should be interesting for the investigator himself. If s/he is not interested in it, s/he will not be able to face and overcome the obstacles which come at every step in research. S/he should have a strong inherent motivation for it. His/her interest should be purely intellectual and should not be there only for a reward, material benefit, and advancement in position, increased authority and so.

III. Importance: - It should be significant enough and involve an important principle or practice. If it is not worthwhile, it neither adds to knowledge nor leads to any improvements in the current practices.

IV. Feasibility or Amenability: - The next question to be asked is whether research into the problem would be feasible. S/he should possess the required competence, knowledge and understanding. S/He should be skilful enough to develop, administer and interpret the necessary data- gathering devise and procedures.

V. Availability of Data: - The research work should ensure the availability of valid and reliable data gathering devices and procedures.

VI. Availability of cooperation: - The study may require cooperation from various institutions, authorize and individuals. In may need administration of tests to pupil's, interviewing employees, observation of students at play, meeting the citizens, writing for data, going through records, conducting necessary experiments and going into prolonged study of exceptional cases.

VII. Availability of other facilities: - Will have the necessary financial resources to carry out the study? The investigators should be able to meet the expenditure involved in data gathering equipment printing, test machines, travel, computerization, clerical help, postage, preparation of the reports etc. Will I have enough time to complete the project? Selecting a

problem, library study, preparing the data-gathering devices, collecting and analyzing the data writing the research report, etc are all time- consuming processes.

VIII. Immediate Application:- Will my research help in solving an urgent problem?

IX. Aim of Research:- The aim of research also influences the selection of the problem.

X. Experience and creativity: - Good research problems stem from a clear understanding of the theoretical, empirical and practical aspects of the subject derived from personal experience and from a thorough review of the literature. Conversely, lack of familiarity, with the subject is almost sure to result in a poor choice.

XII. Courage and confidence:- Will I have the courage and confidence to pursue the study inspire of the difficulties and social hazards that may be involved? Will I be able to work aggressively when data are difficult to gather and when others are reluctant to cooperate?

2.7 Formulating and stating the problem

After the problem has been selected, it must be definitely formulated and stated. If it is to serve as a guide in planning the study and interpreting its result, it is essential that the problem is stated in precise terms. The type of statement to be employed depends on the preference of the worker and the nature of the problem. Preferably it should be set as a question or in such form that the question to be answered is clearly indicated. There are two different ways of stating a problem:-

1. Posing question /questions.
2. Making declaration statement /statements

One may choose any of these ways remembering that the question form has an advantage in sharpening and focusing the issue, but the declarative form is perhaps more common, and both of the ways may be combined easily in an initial statement.

- I. Definition of the problem:** - It implies the separation of the problem from the complex of difficulties and needs. It means to put a fence around it, to separate it by

careful distinctions from like question found in related situations of need. The definition helps to establish the frame of reference with which the researcher approaches the problem.

- II. Delimitation of the problem:-** Here the investigation states the restrictions and limitations which he imposes on his study. It is statement of the limits or scope of the investigation. This statement will provide information concerning who, what, where and how many. It will determine the boundaries of the project in hand.
- III. Justification of the problem: -** This step would prevent wastage of research efforts on un-important or insignificant problems. Problems should be broad-based enough to provide an investigation of real significance. The research worker would assess to what extent the solution of the problem would contribute for the furtherance of human knowledge. The list of the objectives of the study magnifies further its utility and importance.

2.8 Research Hypothesis

The derivation of a suitable hypothesis goes hand in hand with the selection of a research problem. When the mind has before it a number of observed facts about some phenomenon, there is a need to form some generalization relative to the phenomenon concerned.

The Meaning of Hypothesis

1. The word hypothesis is a compound of two words, 'hypo' and 'thesis'. Hypo means, under or below and thesis means a reasoned theory or national viewpoint. *The term hypothesis is defined as a proposition that is stated in a testable form and predicts a particular relationship between two or more variables.*
- ✓ Research Problem “ *Factors that contribute to lower achievement of female students than males in ESLCE in A.A*”

The following hypotheses could be derived from the above research problem:

- H1. Female Students receive significantly less support to their education than that of their male counterpart.
 - H2. Female Students sustain significantly higher stereotypes in textbooks than do their male counterpart.
2. A hypothesis is a statement temporarily accepted as true in the light of what is, at the time, known about a phenomenon, and it is employed as a basis for action in the search of new truth.
 3. A hypothesis is a tentative assumption drawn from knowledge and theory which is used as a guide in the investigation of other facts and theories that are yet unknown. It is a guess, supposition or tentative inference as to the existence of some fact, condition or relationship relative to some phenomenon which serves to explain such facts as already are known to exist in a given area of research and to guide the search for new truth.
 4. A hypothesis is a tentative supposition or provisional guess which seeks to explain the situation under observation.
 5. A hypothesis states what we are looking for. A hypothesis looks forward. It is a proposition, which can be put to a test to determine its validity. It may prove to be correct or incorrect.

The testing of a hypothesis is the important characteristics of the scientific method. It is a prerequisite of any successful research, for it enables us to get rid of vague approaches and meaningless interpretations. It establishes the relationship of concept with theory, and specifies the test to be applied especially in the context of a meaningful value judgment. The hypothesis, therefore, plays a very pivotal role in the scientific research method

The formulation of hypothesis, thus, is very crucial and the success or the failures of a research study depends upon how best it has been formulated by the researcher. We may conclude by saying that it is hard to conceive modern science in all its rigorous and disciplined fertility without the guiding power of hypothesis.

2.7.1 Importance of Hypothesis

The importance of hypothesis can be more specifically stated as under:-

- Represents specific objective, which determine the nature of the data needed to test the proposition
- Offer basis for selecting the sample, the research procedure, and the statistical analysis needed
- Keeps the study restricted in scope thereby preventing it from becoming too broad
- Sets a framework for reporting the conclusion of the study
- It focuses research. Without it research would be like a random and aimless wandering.
- It serves the function of linking together related facts and information and organization them into one comprehensible whole.

2.8.2 Characteristics of a usable Hypothesis

A "good" usable hypothesis is the one which satisfies any of the following criteria.

- ☞ ***A hypothesis should be empirically testable.*** The concepts embodied in the hypothesis must have empirical correspondence. For example, "*Bad parents gets bad children is hardly a statement that can qualify as a usable hypothesis.*"
- ☞ ***A good hypothesis is in agreement with the observed facts.*** A single unexplained conflict between fact and hypothesis is disastrous to the latter. A hypothesis is entirely plausible and conceivable. It is based directly on existing date.
- ☞ ***A good hypothesis does not conflict with any law of nature,*** which is known to be true. The idea involved in this principle is not very different from that expressed in the preceding principle. We know that there are a number of conflicting theories of learning and teaching.
- ☞ ***A good hypothesis is expert.*** It is stated in a scientific and research like language and is not an ordinary statement.
- ☞ It should be so designed that ***its test will provide an answer to the original*** problem,
- ☞ It must be ***stated in final form early in the experiment*** before any attempt at verification is made.
- ☞ The ***hypothesis must be conceptually clear.***

- ☞ ***The hypothesis must be specific.***
- ☞ Advisedly, ***the hypothesis should be related to a body*** of theory or some theoretical orientation.
- ☞ ***Hypotheses should be related to available techniques.*** This is, of course, a sensible requirement applicable to any problem when one is judging its research ability. The researcher who does not know that techniques are available to test his hypothesis is in a poor way to formulate usable questions.

2.8.3 Difficulties in the formulation of Hypothesis

There are a number of difficulties from which a beginner may suffer at the stage of formulation a good hypothesis:-

- ◆ Lack of knowledge and clarity of the theoretical framework of the area
- ◆ Lack of ability to make use of the theoretical framework logically
- ◆ Lack of familiarity (acquaintance) with available research technique resulting in failure to be able to phrase the hypothesis properly.
- ◆ Vagueness of the statement: for example, a course in ethics will make a student a more ethical adult.

2.8.4 Source of Hypothesis

The inspection for hypothesis comes from a number of sources w/h include the following:

1. ***Professional Experience:*** The daily life experience or the day to day observation of the relationship (correlation) between different phenomena leads the researcher to hypothesize a relationship and to conduct a study if his/ her assumptions are confirmed.
2. ***Past Research or Common beliefs:*** Hypothesis can also be inspired by tracing past research or by commonly held beliefs.
3. ***Through direct analysis of data or deduction from existing theory:*** Hypothesis may also be generated through direct analysis of data in the field or may be deducted from a formal theory. Through attentive reading, the researcher may able to get acquaintance with

relevant theories, principles and facts that may alert him or her to identify valid for his/her study

4. *Technological and social changes*: Directly or indirectly exerts an influence in the function of an organization. All such changes bring about new problems for research.

2.8.5 Forms of Hypothesis

Statement of research hypothesis can take a declarative (positive) form, negative form, the null form, or the question form.

- ✓ **Positive:** *“Students who learn in small class size will perform significantly better in mathematics test than those who learn in large class size.”*
- ✓ **Negative:** *“Students who learn in small class size will not perform significantly better in math’s test than those in large class size.”*
- ✓ **Null Form:** *“There is no significances difference between students who learn in small class size and those who learn in large class size in their mathematics performance.”*
- ✓ **Question Form:** *“Is there significant difference between students who learn in small class size and those in large class size in their math’s performance?”*

In general,

- When a researcher makes a positive statement about the outcome of the study, the hypothesis takes declarative forms.
- When the researcher negates about outcome of the study, the hypothesis takes the negative form.
- When the researcher makes a statement that no relationship exists, the hypothesis takes the null form.
- In the question form hypothesis, a question is asked as to what the outcome will be instead of stating what outcome is expected.

It should also be noted that a working proposition stated either in declarative, negative, null, question form is a matter of preference by the researcher.

Check Your Progress

1. Explain the difference between Problem and research problem

2. List and explain the necessary conditions for formulation of research problem

Discuss the criteria's of a good research problem

Explain the *Characteristics of a usable Hypothesis*

Demonstrate the forms of hypothesis

a. Positive form

b. Negative form

c. Null form

d. Question form

Chapter Three: Writing Research Proposal

Contents

Learning objectives

- 3.1 Introduction
- 3.2 What is Research Proposal?
- 3.3 Functions of Research Proposal
- 3.4 General Formats and Elements of Proposal

Learning Objectives

- ☞ To understand how to write research proposal
- ☞ To identify elements and formats of research proposal

3.1. Introduction

The preparation of a research proposal is an important step in the research process. The proposal is comparable to the blue print that an architect prepares before the bids are let and building commences. While developing a proposal, the researcher must see the research process in its totality. The researcher's most important task is to convince that his proposal is worth supporting. The initial draft proposal is subject to modifications by peers and grantors. Since good research must carefully be planned and systematically carried out, a well-designed proposal is indeed a prerequisite in order to apply to funding organizations and donor agencies. Although many potential sources of research funding exist to an individual researcher, for instance government organizations, NGOs, and private organizations, the competition for such funding is exceedingly tough. Only, well-conceived and well-packaged research proposals are likely to be successful.

3.2 What is Research Proposal?

A research proposal is a written document requesting both authorization and funds to undertake a specific research project. It always includes a statement explaining the purpose of the study or a definition of the problem. It systematically outlines the particular research methodology and details the process that will be utilized at each stage of the research process.

In research proposal:

- ☞ What information will be required?

- ↳ What research procedures will be implemented? Will be clearly specified so that others may understand their exact implications.

3.3 Functions of Research Proposal

Research proposal may function at least in three ways, namely, as a means of communication, as a plan and as a contract.

- ↳ **Proposal as a means of communication:** serves to communicate the investigators research plan to those who-give consultations and or disburse fund. Proposal is the primary source on which the graduate students' senior essay, thesis or dissertation committee must be the function of :

- Review
- Consultation
- And more importantly, approval for implementation of the research projects

In general, the quality of assistance and the probability of financial support will all depend directly on the clarity and justification of the proposal.

- ↳ **Research proposal as plan:** helps the researcher to organize his/her idea in a systematic manner and to look for strengths and flows. A successful proposal sets out the plan in step-by step detail. That is, it provides an inventory of what must be done and which materials have to be collected as a preliminary step. Generally, the acceptability of results is judged exclusively in terms of the adequacy of the methods employed in recording, analyzing and interpreting the data in the planned study.

- ↳ **Proposal also functions as a contract:** A completed proposal approved for execution and signed by all members of the sponsoring committee, constitute a bond of agreement between the researcher and that committee.

An approved grant proposal results in a contract between the investigator and often the university and funding sources. Proposal for thesis and dissertation should be in final form prior to the collection of data. Once document is approved in final form, neither the student nor the responding faculty members should be free to alter the fundamental terms of the contract by

unilateral decision. Moreover proposal suggests the data necessary for solving the management questions and how the data will be gathered, treated, and interpreted.

3.4 General Formats and Elements of Proposal

There is no a hard and a fast format in scientific research proposal writing. It varies from one organization to another and from one country to another. Some universities and funding agencies make very specific demand for the format of proposals. Though the format varies, the essence expressed in different proposal remains the same. There are certain elements that appear as very essential to go research which need to be reflected in the preparation of the research proposal.

General format and Elements of Proposal

1. The title of the Investigation
2. Abstract (optional)
3. Background of the study
4. Statement of the problem/The Rationale
5. Research Questions/Hypothesis
6. Objectives of the Study
7. Review of the Related Literature
8. Significance of the Study
9. Definition of the Terms or Concepts (optional)
10. Delimitation/Scope of the Study
11. Research Design and Methodology:
 - Research Design
 - Study Area, Target Population, Sample Size and Sampling techniques:
 - Data type and source
 - Data Gathering Tools/Instruments
 - Method of Data analysis
12. Limitation of the Study (optional)
13. Organization of the study
14. Work plan (time schedule)
15. Cost /budget schedule
16. References/Bibliography
17. Appendix

1. The title of the Investigation

The title of the research should be worded in such a way that it gives sufficient information about the nature of the study. In selecting a title for investigation the researcher should consider the following points:

- ✦ The title should be as explicit as possible and transparent,
- ✦ Not include unscientific, argumentative, emotional or biased terms in nature,
- ✦ *The title shouldn't be too lengthy:* It should be specific to the area of study. For example the following topic appears to be long. “A study of academic achievement of children in pastoral regions whose parents had participated literacy classes against those whose parents didn't”
- ✦ *The title shouldn't be too brief or too short:* The following sentence is too short “Marketing in Japan” or “Unemployment in Ethiopia”.
- ✦ The title of a research proposal should state your topic exactly in the smallest possible number of words.
- ✦ Put your name, the name of your department/faculty/college, the name of your advisor(s) and date of delivery under the title.

2. Abstract/Executive Summary

Abstract/Executive Summary is a summary, which reflects the whole content of the proposal (most of the time less than 300 words). Abstract should be concise, informative and should provide brief information about the whole problem to be investigated.

- ✦ Allows a busy manager or sponsor to understand quickly the thrust of the proposal.
- ✦ It is essentially an informative abstract, giving executives the chance to grasp the essentials of the proposal without having to read the details.
- ✦ The goal of the summary is to secure a positive evaluation by the executive who will pass the proposal on to the staff for a full evaluation.

The abstract of a proposal should contain the following points:

- ✦ Title or topic of the research
- ✦ Statement of the problem and objective
- ✦ Methodology of investigation
- ✦ Expected result (tentative only if a researcher starts with a formulated hypothesis).

3. Background of the study

This section in research proposal should give the general background of the study and need for undertaking the study. It reviews the previous work to reveal what is known on the subject. The introduction should address the following points:

- ✦ Sufficient background information to allow the reader to understand the context and significance of the question you are trying to address.
- ✦ Proper acknowledgement of the previous work on which you are building.

Some questions to be addressed in this part may include:

- ✦ What are current and previous studies that have been made on the issues to be studied?
- ✦ What is the present gap in knowledge and current trend?
- ✦ What makes worth studying?
- ✦ Why has the problem not been solved yet?
- ✦ What do we intend to fill the gap or solve the problem?

4. Rationale and Problem Statement

Statement of the problem elaborates about the problem under investigation. It is an explanation of the title. It also attempts to focus on a clear goal. More specifically, statement of the problem is targeted towards stating the background facts which justify the study to be in order and developing hypotheses or key questions, which may show the direction of the whole exercise. Problems can be derived from theory, prior research results, or personal observation and experience. On the other hand, it can be identified via discussion with the decision makers, interviews with industry experts and analysis of secondary data. It can be either in the form of questions or as a declarative statement. Statement of the problem encapsulates the question you are trying to answer. Effective problem statements answer the question “**Why does this research need to be conducted.**”

5. Research Questions/Research hypothesis

Research question is a clear statement in the form of a question of the specific issue that a researcher wishes to answer in order to address a research problem. A research problem is an issue that lends itself to systematic investigation through research. A hypothesis is a tentative generalization, the validity of which has to be tested.

A hypothesis, at its initial stage, may be an imagined idea or mere guess. It is based on the accumulated previous knowledge. It is made in order to find out the correct explanation of a phenomenon through investigation. On the basis of the hypothesis, facts are observed and collected, when by verification, the hypothesis is found to be true, a theory is obtained. Some researchers consider hypothesis as unnecessary while some others consider it mandatory. However, hypothesis is more related to a research problem even more than research objectives. Research problem and hypothesis are two sides of a coin.

6. Objectives of the Study

In this section the specific activities to be performed are listed. This is the stage of rephrasing the problem in to operational or analytical terms i.e. to put the problem in as specific terms as possible. The general objective provides a short statement of the specific goals pursued by the research; it is stated in a single paragraph while the specific objectives are given in the form of list. The latter is operational in nature. It indicates the type of knowledge to be produced audiences to be reached. Moreover, the objectives of a research project summarize what is to be achieved by the study. Objectives should be closely related to the statement of the problem.

Generally this section should focus on the points:

- ↳ What is to be achieved by the proposed investigation has to be stated plainly and concisely.
- ↳ Should be to the point and logically arranged
- ↳ Should be stated in a form which shows the relations between variables
- ↳ Must clearly state the target of the research activity, i.e., what kind of results are expected or sought from conducting research.

7. Literature Review

Literature review means locating literature in a variety of sources reading it carefully and thoroughly organizing it in to themes along with the line of investigation. The theoretical and empirical framework, from which the problem arises, must be briefly described. A brief summary of related studies found in journals, magazines, abstracts and reports should be made. Review of related literature, provides a brief overview of the literature and the research done and the gaps that the proposed research intends to fill. In the other hand, it provides evidence that the

researcher is familiar with what is already known and also what is unknown or unproved. The analysis of previous research eliminates the possibility of duplication of what has been done, and serve as a basis for formulating hypothesis.

In searching related literature, the researcher should note certain important elements:

- ↪ Reports of studies of closely related problems
- ↪ Design of the study, including procedures
- ↪ Employed and data gathering instruments used
- ↪ Populations that were sampled and sampling methods employed
- ↪ Variables that were defined
- ↪ Extraneous variables that could have affected the findings
- ↪ Faults that could have been avoided

How to organize a literature review

- ↪ **Introduction:** define the topic, together with your reason for selecting the topic.
- ↪ **Body:** this is where you discuss your sources.
- ↪ **Conclusion:** summarize the major contributions, evaluating the current position, and pointing out flaws in methodology, gaps in the research, contradictions, and areas for further study.

8. Significance of the Study

This part of the proposal should indicate the significance, justification, importance, and the intended outcomes of the proposed study. There are three general areas for the significance and contribution of a study: to knowledge in the area, to policy considerations and to practitioners.

When thinking about the significance of your study, ask yourself the following questions.

- ↪ What will results mean to the theoretical framework that framed the study?
- ↪ What suggestions for subsequent research arise from the findings?
- ↪ What will the results mean to the practicing educator?
- ↪ Will results influence programs, methods, and/or interventions?

- ↪ Will results contribute to the solution of educational problems?
- ↪ Will results influence educational policy decisions?
- ↪ What will be improved or changed as a result of the proposed research?
- ↪ How will results of the study be implemented, and what innovations will come about?

9. Definition of the Terms or Concepts (optional)

The technical terms or words and phrases having special meaning need to be defined operationally by the help of special dictionaries

10. Delimitation/Scope of the study

Delimitation of the study addresses how a study will be narrowed in scope, that is, how it is bounded. This is the place to explain the things that you are not doing and why you have chosen not to do them—the literature you will not review (and why not), the population you are not studying (and why not), the methodological procedures you will not use (and why you will not use them). Limit your delimitations to the things that a reader might reasonably expect you to do but that you, for clearly explained reasons, have decided not to do. Generally, it includes period of time, subject, geographic place of the subject, disciplines involved, sampling, and unit of analysis.

11. Research Design and Methodology

In this section the details about sampling procedures, the data collecting tools, and analysis are described.

- ↪ **Research Design:** The research design to be adopted, in broad terms classified as exploratory, descriptive or causal, should be specified. Beyond such a broad classification should be details of the individual techniques that will be adopted and how they will unfold and connect to each other. This means that the reader will clearly see methods of collecting the desired data, justification for these methods, and a sampling plan to include details of sample size(s). This applies to both quantitative and qualitative approaches.

- ↪ **Population and Sampling techniques:**

- **Population:** In this part of research proposal, the researcher should state the amount, the nature and types of respondents involved in the study. Justification of his/her choice of a particular target population is relevant here. **Sample size:** the researcher often comes across unmanageable size of population in which case he/she may be compelled to determine representative sample size. The sample size determination is purely statistical activity, which needs statistical knowledge. Thus; the researcher should determine his/her sample size based on statistical formula or model.
- **Sampling techniques:** Sampling is the process of selecting a sample size from a defined study population. The researcher proposal has to specify the elements from which the desired information is collected and how these elements are selected. There are different sampling techniques (probability and non-probability).

Probability sampling methods includes (*Simple Random Sampling, Systematic Sampling, Cluster sampling, and Stratified sampling*), whereas non probability sampling methods includes (*Convenience sampling, Judgment sampling, Referral sampling, and Quota sampling*). The researcher is expected to consider all of them and select the one, which is appropriate for his current study. Justification of his choice of a particular sampling technique is relevant here.

- ↳ **Data Type and Sources:** In this section, the type of data required to attack the problem is explained. In this case, the researcher can use primary data, secondary data or both data types. The source of the data should also be specified, that is the researcher should state from whom and where those data types will be collected.
- ↳ **Methods of Data Collection/Data Collection Tools:** There are different primary data collection methods. They are (*Questionnaire, Interview, Observation, Focus group discussion*). Accordingly, the researcher has to develop appropriate and reliable tools or instruments and fully aware of their merits and demerits. Thus, the researcher proposal should explain and justify how his/her selection of a particular method is relevant and appropriate to his study.

↳ **Data Analysis Methods:** In this section, once the data is collected the researcher should describe how to organize, analyze, and interpret data. The details of statistical techniques should be described in the research proposal. The important statistical measures that are used to summarize the survey/research data are:

- Measures of central tendency or statistical averages(mean, median, mode)
- Measures of dispersion(range, mean deviation, and standard deviation)
- Measures of asymmetry (skewness);
- Measures of relationship (correlation, simple or multiple regressions, time series or liner programming models).
- Other methods

12.Limitation of the Study

Although a researcher tries his/her best to design his/her research as properly as possible, there are externals (uncontrolled) variables that confront his/her investigation and affect his/her conclusion. All research projects have limitations caused by availability of right data, lack of up to date literature, lack of cooperation, weakness of methodology, time, budget, securing permission from the agency/organization to carry out the study, obtaining the sample and other organizational constraints. In his/ her research proposal, the researcher has to specify such factors that hinder the attainment of his/her objectives. Such anticipated restrictions are referred as limitations of the study. This section should be written with great care and a balanced perspective. On the other hand, this section should not erode their confidence in the research or unduly minimize its importance.

13.Organization of the study

This section explains the composition of each unit in the research.

14.Work Plan (Budget of time)

Work plan is a schedule, chart or graph that summarizes the different components of a research proposal and how they will be implemented. It is a plan in terms of number of weeks or months and expected completion dates. Commonly researcher presents it in a table form.

In the work plan:

- ✦ Different components/phases/stages of the study should be stated
- ✦ Description of activities in each phase
- ✦ Time required to accomplish the various aspects of the study should also be indicated

The Gantt chart

A Gantt chart is a planning tool that depicts graphically the order in which various tasks must be completed and the duration of each activity.

The Gantt chart indicates:

- ✦ The tasks to be performed;
- ✦ Who is responsible for each task; and
- ✦ The time each task is expected to take.

15. Cost Budget and Funding

Most proposals put together with the expectation that funding be necessary and an itemized list of items needed to carry out the research is listed in some detail. Budget items need to be quantitatively stated. These are items like: Field expenses for data collection (Salaries and wages),

- ✦ Consumable supplies expense,
- ✦ Equipment's expense,
- ✦ Travel or Transportation expenses,
- ✦ Communication expense,
- ✦ Publication expense,
- ✦ A sum of money for contingencies etc

16. References/Bibliography

This is a section where a list of books, journals and other documents is referred. The researcher should list all reference material that he has used in selecting the problem and which he may use during the conduct of the study. All works cited in the proposal are listed either alphabetically or

numerically at the end of the document usually under the heading of “References or Bibliography”.

There are several ways of making citation and recording references like American Psychologist association style (APA), Harvard system/ style and Vancouver system/style.

A) For a journal paper give:

- The names of the authors,
- The year of publication,
- The title of the paper,
- The title of the journal,
- The volume number of the journal,
- The first and last page numbers of the paper.

Example:

- Andreasen, A.R. (2002). Marketing social marketing in the social change market place. *Journal of Public Policy and Marketing*, 21, 3-13.

B) For a book give:

- The author,
- The year of publication,
- The title, and the edition number if there is one,
- The name of the publisher,

Example:

- Kotler, P., Roberto, N., and Lee, N. (2002). *Social Marketing: Improving the Quality of Life* (2nd Ed.). Thousand Oaks, CA: Sage Publication.

C) For an internet reference give:

- The author of the web page,
- The title of the item on the web page,
- The date the item was posted on the web page

- The date the item was accessed from the web page
- The complete and exact URL.

Example:

UNFPA, Family Planning and the Environment: Stabilizing population would help sustain the planet. New York: UNFPA; 2008. Available at <http://www.unfpa.org/rh/planning/mediakit/docs/sheet3.pdf>. Accessed on 15 January 2010 at 3:35.

17. Appendices (Annex)

It is not mandatory to have this section. If the researcher thinks that having this section will increase the quality of the research proposal s/he is free to do so. Information types provided in this section are those additional details, which are difficult to accommodate within the standard headings.

Stuffs to be included in appendix:

- ✓ Detail questionnaires and interview schedules
- ✓ Detailed experimental design (in experimental research)
- ✓ Detailed statistical procedures
- ✓ Samples of research materials(chemical and some biological materials)
- ✓ Survey and other geographic maps

Check your progress

1. Define research proposal? explain the importance & functions of research proposal

2. list the specific & general formats and elements of proposal

CHAPTER FOUR: RESEARCH DESIGN

Contents

4.0 Learning objectives

- 4.1 Meaning of Research Design
- 4.2 The Significant of Research Design
- 4.3 Important concepts relating to research design
- 4.4 Features of a good design
- 4.5 Types of Research Design

4.0 Learning objectives

After you study this Chapter, you will be able to explain:

- meaning of research design
- the significant of research design
- important concepts relating to research design
- features of a good design
- types of research design

4.1 Meaning of Research Design

Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance. It includes an outline of everything the researcher will do including what observations to make, how to make them, and what type of statistical analysis to use. A research design, in a way, is a set of instructions to the researcher on how to arrange the conditions for collection and analysis of data in a manner that will achieve the objectives of the study. In a sense, it can be taken as a control mechanism.

The formidable problem that follows the task of defining the research problem is the preparation of the design of the research project, popularly known as the “research design”. Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design. “A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research

purpose with economy in procedure.” In fact, the research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data. Moreover, research design is a set of advance decisions that make up the master plan specifying the methods and procedures for collecting and analyzing the needed information.

4.2 The Significant of Research Design

There are reasons to justify the significant played upon research design. First, although every research problem may seem totally unique, there are usually enough similarities among research problems to allow us to make some decisions, in advance, as to the best plan to use to resolve the problem. Thus, it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money. Second, there are some basic business research designs that can be successfully matched to given research problems. In this way, they serve the researcher much like the blue print serves the builder. In this regard, research design stands for advance planning of the methods to be adopted for collecting the relevant data and the techniques to be used in their analysis, keeping in view the objective of the research and the availability of staff, time and money.

The main purpose of a research design is to enable the researcher to answer research questions as validly, objectively, accurately and economically as possible. In more specific terms, a research design sets up the framework for adequate tests of relationships among variables. In a sense, it indicates what observations to make, how to make them, and how to analyze the data obtained from observations. Moreover, a design specifies what type of statistical analysis to use and can even suggest the possible conclusions to be drawn from the analysis. Any research plan is deliberately and specifically conceived and executed to bring empirical evidence to bear on the research problem.

4.3 Important concepts relating to research design

Before describing the different research designs, it will be appropriate to explain the various concepts relating to designs so that these may be better and easily understood.

1. Dependent and independent variables: A concept which can take on different quantitative values is called a variable. As such the concepts like weight, height, income are all examples of variables.

If one variable depends upon or is a consequence of the other variable, it is termed as a dependent variable, and the variable that is antecedent to the dependent variable is termed as an independent variable. For instance, if we say that height depends upon age, then height is a dependent variable and age is an independent variable. Further, if in addition to being dependent upon age, height also depends upon the individual's sex, then height is a dependent variable and age and sex are independent variables. Similarly, readymade films and lectures are examples of independent variables, whereas behavioural changes, occurring as a result of the environmental manipulations, are examples of dependent variables.

2. Extraneous variable: Independent variables that are not related to the purpose of the study, but may affect the dependent variable are termed as extraneous variables. A study must always be so designed that the effect upon the dependent variable is attributed entirely to the independent variable(s), and not to some extraneous variable or variables.

3. Control: One important characteristic of a good research design is to minimize the influence or effect of extraneous variable(s). The technical term 'control' is used when we design the study minimizing the effects of extraneous independent variables. In experimental researches, the term 'control' is used to refer to restrain experimental conditions.

4. Confounded relationship: When the dependent variable is not free from the influence of extraneous variable(s), the relationship between the dependent and independent variables is said to be confounded by an extraneous variable(s).

4.4 Features of a good design

A good design is often characterized by adjectives like flexible, appropriate, efficient, economical and so on. Generally, the design which minimizes bias and maximizes the reliability of the data collected and analyzed is considered a good design. The design which gives the smallest experimental error is supposed to be the best design in many investigations. Similarly, a

design which yields maximal information and provides an opportunity for considering many different aspects of a problem is considered most appropriate and efficient design in respect of many research problems.

Thus, the question of good design is related to the purpose or objective of the research problem and also with the nature of the problem to be studied. A design may be quite suitable in one case, but may be found wanting in one respect or the other in the context of some other research problem. One single design cannot serve the purpose of all types of research problems.

If the research study happens to be an exploratory or a formulative one, wherein the major emphasis is on discovery of ideas and insights, the research design most appropriate must be flexible enough to permit the consideration of many different aspects of a phenomenon. But when the purpose of a study is accurate description of a situation or of an association between variables (or in what are called the descriptive studies), accuracy becomes a major consideration and a research design which minimizes bias and maximizes the reliability of the evidence collected is considered a good design.

Studies involving the testing of a hypothesis of a causal relationship between variables require a design which will permit inferences about causality in addition to the minimization of bias and maximization of reliability. But in practice it is the most difficult task to put a particular study in a particular group, for a given research may have in it elements of two or more of the functions of different studies. It is only on the basis of its primary function that a study can be categorized either as an exploratory or descriptive or hypothesis-testing study and accordingly the choice of a research design may be made in case of a particular study. Besides, the availability of time, money, skills of the research staff and the means of obtaining the information must be given due weightage while working out the relevant details of the research design.

4.5 Types of Research Design

Research designs are classified in to three major categories: exploratory, descriptive, and causal. The choice of the most appropriate design depends largely upon the objective of the research. It has been said that research has three objectives:

↳ To develop hypothesis,

- ↳ To measure the state of a variable of interest ,
- ↳ To test hypothesis that specify the relationships between two or more.

A Caution: Before discussing the three type of research design it is better to warn you about thinking of research design solely in step-by-step fashion. Some may think that it is implied in the discussion that the order on which the designs are presented- that is exploratory, descriptive and causal- is the order in which theses designs should be carried out. This is incorrect.

Three points should be made relative to the interdependency of research designs.

- ↳ First, in some cases, it may be perfectly legitimate to begin any one of three designs and to use only that one design.
- ↳ Second, research is an “iterative” process; by conducting one research project, we learn that we may need additional research, and so on. This may mean that we need to utilize multiple research designs. We could very well find, for example, that after conducting descriptive research, we need to go back and conduct exploratory research.
- ↳ Third, if multiple designs are use in any particular order (if there is an order), it makes sense to first conduct exploratory research, then descriptive research, and finally causal research. The only reason for this order pattern is that each subsequent design requires greater knowledge about the research problem on the part of the researcher. Therefore, exploratory may give one the information needed to conduct a descriptive study which, in turn, may provide the information necessary to design causal experiment.

1. Exploratory Research:

Exploratory research is most commonly unstructured, informal research that is undertaken to gain background information about the general nature of the research problem. By unstructured, we mean that exploratory research does not have a formalized set of objectives, sample plan, or questionnaire. It is usually conducted when the research does not know much about the problem and needs additional information or desire new or more recent information. Because exploratory research is aimed at gaining additional information about a topic and generate possible hypothesis to test, it is described as informal. Such research may consist of going to the library

and reading published secondary data; of asking customers, sales persons, and acquaintances for their opinions about a company, its products, services, prices; or of simply observing every day company practices. Exploratory research is systematic, but it is very flexible in that it allows the researcher to investigate whatever source s/he desires and to the extent s/he feels is necessary in order to gain a good feel for the problem at hand.

Exploratory research studies are also termed as formulate research studies. The main purpose of such studies is that of formulating a problem for more precise investigation or of developing the working hypotheses from an operational point of view. The major emphasis in such studies is on the discovery of ideas and insights. As such the research design appropriate for such studies must be flexible enough to provide opportunity for considering different aspects of a problem under study. Inbuilt flexibility in research design is needed because the research problem, broadly defined initially, is transformed into one with more precise meaning in exploratory studies, which fact may necessitate changes in the research procedure for gathering relevant data.

Uses of Exploratory Research: Exploratory research is used in a number of situations: to gain the background information, to define terms, to clarify problems and hypothesis, and to establish research priorities.

- a) **Gain Background Information:** when very little is known about the problem or when the problem has not been clearly formulated, exploratory research may be used to gain much-needed background information.
- b) **Define Terms:** exploratory research helps to define terms and concepts.
- c) **Clarify Problems and Hypothesis:** exploratory research allows the researcher to define the problem more precisely and to generate hypothesis for the upcoming study. Exploratory research can also be beneficial in formulation of hypothesis, which are statements describing the speculated relationships among two or more variables.
- d) **Establishing Research Priorities:** exploratory research can help a firm prioritize research topics in order of importance, especially when it is faced with conducting several research studies. A review of customer compliant letters, for example, may indicate which product or services are most in need of management's attention.

Methods of Conducting Exploratory Research: A variety of methods are available to conduct exploratory research. These include secondary data analysis, experience survey, case analysis, focus groups, and project techniques.

- a) **Secondary Data Analysis:** by secondary data analysis we refer to the process of searching for and interpreting existing information relevant to the research problem. Secondary data are data that have been collected for some other purpose. An analysis of secondary data is often the “core” of exploratory research. This is because there are many benefits to examining secondary data and the costs are typically minimal. Furthermore, the costs for searching time for such data are being reduced everyday as more and more computerized databases become available.
- b) **Experience Survey:** experience survey refers to gathering information from those thought to be knowledgeable on the issues relevant to the research problem. For instance, if the research problem deals with difficulties encountered when buying infant clothing, then surveys of mothers (or fathers) with infants may be in order. Experience survey differ from surveys conducted as part of descriptive research in that there is usually no formal attempt to ensure that the survey results are representatives of any defined group of subjects.
- c) **Case Analysis:** by case analysis, we refer to a review of available information about a former situation(s) that has some similarities to the present research problem.
- d) **Focus Groups:** An increasing popular method of conducting exploratory research is focus groups, which are small groups of people brought together and guided by a moderator through unstructured, spontaneous discussion for the purpose of gaining information relevant to the research problem. Although focus group should encourage openness on the part of the participants, the moderator’s task is to ensure the discussion is “focused” on some general area of interest.

2. Descriptive Research

As the name implies, the major objective of descriptive research is describing the characteristics of a particular individual, or of a group/ state of nature/ variables under study. Since the aim is to obtain complete and accurate information in the said studies, the procedure to be used must be

carefully planned. The research design must make enough provision for protection against bias and must maximize reliability, with due concern for the economical completion of the research study. The design in such studies must be rigid and not flexible.

For example, when we wish to know:-

- ↳ How many customers that a specific bank have,
- ↳ What services they buy and in what frequency,
- ↳ Which advertisement of service they recall, and
- ↳ What their attitudes are towards the bank and its competitors, we turn to descriptive research, which provides answers to questions such as who, what, where, when, and how, as they are related to the research problem. Typically, answers to these questions, are found in secondary data or by conducting surveys. Managers or/and decision makers often need answers to these basic questions before they can formulate and implement any business strategies.

Classification of Descriptive Research Studies

There are two basic descriptive research studies available to the business researcher; cross-sectional and longitudinal.

<i>Types of Study</i>	<i>Features of Study</i>
Cross-sectional	One-time measurement, including a sample survey where the emphasis is placed on large, representative sample.
Longitudinal	Repeated measurements on the same sample, including a traditional panels (questions remain the same) and an omnibus panel (questions differ)

Table 4.1: Classifications of descriptive Research Studies

a) **Cross-sectional studies:** measure a population at only one point in time. Cross sectional studies are very prevalent in marketing research, outnumbering longitudinal studies and

causal studying. Because cross sectional studies are one-time measurements, they are often described as “snapshots” of the population. As an example, many magazines survey a sample of their subscribers and ask them questions such as their age, occupation, income, educational level, and so on. This sample data, taken at one point in time, is used to describe the readership of the magazine in terms of demographics. Cross sectional studies normally employ a fairly large sample size, so many cross sectional studies are referred to as sample surveys. Sample surveys are cross sectional studies whose samples are drawn in such a way as to be representative of a specific population.

- b) Longitudinal studies:** repeatedly measure the same population over a period of time. Because longitudinal studies involve multiple measurements, they are often described as “movies” of the population. Longitudinal studies are employed by almost 50 percent of business using marketing research. To ensure the success of longitudinal study, researcher must have access to the same members of the sample, called a panel, so as to take repeated measurements.

There are two types of panels: traditional panels and omnibus panels. Traditional panels ask panel members the same questions on each panel measurement. Omnibus panels vary questions from one panel measurement to the next. Usually, firms are interested in using data from traditional panels because they can gain insights into changes in consumers’ purchases, attitudes, and so on.

3. Causal Research

Causality may be thought of as understanding a phenomenon in terms of conditional statements of the form “if x , then y ”. These “if-then” statements become our way of manipulating variables of interest. For example, if I spend more on advertising, then sales will rise. Fortunately for mankind, there is an inborn tendency to determine causal relationships. This tendency is ever present in our thinking and our actions. Likewise, marketing managers are always trying to determine what will cause a change in consumer satisfaction, a gain in market share, or an increase sale.

Condition	Description
Co-variation	It must be demonstrated that the causal variables occurs with the caused variable and that the two variables have an orderly relationships (For example, as price goes down, sales goes up).
Time Sequence	It must be demonstrated that the causal variable changed prior to or simultaneous with observed changes in the caused variable (for example, prices were lowered on Monday, and sales go up for Monday and all other days when price were lower)
Systematic Elimination	It must be demonstrated that all other possible causal variables are eliminated from candidacy (for, example, if advertising campaign began on the day we lowered prices; we could not eliminated the ad campaign as a cause of sales going up).
Experimental design	It must be demonstrated that as valid experiment has been conducted in order to state that the variable is unequivocally causal (for example, a formal market test would be designed and conducted in order to determine the effect of a price reduction on sales).

Table 4.2 Formal Conditions for Causality

The above table describes the formal requirements for causality consumers are bombarded on a daily and sometimes even in a hourly basis by a vast multitude of factors, all of which could cause them to act in one way or another. Nevertheless, there is a high “reward” in the market place for even partially understanding causal relationships. Causal relationships are determined by the use of experiments.

Check your progress

1. **Define** research design

2. Explain the significant of research design

3. Discuss important concepts relating to research design

4. Explain the features of a good research design

5. Discuss types of research design

CHAPTER FIVE: QUALITATIVE & QUANTITATIVE RESEARCH

Contents

5.0 Learning Objectives

5.1 Introduction

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5.1.2 Types of Focus Groups

5.2.3 Conducting Focus Groups

5.2.4 . Preparing for a Focus Group

5.3 Other Qualitative Research Methodologies

5.4 Learning objectives

After you study this Chapter, you will be able to explain:

- What qualitative research is?
- What quantitative research is?
- the difference between qualitative and quantitative research approach

5.1 Introduction

Qualitative research is a loosely used term. It means that the research findings are not subjects to quantification or quantitative analysis. Quantitative research uses mathematical analysis and can reveal statistically significant differences between, for example, heavy and light users.

In contrast, qualitative research could be used to examine the attitudes, feelings, and motivations of the heavy user.

5.1 The Qualitative Versus Quantitative Controversy

Perhaps most significant to managers is that qualitative research typically is characterized by small samples, which has provided a focal point for the criticism of all qualitative techniques.

In essence, many managers are reluctant to base important strategy decisions on small samples research because it relies so greatly on the subjectively and interpretations of the researcher. They strongly prefer a large sample with computer analysis, summarized into tables.

Large samples and statistical significance levels are aspects of marketing research with which these managers feel very comfortable, because the data is generated in a rigorous and scientific manner. The following table compares qualitative and quantitative research on several levels

5.1.1 Focus Group Research

Focus group had their beginning in a group therapy used by psychiatrist. Today a focus group consists of 8 to 12 participants led by a moderator in an in depth discussion on one particular topic or concept. The goal of focus group research is to learn and understand what people have to say and why. The emphasis is on getting people talking at length and in detail about the subject at hand. The intent is to find out how they feel about a product, concept, idea, or organization, how it fits into their lives, and their emotional involvement with it.

Focus groups are much more than merely question-and-answer interviews. The distinction is made between “group dynamics” and ‘group interviewing’.

The interaction provided in group dynamics is essential to the success of focus group research. The interaction is the reason for conducting group rather than individual research. One of the essential postulates of group session usage is the idea that a response from open person may become a stimulus for another, thereby generating interplay of responses that may yield more than if the same number of people had contributed independently. Normally, in group dynamics, direct questions are avoided. In their place are indirect inquiries that stimulate free and spontaneous discussions. The result is much richer base of information of a kind impossible to obtain by direct interviews.

Qualitative research and focus groups are often used as synonyms by marketing research practitioners. Popular writings are full of examples of researchers referring to qualitative research in one breath and focus groups in the next even though, as discussed earlier, focus groups are only one type of qualitative research. The overwhelming popularity of the technique has virtually overshadowed other qualitative tools.

5.1.2 Types of Focus Groups

Bobby Calder, a noted scholar on qualitative research, has classified focus groups into three major groups: exploratory, clinical and experiencing.

1. Exploratory Groups

Exploratory focus groups are commonly used at the exploratory phase of the market research process to aid in the precise definition of the problem. They also can be viewed as pilot testing. Groups may be employed to test wording on a questionnaire or product placement instructions. Exploratory groups may have a loftier goal of attempting to generate hypotheses for testing or concepts for further research.

2. Clinical Focus Groups

Clinical focus groups are qualitative research in its purest form. The research is conducted as a scientific endeavor, based upon the premise that a person's true motivation and feelings are subconscious in nature. What consumer says cannot be taken at a face value. Instead, the research must probe beneath the level of consciousness.

Obviously clinical groups require a moderator with expertise in psychology and sociology. It is assumed that a person's real motives must be uncovered using clinical judgment. Thus, the focus group becomes the data input source for clinical judgment. The moderator must be highly skilled to entice participants into revealing inner feelings and thoughts.

Because of the difficulty of validating findings from clinical groups and in skilled moderators attempting to conduct clinical groups, their popularity has markedly diminished.

3. Experiencing Focus Groups

A researcher who speaks of "doing a few groups" usually is referring to experiencing focus groups. Experiencing focus groups are those focus groups that enable a client to observe and listen to how consumers think and feel about products.

Thus, an experiencing approach represents an opportunity to “experience” a flesh and blood consumer. It allows the researcher to experience the emotional framework in which the product is being used. In a sense, the researcher can go into a person’s life and relive with him or her all the satisfaction, dissatisfactions, rewards, and frustrations experienced when the product is taken home.

5.2.3 Conducting Focus Groups

There are certain steps involved in conducting a focus group. The details of which is as illustrated below:

All marketing managers want to know how well their promotional programs are working. This information is critical to planning for the next period, since program adjustments and/or maintenance are based on evaluation of current strategies.

The issues involved in measuring the effects of advertising includes reasons for testing, reasons companies do not test, and the review and evaluation of various research methodologies. We arrived at a number of conclusions: (1) advertising research to measure effectiveness is important to the promotional program, (2) not enough companies test their ads, and (3) problems exist with current research methodologies.

Problems often result when measures taken to determine such effects are inaccurate or improperly used. This unit demonstrated that testing must meet a number of criteria (defined by PACT) to be successful. These evaluations should occur both before and after the campaigns are implemented.

5.2.4 . Preparing for a Focus Group

- **The setting**

Focus groups are usually held in a focus group facility. The setting is normally conferences room style with a large one way mirror in one wall. Microphones are placed in an unobtrusive location (usually the ceiling) to record the discussion. The viewing room also houses the recording or videotape equipment. Another variation is to not use a one-way mirror, but to televise the proceedings to a remote viewing room.

- **Recruiting Participants**

Participants are recruited for focus group from a variety of sources. Two common procedures are mall intercept interviews and random telephone screening. Researchers normally establish criteria for the group participants.

- **Selecting the moderator**

Having qualified respondents and a good focus group moderator are the keys to successful focus groups. Regardless of the type of group conducted, a qualified moderator is essential. Qualifications, of course, depend on the type of group the researcher is conducting. A moderator of clinical groups should have extensive training in psychology and sociology.

- **Developing the Discussion Guide**

Regardless of the type of training and personality a moderator possesses, a successful focus group requires a well-planned discussion guide. A discussion guide is an outline of the topics to be covered during the session. Usually the guide is generated by the moderator based on the research objective and client information needs. It serves as a checklist to make certain that all salient topics are covered and in the proper sequence.

- **Preparing the Focus Group Report**

Typically, after the final group in a series is completed, there will be a moderator debriefing, sometimes called an instant analysis. There are both pros and cons of this tradition. Arguments for employing instant analysis include

- (1) Providing a form for combining the knowledge of the marketing who viewed the group with that of the moderator
- (2) Getting an initial hearing of and reaction to the moderator's top-of-mind perceptions, and
- (3) Using the heightened awareness and excitement of the moment to generate new ideas and implications in a brain storming environment.

The short coming includes:

- (1) Biasing future analyzing on the part of the moderator
- (2) Not being able to hear all that was said in a less than highly involved and anxious state.
- (3) Decency, selective recall, and other factors associated with limited memory capabilities, etc,

5.2.3.1 Advantages and Disadvantages of Focus Groups

The advantages and disadvantages of qualitative research in general also apply to focus groups. Yet, focus groups also have some unique pros and cons that deserve mention.

(i) Advantages of Focus Groups

The interaction among respondents can stimulate new ideas and thoughts that might not arise during one-on-one interviews. And group pressure can help challenge respondents to keep their thinking more realistic.

The energetic interaction among respondents also means that observation of a group generally provides “firsthand” consumer information to the client observers in a shorter amount of time and in a more interesting way than do individual interviews.

Another advantage focus group offers is the opportunity to observe customers or prospects from behind a one-way mirror. In fact, there is a growing use of focus groups to expose a broader range of employees to the customer comments and views.

Another advantage focus group offers is the opportunity to observe customers or prospects from behind a one-way mirror. In fact, there is a growing use of focus groups to expose a broaden range of employee to the customer comments and views.

Another advantage focus group offer is that they often can be excused more quickly than other research approaches.

ii) Disadvantages of Focus Groups

Some of the very strength of focus group can also become disadvantages. For example, the immediacy and apparent understandability of focus group findings can mislead instead of uniform. Another problem is that what is said in a focus group may not be all that typical.

Other disadvantages relate to the focus group process itself. For example, focus group recruiting is a problem if the type of person recruited respond differently to the issues being discussed than other target segments. Also, some focus group facilities create an impersonal feeling, making honest conversation unlikely.

Respondents can also be a problem. Some individuals are simply introverted and do not like to speak out in group settings. Other people may attempt to dominate the discussion. These are people who know it all, or think they do, and who invariably answer every question first and do not give others a chance to speak, etc.

5.3 Other Qualitative Research Methodologies

There are other methods used in qualitative research, even though the major focus is provided to focus group research. Some of these techniques are used in a more limited basis.

i) Depth Interviews

The term depth interview has historically meant a relatively in structured one-on-one interview. The interviewer is thoroughly trained in the skill of probing and eliciting detailed answers to each question. Sometimes psychologists are used a depth interviews. They use clinical non directive technique to in cover hidden motivations.

ii) Projective Techniques

Projective techniques are sometimes incorporate into depth interviews. The origins of projective techniques lie in the field of clinical psychology. In essence, the objective any projective test is to decline below surface responses to obtain true feelings, meanings, or motivations. The rational behind projective tests comes from knowledge that people are often reluctant or cannot reveal their deeper feelings.

iii) Word Association Test

Word association tests are among the most practical and effective projective tools for market researcher. An interviewer reads a word to a respondent and asks him or her to mention the first thing that comes into mind. Usually the consumer will respond with a synonym or an antonym.

The list is read in quick succession to avoid time for defense mechanism to come into play. If the respondent fails to answer within three seconds, some emotional involvement with the word is assumed.

iv) Cartoon Tests

Cartoon tests create a highly projective mechanism by means of cartoon figures or strips similar to those seen in comic books. The typical cartoon test consists of two characters one balloon is filled with dialogue and the other balloon is blank. The respondent is then asked to fill in the blank balloon.

Cartoon tests are extremely versatile. They can be used to obtain differential attitudes toward the types of establishment and the congruity, or lack of congruity, between these establishments and a particular product.

v) Consumer Drawings

Researcher sometimes ask consumers to draw what they are feeling or how they perceive object. Sometimes consumer drawing can unlock motivations or express perceptions.

vi) Photo Sorts

Consumers express their feelings about brands through a specially developed photo deck showing pictures of different types of people, from business executives to college students. Respondents connect the people with brands they think they use.

vii) Third Person Techniques

Perhaps the easiest projective techniques to apply, other than word association, are third person techniques. Rather than asking someone directly what he or she thinks the interviewer couches the questions in terms of “your neighbor”, or “most people” or some other third party.

5.4 Advantages & Limitations of Qualitative Research

i) Advantages of Qualitative Research

The popularity of qualitative research continues to grow unabated. Several reasons accounts for its popularity. First, qualitative research is usually much cheaper than quantitative research.

Second, there is no better way than qualitative research to understand the in-depth motivations and feelings of consumers. A third reason that qualitative research is popular is that it can improve the efficiency of quantitative research.

In the final analysis, all research is undertaken to increase the effectiveness of marketing decision making. Qualitative research blends with quantitative measures by providing a more thorough understanding of consumer demand. Qualitative techniques involve open-ended questioning and probing. The data is rich, human, subtle and often very revealing.

ii) Limitations of Qualitative Research

Qualitative research can, and does, produce helpful and useful information. Yet it is looked down upon by some researchers. One reason is that marketing successes and failures many times are based on small differences in a marketing mix. Qualitative research does not distinguish small differences as well as large-scale quantitative research. Qualitative research sometimes is superior, however, in detecting minor problems that may escape notice in a quantitative study.

A second limitation of qualitative techniques is that qualitative studies are not necessarily representative of the population of interest to the researcher.

A final concern about qualitative research is the multitude of individuals who, without formal training, prefers to be experts in the field. Because there is no certification body in marketing research, anyone can call himself or herself of a qualitative expert.

Check your progress

1. discuss the qualitative and quantitative research approach controversy

2. list and explain about the other qualitative research methodologies

Chapter Six: Measurement and Scaling

Contents

6.0 Learning Objectives

6.1 Introduction

6.2 Levels of Measurement

6.3 Criteria for Good Measurement

6.4 Measurement Problems

6.5 Measurement Scaling Methods

6.6 Basic Considerations when Selecting a Scale

6.0 learning Objectives

After you study this Chapter, you will be able to explain:

- levels of measurement
- criteria for good measurement
- measurement problems
- measurement scaling methods
- basic considerations when selecting a scale

6.1 Introduction

The process of measuring marketing phenomena is a basic aspect of marketing research. From a marketing decision view point, managers are interested in measuring various aspects of the marketing system. For example, they may want to measure demographic characteristics about individuals that would provide a basis for dividing or segmenting the total market for a product into a smaller groups or segments.

The most commonly used demographic characteristics include age, sex, social class, income, educational level, and nationality. They may want to seek information about the individual's motivation, which would provide clues that can be used partially to answer the question. "Why does a person buy a particular product?" often, they want additional information that gives an indication of the influence over behavior directed toward some object, person or group.

Knowledge about intentions is often sought to glean information about a person's current plans regarding future behavior. Therefore, the measurement of marketing phenomena is fundamental to providing meaningful information for marketing decision making. The objective of measurement is to transform the characteristics of objects into a form that can be analyzed by the researcher. The concept of an object is a thing that can be seen or touched – a material thing that occupies space, such as people, tables, books, automobiles.

On the other hand, the concept of characteristics suggests the indication of a quality that is peculiar to and helps identify an object. For example, an individual's physical characteristics could be his or her weight, height, color, of hair, or eyes, font size and so on. Also, objects include things that are not concrete in nature such as attitudes, status, leadership, ability, and intelligence. An individual would therefore possess psychological and social characteristics too, such as attitudes held toward some object, an intelligence level, and leadership style that could distinguish one person from another. These forms of an individual's characteristics and many other phenomena are of interest to marketers and therefore, necessitate measurement by the researcher.

6.2 Levels of Measurement

In measuring, the assignment of number must be made to the observation of the object. Therefore, our goal is to develop some form of measurement scale and then transform the observation of the characteristics of the object onto this measurement scale. In other words, we want to assign numerals so that the properties of the numbers are analogous to the characteristics of the objects we are attempting to measure. A measurement scale can be defined as a plan that is used to assign numbers to characteristic of objects.

In marketing research there are several types of measurement scales available. The appropriate one to use depends on the researchers' assumptions about how the numerals resemble the real world observations. Each measurement scale has its own underlying assumptions about its correspondence to the real world and, therefore, depending upon the scale used, may convey a different meaning about the observation. While there are a tremendous variety of measurement devices available for gathering information, all scales possess the properties of at least one of four levels of measurement. The levels of measurement are nominal, ordinal, interval and ratio.

Table 6.1 depicts the characteristics of these scales.

Table 6.1 Characteristics of the four levels of Measurement

Scale	Number system	Marketing Phenomena	Permissible Statistics
Nominal	Unique definition Of numerals (0, 1, 2, ..., 9)	Brands male-female store types Sale territories	Percentage mode Binomial test Chi-Square test
Ordinal	Order of numerals (0 < 1 < 2... < 9)	Attitudes Percentiles Preferences Occupation Social class	median Rank-order Correlation
Interval	Equality of Differences (2 - 1) = (7 - 6)	Attitudes opinions Index numbers	Range mean Standard Deviation Product-movement Correlation
Ratio	Equality of ratios $\left(\frac{2}{4} = \frac{4}{8}\right)$	Age Costs number of customers Sales (units/dollars)	Geometric mean Harmonic mean Coefficient of Variation

1. Nominal Scale

A nominal scale is one level of measurement where numbers are used only as labels to classify objects. Examine these two sets of numbers, to begin 19901 and 44822. They probably signify nothing to you. When you are told that they are zip code numbers, they probably still are

meaningless until you can refer to a zip code directory. You will find that they designate two towns named A, respectively, in B and C. Determined on an arbitrary system by the postal service, they are useful only for its purposes. The numbers have no mathematical properties in themselves as they are only designators, like names so we say that they are examples of a nominal scale. Many variables studied in marketing are nominal. Examples of such variables are sex, geographic area of residence, occupations, religions preference, store types, and brand awareness versus non awareness.

2. Ordinal Scale

An ordinal scales provide information about the ordered relationship among objects. This level of measurement contains all the information of a nominal scale plus a measure of whether an object has more or less a characteristic than some other object, but not how much more or less.

Let's illustrate ordinal measurement by assuming that a manufacturer of fine cloth is going to bring out a new line for which the designs have created three new patterns (only one to be selected for manufacturing). This market oriented firm is going to have consumers choose the pattern of exhibiting it to them in retail department. One approach is to ask each person to rank his/her preference as first, second and third, when done with twenty-five respondents, the results might look like this:

Respondent	Design Ranking		
	Style 1	Style 2	Style 3
A	2	1	3
B	1	2	3
C	2	3	1
D	1	3	2
E	1	2	3
F	1	3	2
:	:	:	:
Y	1	3	1

The common arithmetical operations – addition, subtraction, and division – can not be legitimately used with ordinal scales, but statistical procedures based on interpretations of “greater than” or “less than” are permissible.

Another use of the ordinal scales, but more controversial, is the rating of particular characteristics. For example, suppose that we wanted to measure an individual’s attitude toward a product “A” by requesting he or she answer the following question:

The product “A” is a terrific product (Check one)

(6) I strongly agree (3) I slightly disagree

(5) I somewhat agree (2) I somewhat disagree

(4) I slightly agree (1) I strongly disagree

Here the researcher assigns numbers to reflect the relative rating of each of the statements that will be used to interpret relative differences. The number in parenthesis next to each statement represents the numerical value assigned to the individual’s response to the question.

3. Interval Scale

The manufacturer might gauge shoppers’ preferences by another approach. For a different approach to measuring preference, a shopper might be shown the three patterns, asked to rank them, and then asked to state how much more she would be willing to pay for each preferred pattern. There would be six pairs in the results and therefore six columns, but illustrating possible results (with the same twenty-five persons):

Additional Amount Person would pay

For Preferred Style

Respondent	Style 1 Over style 2	Style 1 over style 3	Style 2 over style 1	ETC
A	—	\$4	\$11	
B	\$15	—	—	
C	3	—	—	
D	10	6	—	
E	10	15	—	
F	—	8	—	
G	5	—	—	
:	:	:	:	
Y	12	10	—	

Now the distance between the rankings has been quantified and can be interpreted. Another advantage is that these data are capable of more calculations, are more versatile.

If the mean (average) difference given for style 1 over 2 was \$8 – 65 and that between style 1 and style 3 was \$10 – 81, we can infer that these people had a 20 percent higher interest in style 2 than in style 3. This is an example of interval scaling, in which all intervals are measured in the same standard which in this case is \$1. The statistical capabilities far surpass those of ordinal scales. However, they have a weakness of having no zero base, which restricts their statistical versatility.

iv) Ratio Scale

A fourth approach would be to show each person the three designs, one at a time, and ask directly: “How much would you pay for the set with this design? (The sequence in which they are shown should be rotated to avoid order bias) Answers to this question might be the following for the same group of respondents:

Price Per Set Person would Pay for Each Style

Respondent	Style 1	Style 2	Style 3
A	\$ 95	\$110	\$85
B	110	102	95
C	85	75	90
D	115	105	110
E	100	90	88
F	90	80	80
G	96	90	100
:	:	:	:
Y	90	80	83

These data are in a ratio scale, which are measured from a base of zero. With them the manufacturer can now infer that respondent E would pay 10 percent more for style 1 than for style 2. These are the most versatile or robust scales in terms of the power of statistical analysis of them.

It may seem that any sensible researcher would always use ratio scales, but that is not true. Their advantages quantitatively may be offset, in some cases, by the particular meanings found uniquely in one of the three other types of scales.

The specific units, in which responses are to be given from another essential decision is quantitative measurement. This determination depends on the meanings that are desired in the measured results, the qualitative aspect that is inextricably linked with the quantitative.

6.3 Criteria for Good Measurement

Against this background the obstacles to unsatisfactory measurement become impressive. To identify the first, we need to express the objectives that a researcher should satisfy, if the measurements are to be an acceptable quality. We are listing six, of which the first three are of more fundamental importance:

1. Reliability

It is the property of producing consistent results when certain research methods are repeated. If a replication of the some techniques on a similar population did not yield the same measurement as the first data gathering, it would mean that it marred by random errors. One should not depend on them as generalization for guiding decisions. Reliability, then is very desirable.

2. Validity

It is a more extensive objective than reliability. An instrument is valid when it measures what it is supposed to measure; but since attitude are elusive, attitude-scale validation is difficult.

Marketing studies must have validity, or they are not scientific. But of more concern to a decision maker, then data are dangerous decision inputs when they are valid. One must have an

accurate concept of what the data mean when interpreting them, and the persons who are its sources need to accurately interpret when he or she is desired to measure and report.

3. Sensitivity

It is the ability of a measurement to indicate changes or differences. The construct researched may lack sensitivity or the attributes and scales of response may be the wrong ones to measure differences. Research yields nothing significant and is wasted when data lack sensitivity.

4. Relevance

Relevance to the decision that is to be made (or problem to be solved) is an obvious practical consideration. The constructs that need to be measured and the terms descriptive of them should be identically defined by the decision maker, the researcher, and the respondents who are to give information about them as far as possible.

5. Versatility

Versatility of the measurements for various statistical interpretations is a desired goal, especially for assessing the result; validity and for drawing maximum meaning from them.

6. Ease of Response

On the part of the persons who will supply the data is a question that should always be considered. The fate of the study is substantially in their hands, and if they are repelled by difficulties in replying to make serious misjudgments of the information desired to them, due to questionnaire design, a study is in deep trouble. Too easily is the respondent out there overlooked?

6.4 Measurement Problems

In developing a communication, one needs to cope with a number of factors. They relate mainly to (1) the respondent and (2) the instrument that states the questions and provides for the answers, usually a questionnaire.

Respondent-associated errors results from a situation or state of a subject at the time when he or she is approached for an interview or undertakes to answer a questionnaire received by mail. These might be categorized into four situations:

1. Respondents may not understand the question; under such circumstances, answers are likely to be given that do- not relate to the problem under investigation.
2. Respondents may understand the question, may wish to answer, but may not remember the necessary information. In the search for facts the respondent is frequently unable to remember, and the questionnaire must be designed to help the respondent recall information
3. Respondent may understand the questions, have the information, and yet be reluctant to give it. Sometimes personal information must be to refuse to answer. Another aspect of the problem is that of having the respondents deliberately give incorrect information in an attempt to avoid embarrassment or to say what they think the researcher wants to hear.
4. Respondents may understand the question, may wish to answer, but be in able to. Conditions that contribute to this situation are (a) respondents may lack the facility for expressing themselves, or (b) the question may be asked of the wrong people.

Fatigue, confusion, inconvenience, indifference, and perceived threats to one's prestige or privacy may operate to produce such situation.

Instrument associated errors are those caused by faults in questionnaires rather than our in the respondent. Some of the faults may be

1. Excessive length or monotony that bored and tires people
2. Ambiguous instruction on what is wanted or the terms in which the person is to respond
3. Poor choice of wording, in terms of the meaning that the research intended to convey or in terms of the respondent's vocabulary or concepts of words
4. Spaces or wording of answer categories may be inadequate, confusing, or biasing.
5. Erratic or tactless sequences of questions.

6. Excessive plumbing of memory or mental gymnastics entailed
7. Revelations of sponsorship or purpose.

Poor designs of instruments also affect interviewers, multiplying the difficulty of communicating with respondents.

6.5 Measurement Scaling Methods

Many marketing phenomena are easy to measure. For example, if a researcher is interested in the sales volume of a particular product, he or she may find that the information is stated in dollar terms and that accurate records have been kept on such amounts. However, in many instances, researcher may be interested in measuring such concepts as motivation or attitudes.

Measuring such concepts is not as easy as measuring dollar amounts. Respondents may be unwilling to verbalize certain psychological characteristics such as attitudes. Even if they were to express their feelings, they may have difficulty communicating their attitudes.

So the initial objective of the researcher is to obtain cooperation, to allay suspicion and other resistances on the part of the person requested to respond. The approach must be one that makes clear what is wanted, why it is wanted and that the respondent may answer without fear. Then the researcher must make certain that appropriate research methods are used to make it easy for the respondent to answer, and to do so in a manner that avoids measurement errors. Success in these objectives depends partly on developing special measurement scales. Some of the rating scales applied by the researcher are as follows.

a) Basic Rating Scales

1. Itemized Rating Scale

The itemized rating scale is, perhaps the most frequently used in marketing research because of its simplicity and its adaptability to most measurement situations. This form of rating scale requires a respondent to indicate his or her attitude by selecting a position on a continuum that reflects a range of possible views regarding an attitude object. The various positions on the continuum are set up in a sequential order in terms of the scale positions (in other words,

representing the degree of attitude held). The scale positions are clearly marked by a descriptive statement of some kind. The following is an example of such a scale.

Overall, how satisfied would you say you are with Your present long-distance service:				
Very Satisfied	Somewhat Satisfied	Indifferent	Somewhat Dissatisfies	Very Dissatisfied
_____	_____	_____	_____	_____

Even though this rating scale appears to be simple, there are several considerations that a researcher must address:

a) Number of Categories

The researcher has the option of choosing the number of categories that represents the respondent's attitude object. For example, he or she may choose a scale that merely classifies the respondent into one of the two categories (for example, two opposite such as favorable and unfavorable). Thus this form of rating scale will only have the properties of a nominal scale that limits the type of analysis possible. Despite this disadvantage, it may be appropriate when a questionnaire is extremely long or when a respondent has a limited educational level.

b) Balanced or unbalanced terms

A question that must be considered is: "should the categories be balanced in terms of the number of favorable versus the number of unfavorable items?" A balanced scale has the same number of favorable or unfavorable categories. The argument for this type of scale is the potential biasing of responses that can result from limiting the number of categories on either side of favorable or unfavorable. For example, consider the following scale

Now, please tell me how you would rate the Promoters of service				
Extremely Good	Very Good	Good	Above Average	Average
_____	_____	_____	_____	_____

If a respondent disliked the service, he or she would not be able to give an unfavorable answer with this form of scale. The company's service would, at worst, be rated average. This would not permit respondents to indicate low attitudes. The researcher must be alert for such an unbalanced scale.

c) Even or odd number of categories

An odd number of categories allow a respondent to be indifferent or neutral toward the question by picking the mid-scale value. Some opponents of an odd number of categories argue that attitudes are not neutral, and by allowing a respondent to answer as such they are really indicating an untrue answer. On the other hand, if an even number of categories were to be used, the respondent would be forced to take a position by expressing some degree of sentiment.

2. Rank-Order Scale

Itemized scale is considered to be non-comparative because the respondent makes a judgment without reference to another object, person, and so on. On the other hand, comparative rating scales, in general, make an explicit reference point against which to compare the views thus obtained. Asking questions are a form of opinion questions in which the respondent is asked to rank comparatively the items listed. Ranking questions have advantages in being easy to tabulate and in giving the respondent a definite set of items. Among the negatives are these:

- a) Unless all the alternatives that are in the respondent's set of choices are included, the data can be misleading
- b) Order bias can affect answers, in which the first and last in the list may be given preference.
- c) When asked to rank items that are wholly outside the respondent's preference set, the responses are meaningless.
- d) Ordinal scales like this tell us nothing about how far apart the items stand, in the respondents' perceptions, or why they were ranked that way. The following figure shows an example of Rank-order scale

In your job you may perform any of the seven roles listed here. Consider how much time you spend in each role. Then rank the roles from 1 to 7 in time spent on each.	
Write a "1" after that given the most time – and a "7" after the last time	
Coordinator _____	innovator _____
Entrepreneur _____	Integrator _____
Expediter _____	
Expert _____	
Forecaster _____	

3. Paired Comparison Scale

People tend to be able to select more readily from the items that they can compare directly. The paired comparison method overcomes this weakness of ranking questions that have three or more items, and it also avoids order bias. An example is given in Figure 4.2, which presents six different items in pairs. As each item is compared individually with the five other items, all comparisons are made. The ranking is found in terms of how many times each item is preferred over the other (For example, if “distributor relations” was selected in five out of six of its pairs and “product costs” in only two out of its comparisons, distributor relations would be ranked the higher). Notice that each item appears first half of the time. As the method is cumbersome and time consuming, it is not often used.

Fig 6.2 A paired comparison Test for product “A”

Thinking about sun products in general, here are some characteristics used to describe them. Please tell me which characteristic in each pair is more important to you when selecting a sun care product ‘A’	
a. Tans evenly	b. Tans without burning
a. Prevents burning	b. Protects against burning and tanning
a. Good value for the money	b. Goes on evenly
a. Not greasy	b. Does not stain clothing
a. Tans without burning	b. Prevents burning
a. Protects against burning & Slamming	b. Good value for the money
a. Goes on evenly	b. Tans evenly
a. Prevents burning	b. Not greasy

4. Constant Sum Scale

This scale provides a better perspective of the distance between points on a continuum. With this type of scale, the respondent is asked to divide or allocate a number of points, percentages, or dollars, usually a total sum of 100 to indicate the relative importance of the attributes being studied.

The amount that are allocated to each alternative indicate the ranks assigned to them by the respondent, but ranks assigned to them by the respondent, but it also indicates the amount of difference the difference the respondents set between each alternative. The following figure is an example of the constant sum approach.

Fig. 6.3 Constant Sum Question

If you had \$100 to allocate to the following charitable organization, how would you allocate your money? Your may give all your dollars to any one organization, but your total must add up to \$100	
Red Cross	\$ _____
Cancer society	\$ _____
Heart Association	\$ _____
Hung Association	\$ _____
Total	\$ _____

While the use of this form of scale is growing, some problems remain; first, there is some uncertainty whether the results represent interval or ratio data. For example, when a respondent allocate \$50 to the Red Cross and \$10 to cancer society, the question is:

Does this mean that the Red Cross is five times as important?

A second limitation of the constant scale is the number of attributes that can be handled by the respondent. As the number of categories begins to increase, the respondent may have difficulty dividing up the number of points. However, the constant sum scale has an advantage over the rank-order scale in that it allows a respondent to specify equality to objects by assigning equal points to alternatives.

B) Specific Attitude Scales

To this point, we have been discussing the general types of form of attitude scales. In addition to these, a large variety of specific scaling techniques have been conceived and applied during their twenty-five years of adaptation to marketing studies. The preceding discussion is focused on the three most widely used scales: (1) Semantic differential, (2) Likert, and (3) Staple.

1. Semantic Differential

In the semantic differential scale, respondents are asked to express their feelings about whatever is being evaluated by recording their responses on a scale of adjectives (such as strong-mild), which are paired polar opposites (or antonyms). The general model for this differentiating scale can be shown in the following, for cigarette brands:

Cigarette Brand 2

(Concept)

(Polar term X)

(Polar term Y)

Strong (1) (2) (3) (4) (5) (6) (7) mild

The seven scale positions are intended to signify:

1. Extremely X; 2 Quite X ; 3. Slightly X ; 4. Neither X nor Y, equally X and Y
5. Slightly Y; 6 Quite Y 7. Extremely Y

The semantic differential technique may use words to label the several scale positions, which may be of any number as in the five shown next, in which the respondents where asked to rate radio and television commercial that were played to them.

	Very	Some What	Neither	Somewhat	Very
Exciting	_____	_____	_____	_____	Dull
More for					more for
Older people	_____	_____	_____	_____	younger people
Boring	_____	_____	_____	_____	Interesting
Like me	_____	_____	_____	_____	Not like me

You may notice that the favorable labels are not all on the left side above, for varying their location is intended to avoid a “halo” effect in which the respondent tends to put all of his or her responses on the same side as in the first items on the questionnaire.

It is preferable for these scales to be self-administered, putting the form in the respondent’s hands rather than expecting them to understand clearly by listening to the interviewer.

2. Likert Scale

In the Likert scale, the matter of choosing opposite adjectives is avoided. Rather, it makes a statement or poses one description (or adjective) for whatever is being evaluated. The respondent is then given a scale whose positions range from “strongly agree” to “strongly disagree”. The original Likert format had five rating position, but in the research from which we are drawing our example, a six-place scale was used, as follows:

	Strongly Agree	Generally Agree	moderately Agree	moderately Disagree	Generally Disagree	Strongly Disagree
Selection is wide	_____	_____	_____	_____	_____	_____
Brands are less known	_____	_____	_____	_____	_____	_____
Quality is high	_____	_____	_____	_____	_____	_____

One apparent advantage of the Likert scale is that the respondent needs to consider only one objective (description) for each item, and there is no problem of finding exactly opposite terms. Also, the researcher can run a whole battery of items for the respondent to evaluate, yet there is only one inform set of rating categories that the person needs to use.

3. Staple Scale

The staple scale is a modification of the semantic differential. A single adjective is placed in the center of the scale. Typically it is designed as a ten point scale ranging from +5 to -5. The technique is designed to measure both the direction and intensity of attitudes simultaneously.

The semantic differential, on the other hand, reflects how close the descriptor adjective fits the concepts being evaluated. The following figure is an example of a staple scale.

**Figure 6.4 Staple Scale
loan Rates**

		Friendly personnel	Competitive
+5	+5	-1	-1
+4	+4	-2	-2
+3	+3	-3	-3
+2	+2	-4	-4
+1	+1	-5	-5

Select a plus number for words that you think describes the savings and loan accurately. Select a minus number for words you think do not describe the savings and loan accurately. Therefore, you can select any number form +5 for words that you think are very accurate all the way to -5 for words that you think are very inaccurate.

The staple scale is the simplification of the semantic differential, in which a single adjective or description is used for each item rated. To quote from Menezes and Elbert, whose examples we are using: It can be described as a unipolar rating scale with value progression ranging from positive to negative which measures directions and intensity simultaneously.

Their application of a staple scale for the retail store image study was this

+3	+3	+3
+2	+2	+2
+1	+1	+1
Wide selection	lesser known brands	high quality
-1	-1	-1
-2	-2	-2
-3	-3	-3

The primary advantages of the staple scale are that it enables the researcher to avoid the task of creating bipolar adjective pair. It is also claimed that the scale permits finer discrimination in measuring attitudes.

On the negative side, is the problem that descriptor adjective can be phrased in a positive, neutral, or negative vein. The choice of phrasing has been shown to affect the scale results and the person's ability to respond. The staple scale has never had much popularity in commercial research and is used less than the semantic differential.

6.6 Some Basic Considerations when Selecting a Scale

For most studies, the question arises as to which scale to use. We have presented the most commonly used scales and the advantages and disadvantages of each.

i) Selecting a Rating, Ranking, Sorting Scale

Most commercial researchers lean toward scales that can be administered over the telephone to save interviewing expense. Each of administration and development are also important considerations.

For example, a rank-order scale can be quickly created, whereas a semantic differential rating scale is often a long and tedious process. Decision making needs of the client are always paramount. Can the decision be made using ordinal data, or must we have interval information? Researchers must also consider the respondents who usually prefer nominal and ordinal scales because of their simplicity. The choice of which type of scale to use, will depend upon the problem at hand and the questions that must be answered. It is not uncommon to find several types of scales in one research study. For example, an image study for a grocery chain might have a ranking scale of competing chains and a semantic differential to examine components of the chains image.

ii) Balanced versus non balanced Alternatives

A balanced scale has the same number of positive and negative categories. A non balanced scale is weighted toward one end or the other. If the researcher expects a wide range of opinions then a

balanced scale is probably in order. If past research or a preliminary study has determined that most opinions are positive, then the scale should contain more positive gradient than negative. This would enable the researcher to ascertain the degree of positive ness toward the concept being researched.

iii) Number of Categories

The number of categories to be included in a scale is another question that must be resolved by the marketing researcher. If the number of categories is too small – for example, good, fair, poor – the scale is crude and lack richness. A three-category scale does not reveal the intensity of feeling that, say, a ten – category offers. Yet, a ten-category scale may go beyond a person’s ability to accurately discriminate from one category to another.

Research has shown that rating scales should typically have between five and nine categories.

When a scale is being administered over the telephone, five categories seem to be the most that respondents can adequately handle.

iv) Odd or Even Number of Scale Categories

An even number of scale categories means that there is no neutral point. Without, neutral point respondents are forced to indicate some degree of positive or negative feelings on an issue.

People who are truly neutral are not allowed to express their feeling. On the other hand, some commercial marketing researchers say that putting a neutral point on a scale gives the respondent as easy way out. Assuming that he or she has no really strong opinion, the person does not have to concentrate on his or her actual feelings and can easily choose to be neutral. However, researchers also point out that it is rather unusual to be highly emotional about a new flavor of salad dressing, a package design, etc.

v) Forced Versus Non forced Choice

A consideration, mentioned in our discussion of the semantic differential, is that if a neutral category is included, it will typically contain those who are neutral and these who lack knowledge to answer the question. Some researchers have resolved this issue by adding a “doubt

know” response as an additional category. For example, a semantic differential might be set up as follows:

Friendly	1	2	3	4	5	6	7	unfriendly	don't know
Unexciting	1	2	3	4	5	6	7	exciting	don't know

Adding a don't know option, however, can be an easy out for the lazy respondent. A neutral point on a scale without a don't know option does not force a respondent to give a positive or negative opinion. A scale without a neutral point or a don't know forces even people with no information about an object to state an opinion.

The argument for forced choice is the same as for a scale with an even number of categories. The argument against forced choice are that inaccurate data are recorded or respondents refuse to answer the question.

A questionnaire that continues to require respondents to provide an opinion, when, in fact, they lack information to make a decision can create ill will and result in termination of the interview.

Check your progress

1. List and explain the levels of data measurement

2. Discuss criteria for good data measurement

3. Explain the problems related to data measurement

4. basic considerations when selecting a scale of measurement

CHAPTER SEVEN: QUESTIONNAIRE DESIGN

Contents

7.0 Learning objectives

7.1 Introduction

7.2 Types of Questionnaires

7.3 The Questionnaire Development Process

7.0 Learning Objectives

After you study this Chapter, you will be able to explain:

- types of questionnaires
- questionnaire development process

7.1 Introduction

Data may be obtained by either observing or asking for them, and forms are needed for field use in both observation and interviewing. All three media for communicating with respondents – personal, telephone, and mail – rely on data collection forms known as a questionnaire.

A questionnaire is a set of question designed to generate the data necessary for accomplishing the objectives of the research project. It is a formalized schedule for collecting information from respondents.

A questionnaire provides standardization and uniformity in the data gathering process. It standardizes the wording and sequencing of the questions.

The accuracy and relevancy of the data gathered depend heavily on the questionnaire. In this stage of research too, the decision makers should be consulted. They would cooperate, for people tend to believe that they have some expertise in the art of questionnaire writing.

The questionnaire (sometimes referred to as an interview schedule or survey instrument) plays a critical role in the data collection process. An elaborate sampling plan well-trained interviewers proper statistical analysis techniques, and good editing and coding accomplish nothing if the

questionnaire is poorly designed. Improper design can lead to incomplete information, inaccurate data, and of course higher costs. The questionnaire and the interviewer are the production line of marketing research. It is here that the product, be it good or bad, is created. The questionnaire is the workers' (Interviewers') tool that creates the basic product (respondent information).

A questionnaire is simply a formalized schedule to obtain and record specified and relevant information with tolerable accuracy and completeness. In other words, it directs the questioning process and promotes clear and proper recording.

That can be spelled out in five functions of questionnaires relating to the respondent (person interviewed):

1. Give the respondent clear comprehension of the questions.
2. Induce the respondent to want to cooperate and to trust that answers will be treated confidentially.
3. Stimulate responses through greater introspection plumbing of memory, or reference to records.
4. Give instruction on what is wanted and the manner of responding.
5. Identify what needs to be known to classify and verify the interview.

Questionnaire also should be designed to facilitate interviewers' administering them. Questionnaire design also should anticipate the requirement of efficient data processing.

7.2 Types of Questionnaires

The content of the question is only one important aspect in the construction of survey questionnaires. The researcher must also consider the structure of the question and the format of the response categories accompanying the question. The two major types of question structures include: (1) open ended questions, and (2) Closed-ended questions.

(1) Open Ended Questions

An open ended question, known also as "free answer" or "free response", calls for a response of more than a few words. The topic is established for the respondent, who is left to structure a reply as he or she sees fit. The respondent has considerable freedom in phrasing an answer, which may be lengthy and detailed, and in his or her own words.

Open-ended questions are most likely to be used in the early stages of the study, when the unrestricted responses they attract are of value in giving researchers a general map of the area of survey. This can lead to the identification of significant aspect of affecting the subject under survey, so that later stages of research can be designed to cover these factors.

In order to build up good will with the respondent, it is often advantageous to start a survey questionnaire with an open question. This will allow the respondent considerable latitude in forming a reply. A typical question might be: what do you like to do in your spare time? Most people like to talk about their hobbies and spare-time interests, and will not be reluctant to tell an interviewer something about these activities. In doing so, they are more likely to form a favorable attitude towards the interviewer, and be more willing to answer the remainder of the question.

Open questions are interesting because of the spontaneity and individual flavor of the replies, but questionnaire designs should not use them indiscriminately.

In unstructured interviews where informal methods of enquiry are customary, open questions predominate. Skilled interviewers are responsible for phrasing questions in a style suitable for their particular audience, and also, of course, in agreement with the objectives of the survey.

Interviewers should be briefed as to the extent to which they can probe for further information, to expand or clarify some statement in the open answer.

2. Close-Ended Questions

Questions in a questionnaire can be either open-ended or closed-ended. In a closed-ended question, respondents are offered a set of answers from which they are asked to choose the one that most closely represents their views. An example of closed-ended questions looks like the following:

“All groups can live in harmony in this country without changing the system in anyway”

_____strongly agree

_____ Disagree

_____ Agree

_____ strongly disagree

Closed question call for responses which are strictly limited. They are easy to ask and quick to be answered. They require no writing by either respondent or interviewer, and their analysis is straight forward. Closed question may be:

1. Simple alternative questions:

These have only the choices of response.

For example: Yes/No, Good/Bad

Respondents are divided into the sub-groups or categories affecting certain basic characteristics of the sample populations. Quantification is simple.

These simple questions, sometimes referred to as dichotomous, are useful as filter questions, separating users from non-users, e.g. did you buy product X last week?

2. Multi-choice Questions:

These are an extension of simple alternative questions. Respondents are able to choose form a range of possible answers, which are designed to reflect different shades of opinion or variations in use of a product.

Careful pilot work is necessary in order to ensure that the alternatives offered in multi-choice questions provide sufficient scope for respondents to make valid answers. Alternatives must be mutually exclusive, so that respondents are able to differentiate between them without difficulty.

Closed questions could lead to bias by 'forcing' respondents to choose between certain alternatives, but provided the piloting stage has been thorough the risk can be minimized.

There is some evidence that respondents of low socio-economic status and education appear to prefer closed questions to open questions, since they can then answer questions which they do not fully understand without revealing their lack of understanding to interviewers. Survey planers should, therefore, take note of this potential source of bias, and design questionnaires which are likely to result in valid respondent's degree of knowledge about the subject of the survey and the extent to which this can be established before formal interviewing takes place.

The major drawback is that they may introduce bias, either by forcing the respondent to choose from given alternatives or by making the respondent select alternatives that might not have otherwise occurred to him or her.

The appropriateness of either open-ended or closed-ended questions depends upon a number of some factors. Some years ago, Paul Lazarsfeld suggested the use of the following considerations to determine appropriateness.

1. The objective of the questionnaire

Closed-ended questions are suitable when the researcher's objective is to lead the respondent to express agreement or disagreement with an explicit point of view. When the researcher wishes to learn about the process by which the respondent arrived at a particular point of view, an open-ended question is likely to be more appropriate.

2. The respondent's level of information about the topic in question

Open-ended questions provide opportunities for the interviewer to ascertain lack of information on the part of the respondent, whereas closed-ended questions do not obviously, it is futile to raise questions that are beyond the experiences of respondents

3. The extent to which the topic has been thought through by the respondent

The open-ended question is preferable in situations where the respondents have not yet crystallized their opinions. The use of a closed-ended questions in such situations involves a risk that in accepting one of the alternatives offered, the respondent may make a choice that is quite different from an opinion that would have otherwise been expressed had he or she gone through the process of recall and evaluation of past experience

4. The ease with which the content of the answer can be communicated by the respondent or the extent to which the respondent is motivated to communicate on the topic.

The closed-ended question requires less motivation to communicate on the part of the respondent, and the response itself is usually less revealing (and hence less threatening) than in the case of the open-ended question. The researcher who uses close-ended questions tends to encounter less frequent refusal to respond.

7.3 The Questionnaire Development Process

Designing a questionnaire involves a logical series of steps. The steps may vary slightly from researcher to researcher, but all researchers tend to follow the some general sequence committees and line of authority can complicate the questionnaire design process. It is often wise to clear each step of the design process with the individual who has the ultimate project authority.

The design process itself, such as question wording and format, can raise additional issues of unanswered question. This, in turn can send the researcher back to step one a clearer delineation of information sought.

The steps involved in questionnaire development are as illustrated below:

1. Determine survey objectives, resources and constraints
2. Determine Data collection method(s)
3. Determine question response format
4. Decide question wording
5. Establish questionnaire flow and layout
6. Evaluate the questionnaire and layout
7. Obtain appraisal from all relevant parties
8. Pretest and Revise
9. Prepare final copy
10. Implementation

1. Determine survey objectives, Resources and constraints

The research process often begins when a marketing manager, brand manager, or new product development specialist has a need for decision making information that is not available.

some firms it is the responsibility of the manager to evaluate all secondary sources to make certain that the needed information has not already been gathered. In other companies, the manager leaves all research activities, primary and secondary, to the research department.

Survey objectives – the decision-making information sought – should be spelled out as clearly and precisely as possible. If this step is completed thoroughly, the rest of the process will follow more smoothly and efficiently.

The initial stage is the time to make sure that other projects are not tagged onto the study objectives. It is also the point weight budget constraints versus information needs. If for example, a consumer needs to be showing several package style and logos, a personal interview is mandatory. Give a limited budget is probably means that a mall intercept study is dictated. A mall intercept interview should almost always be kept to 15 minutes or less. Thus, the brand manager is quite limited in the quantity of data that can be gathered.

2. Determine Data Collection Method(s)

There are variety of ways on which data can be gathered, such as in person, telephone, mail etc. Each method will have an impact on questionnaire design. In fact, an in-person questionnaire in a mall will have constraints not found in an in-home interview. A mall, interview, for example, faces the time limitation. A telephone interview often requires a rich verbal description of concept to make certain the respondent understands the idea being discussed. In contrast, in a personal interview an interviewer can show the respondent a picture or demonstrate the concept.

3. Determine Question Response Format

Once the data collection method has been determined the actual questionnaire design process begins. The first phase on the process concerns itself with the types of questions to be used in the survey. Three major types of question-response formats are used in marketing research: open-ended, close-ended, and scale-response questions.

a) Open-Ended Questions

Open-ended questions are those to which respondents can reply in their own words. In other words, the researcher does not limit the response choices.

Often open-ended question require “probes” from the interviewer. A probe is encouragement from the interviewer for the respondent to elaborate or continue the discussion. The interviewer may say, “Is there any thing else?” Or “Would you elaborate on that?”

Probes aid in clarifying the respondent’s interests, attitudes, and feelings. Today computers are playing an increasingly important role in analyzing and recording probes to open-ended questions.

Open-ended questions provide several advantages to the researcher. They enable respondents to give their general reactions to questions.

Another advantage of open-ended responses is that they can provide the researcher with a rich array of information. Respondents are answering from their own frame of reference.

Advantages are described in “real world” terminology rather than laboratory or marketing jargon. Often this is helpful in designing promotion themes and campaign. It enables copywriters to use the consumers’ language.

The inspection of open-ended data can also serve as a means of interpreting closed-ended questions. This analysis often sheds additional light on the motivators or attitudes behind the closed-ended response pattern.

Open-ended question are not without problems. One factor is the time and money consuming process of editing and coding. Editing open-ended responses requires collapsing the many response alternatives into some reasonable number. If too many categories are utilized, data patterns and response frequency may be difficult for the researcher to interpret. If the categories are the broad, the data are too general and important meaning may be lost, etc.

Thus, a basic problem with open-ended questions lies in the interpretation processing area. In fact, a two phase judgment must be made. First the researcher must decide on the proper set of categories and then each response must be evaluated as to which category it falls into.

A related problem of open-ended questions is interviewer bias. Open-ended questions may also be biased toward the articulate interviewee. A person with elaborate opinion and the ability to express them may have much greater input than a shy, inarticulate, or withdrawn respondent. Yet, both could be equally likely prospects for a product.

A final difficulty with open-ended questions is their inappropriateness to some self-administered questionnaires. If no interviewer is there to probe, a shallow, incomplete, or unclear answer may be recorded.

b) Closed-Ended Questions

A closed-ended question is one that requires the respondent to make a selection from a list of responses. The primary advantage of closed-ended questions is simply the avoidance of many of the problems of open-ended questions.

Interviewer and coder bias are removed because the interviewer is simply checking a box, circling a category, recording a number, or punching a key.

Reading response alternative may jog a person's memory and provide a more realistic response. Also, because the option of expounding on a topic is not given to a respondent, there is no bias toward the articulate. Finally, the coding and data-entry process is greatly simplified.

There is a difference between a preceded open-ended question and a closed-ended question. An open-ended question allows the respondent to answer in a freewheeling format. The interviewer simply checks the point on the preceded answer as they are given. In contrast, the closed-ended question requires alternatives to be read or show to the respondent.

Traditionally, marketing researchers have separated the two item response option from the many-item type. A two-choice question is called dichotomous. And the many item types is often called multiple-choice or multi-chotomous. With the dichotomous closed ended questions, the response categories are sometimes implicit. For instance, how would you respond to the following

question: “Did you buy gasoline for you automobile in the last week?” Obviously, the implicit options are “Yes” or No.

The simplest form of a closed-ended question is the dichotomous choice. A few examples are:

1. Do you think that inflation will be greater or less than last year?

Greater than 1

Less than 2

2. the federal government doesn't care what people, like me, think

Agree 1

Disagree 2

Note that the respondent is limited to the fixed alternatives. It is easy to administer and usually evokes rapid response. Many times a neutral or “no opinion/don't know” option is added to dichotomous questions to take care of those situations.

Dichotomous questions are proving to a large amount of measurement error. Because alternatives are polarized, the wide range of possible choices between the poles is omitted. Thus, question wording is very critical to obtain accurate responses.

Multiple choice questions have about the same advantages and disadvantages as those given in the general discussion of closed-ended questions. Replies do not have to be coded like an open-ended question, but limited information is provided. Interviewees are asked to give one alternative that correctly expressed their opinion, or, in some instances, to indicate all that apply. Some examples of multiple-choice questions follow:

1. In the last three month, have you used Johnson skin cream: [Check all that apply]

- as a facial wash 1
- for moisturizing the skin 2
- for cleansing the skin 3

- for treating dry skin 4
- for softening skin 5
- for sun burn 6

2. Please look at this card and tell me the letter that indicates the age group you belong to:

A. Under 17	1
B. 17 – 24 years	2
C. 25 – 34 years	3
D. 35 – 49 years	4
E. 50 – 64 years	5
F. 56 and over	6

Disadvantages of closed-ended Questions

Each type of closed-ended question has unique disadvantages. For the dichotomous question form, frequently the responses fail to communicate any intensity of feeling from the respondent. In some cases, the matter of intensity does not apply, as for the previous example on gasoline purchasing. But instances do arise in which the respondent feels very strongly about an issue but the intensity is lost in the dichotomous response form.

The multiple response close-ended questions have two additional disadvantages. First, the researcher must spend time generating the list of possible responses. This phase may require intensive analysis of focus group tapes, brainstorming, or secondary data investigation.

In any case, it requires more time and effort than the open-ended alternative or the dichotomous form. Another problem with closed-ended multiple response question is the range of possible answers. If the list is too long, respondents may become confused or disinterested. A related problem with any list is position bias. Respondents typically choose from among the first and last

alternatives. Scaled-response questions are multiple choice questions with the choices designed to capture intensity. Consider the following two question forms

1. Now that you have used the product, would you say that you would buy it or not?
 - Yes, would buy it
 - No, would not buy it

2. Now that you have used the product, would you say that you would ...
 - Definitely buy it
 - Probably buy it
 - Might or might not buy it
 - Probably would not buy it
 - Definitely would not buy it

The first question fails to capture intensity. It determines the direction (yes versus no), but it cannot compare to the second one for completeness or sensitivity or response. The latter is ordinal in nature.

A primary advantage of scaled-response questions is that scaling permits the measurement of the intensity of respondents' answers. Another advantage is that many scaled – response forms incorporate numbers, and these numbers may be used directly as codes. Finally, the marketing researcher is allowed to use much more powerful statistical tools with some scaled-response questions.

4. Decide Question Wording

Once the marketing researcher has decided on the specific types of question and the response formats, the next task is the actual writing of the question. The wording of specific questions always requires a significant time investment for the marketing researcher. It is a skill developed

over time and subject to constant improvement. Four guidelines are useful to bear in mind during the wording and sequencing of each question.

- a) The wording must be clear
- b) Select words so as to avoid biasing respondent
- c) Consider the ability of the respondent to answer the question and
- d) Consider the willingness of the respondent to answer the question

5. Establish Questionnaire flow and Layout

After the questions have been properly formulated the next step is to sequence them and develop a layout for the questionnaire. Questionnaires are not constructed haphazardly. There is a logic to the positioning of each section of the questionnaire experience marketing researcher are well aware that questionnaire development is the key to obtaining interviewer – interviewee rapport. The greater the rapport, the more likely the interviewer will obtain a completed interview. Also, the respondent's answers will probably be more carefully thought out and detailed. Researcher wisdom has developed the following general guidelines concerning questionnaire flow.

- a) use the screener question to identify qualified respondents
- b) Begin with a question that sparks a respondent interest
- c) Ask general question first
- d) Ask questions that require work in the middle of the questionnaire
- e) Insert prompters at strategic points
- f) Position sensitivity, threatening, and demographic questions at the end

6. Evaluate the questionnaire and layout

Once a rough draft of the questionnaire has been designed, the marketing researcher must take a step back and critically evaluate it. This phase may seem redundant, given all the careful thought that went into each question. But recall the crucial role played by the questionnaire. At this point in the questionnaire development, the following items should be considered: (1) Is the question necessary? (2) Is the survey too long? (3) Will the question provide the answer to the survey objectives?

(a) Is the Question Necessary?

Perhaps the most important criterion for this phase of questionnaire development is judging the need for a given question. Every question must serve a purpose.

Either it must be a screener; an interest generator, a required transition, or directly and explicitly related to the stated objectives of this particular survey. Any question that fails at least one of these criteria should be omitted.

(b) Is the Questionnaire too long?

At this point the researcher should role play the questionnaire with volunteers acting as respondents. Although there is no magic number of iterations the length of time it takes to complete the questionnaire should be averaged over a minimum of five trials. Any questionnaire to be administered in a mall or over the telephone that averages longer than 20 minutes should be cut.

(c) Will the questions provide the desired information to accomplish the research objectives?

The researcher must make certain that a sufficient number and types of questions are contained within the questionnaire to meet the decision-making needs of management. A suggested procedure is to carefully review the written objectives for the research project. Next, the researcher should go down the questionnaire and write each question number next to the objective that a particular question will help accomplish.

The objective of a good questionnaire layout is to make the tasks of the interviewer and respondent as clear, logical, and simple as possible.

Several key considerations of layout and design include the following:

- Appearances of mail and self-administered question
- Avoid a clutter look
- Allow plenty of space for open-ended responses
- Consider color coding the questionnaires
- Instructions printed within the questionnaire should be in capital letters.

7. Obtain Approval from all relevant parties

At this point in the questionnaire design process, the first draft of the questionnaire has been completed. Copies of it should be distributed to all parties that have direct authority over the project. Practically speaking, managers may step in at any time in the design process with new information, requests, or concerns requiring revisions. It is still important to get final approval of the first draft, even if managers have already intersected in the development process.

8. Pretest and Revise

After final managerial approval, the questionnaire must be protested – put through a trial run.

A pretest is done by the best interviewers who will ultimately be working on the job and administered to target respondents for the study.

They are told to look for misinterpretation, by respondents, poor skip patterns additional alternatives, for preceded and closed-ended questions, and general respondent reaction to the interview. The pretest should also be conducted in the same mode as a final interview. If we study is to be door to door then the pretest should be the same.

After completion of the pretest, any necessary changes should be made. Approval should then be re obtained before going into the field. If the pretest resulted in extensive design and question alternations, a second pretest would be in order.

9. Prepare Final Copy

Even the final copy phase does not allow the researcher to relax. Precise typing instructions, spacing, numbering, and proceeding must be set up, monitored, and proofread. In some instances the questionnaire may be reduced to save space, or it may be specially folded and stapled. Duplication may require typesetting, although this instance is rare. In general the quality of copying and a paper used is a function of who will see the questionnaire.

10. Implementation

The completed questionnaire is the basis for obtaining the desired decision-making information from the market place. A series of forms and procedures must also be issued with the questionnaire to make certain that the data are gathered correctly, efficiently, and at a reasonable

cost. Depending on the data collection method, procedures include supervisor's instructions, interviewer instructions, screeners, call record sheets and visual aid.

Check Your Progress

1. Explain the advantages and disadvantages of open-ended questions and closed-ended questions?

2. Explain in detail and procedure involved in the questionnaire design.

3. Design three open-ended and three closed question to measure consumers' attitudes toward Gillette shaving cream.

CHAPTER: – EIGHT: SOURCES AND METHODS OF DATA COLLECTION

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8.2.1 Collection of Secondary data

Learning Objectives

After you study this Chapter, you will be able to explain:

- the source of data
- techniques of data collection

8.0 Introduction

There are numerous possible sources of date and again we cannot list them in detail. Any way this is a determination that is special to each project. A step toward that determination is having, first, general classification of sources, which we now offer in several dimensions. These data sources include: Primary data and secondary data.

7.1 Primary Sources

The task of data collection begins after a research problem has been defined and research design/ plan worked out. Before deciding the method of data collection, the researcher should be aware of the existence of two types of data i.e., primary and secondary data. The researcher has to decide which sort of data he will be using for his study and accordingly he has to select one or the other method of data collection.

The method of collecting primary and secondary data is different. Primary data are to be originally collected, while secondary data; the nature of data collection work is that of compilation.

8.1.1 Collection of primary data

We collect primary data during the course of doing experiment in an experimental research. But in case of non-experimental research a researcher conducts survey to obtain primary data either through:

- Observation
- Direct communication with respondent in one form or another
- Personal interview

There are several method of collecting primary data particularly in survey and descriptive research. Commonly used methods of collecting primary data are discussed below.

- A. Observation method
- B. Interview
- C. Self administered Questionnaires
- D. Schedule (Interview Questionnaires)
- E. Focus Group Discussion (FDG)
- F. In-depth interview Etc.....

A. Observation method of data collection

Observation is the primary source of information especially in studies related to behavioral science. We all observe things around us, but this type of observation is not scientific observation.

Observation becomes scientific tools and methods of data collection:

- When it serves a formulated research purpose
- When it is systematically planned and recorded
- And it is subject to checks and controls on validity and reliability.

Under this method the researcher should personally and directly observe the condition and incidence of his fields of study. The researcher would not ask anything from respondents.

For example, in a study related to consumers' behavior, the investigator instead of asking the brand of say, wristwatch used by the respondent may himself look at the watch.

Direct observation is the most reliable method for gathering information related to the life style, status, conduct, behavior, language, custom and tradition and the like phenomenon. The observer should be absolutely detached and objective in gathering facts

The main advantages of this method

- Information obtained under this method relates to what is currently happening. It is not complicated by the either the past behavior or future intention or attitude.
- It is independent of respondents and is not demanding the active cooperation of the respondents.

Limitation of observation method

- It is an expensive method
- The information provided by this method is very limited
- Sometimes unforeseen factors may interfere with the observation task
- Some people or phenomenon are rarely accessible to direct observation

The researcher using this method should decide priority:

- What should be observed?
- How the observation should be recorded?
- How the accuracy of observation can be ensured?

☞ Participant Vs Non-participant observation

- i. **Participant observation:** The researcher lives in the group or in the community as a member of it and participates in their life. He experiences what the member of the group experience.

Advantages of this approach

- The researcher is enable to record the natural behavior of the group

- The researcher can even gather information which could not easily be obtained if he observe in a disinterested fashion
- The research can verify the truth of the statement made by informant in the context of the study

Limitation of this method

- The observer may loss the objectivity to the extent he participate emotionally
- The problem of observation control is not solved
- It may narrow down the researcher's range of experience.

ii.Non-participant observation: The researcher does not participate in the group life but observe as an external spectator. Under such approach the presence of the researcher is unknown to the people.

Advantages of this approach

- Check and control is possible
- Since the observer is not a part of a group he is less subjective
- Wider range of experience can be obtained

Limitation of this approach

- Internal information can not be obtained
- Since the presence of the observer is known, it is very hard to observe the natural behavior of the observed object

The choice between participant and non-participant observation depends up on factors like,

- Purpose of the study (type of the study)
- The cost of the research or availability of fund to carry out the research

- Availability of time (time consideration)
- Accessibility of the group or community (whether it is possible to be a part of a community or that group)
- Convenience to the observer

☞ **Control Vs uncontrolled observation**

- i. **Uncontrolled observation:** Is the observation, which takes place in natural setting. Here no attempt is made to use precision instruments. The main aim of this type of observation is to get a spontaneous picture of life or person. The main weakness of uncontrolled observation is that of subjective interpretation.
- ii. **Controlled observation:** Observation takes place according to definite pre-arranged plans, including experimental procedure. In this observation we use mechanical (or precision) instruments as aids to accuracy and standardization. Controlled observation takes place in various experiments that are carried out in a laboratory or under controlled condition.

☞ **Structured Vs Unstructured**

- i. **Structured Observation:** It is structured and preplanned observation technique. This observation is characterized by a careful definition of units, the style of recording the observation information; standardize conditions of observation and the selection of pertinent observation. Such observation is appropriate in descriptive research. The approach followed in the observation process is specified in detail. It includes
 - The behavior to be observed
 - The unit of observation
 - Subject of observation (women, adult, etc)
 - Conditions of observation (time of observation, place of observation, approaches of observation, etc)

- Style of recording the observed information and the like are predetermined.

In general, such observation has standardize format and is pre-planned

- ii. **Unstructured observation:** The observation takes place without the characteristics mentioned above, i.e., with out standardized format and plan. There is no specification of subject of observation, behavior to be observed and no standard format for recording the observed information.

Such observation is very much flexible and commonly used in exploratory research.

Advantages of observation method

The main advantage of this method of data collection is that, information obtained relates to what is currently happening. That is, it is not complicated by either the past behavior or future intention or attitude.

Limitations of observation method

- It is an expensive method
- The information provided by this method is very limited
- Sometimes unforeseen factors may interfere with the observation task
- Some people or phenomenon are rarely accessible to direct observation
- The problem of subjected interpretation of the observed matter is not solved
- Recording problem is not solved either

8.1.2 Some suggested methods of recording the observed information

- Write down on a prepared recording format, which can be, on the spot (during observation or later after each observation).
- Motion picture like video camera or still camera.

8.2 Interview Method

In an interview, the researcher meets people and discusses his social economic or some other problem with them. During the courses of discussion, he gathers facts. An interview is different from Schedules (interview questionnaires). A schedule includes some predetermined questions asked by the researcher in a definite order without change. But the interview has no such definite form or order of question. The researcher may ask any question on the basis of his insight into the problem. Interview can be either personal **interview** or **interview** through telephone.

8.2.1. Personal Interview

Such method requires interviewer-asking question in face-to-face contact to respondent. The interviewer has to be on the spot and has to meet people from whom the data are collected.

This approach is suitable for intensive investigation. But in certain cases it may not be possible or worthwhile to contact direct the person concerned and the direct personal investigation may not be used. In such case indirect or oral-examination can be conducted under which the interviewer has to cross-examine other person who are supposed to have knowledge about the problem under investigation and the information obtained is recorded

The personal interview can be of two type - **structured and unstructured**

- i. **Structured interview:** Personal interview method of data collection is usually carried out in a structured and pre-planned way.

Structural interview involves the use of a set of predetermined questions and has highly standardized technique of recording. It is not possible for interviewer to change even the sequences of the questions. The recording formats also are standardized.

- ii. **Unstructured interview:** Such interview is characterized by a flexibility of questions to questioning. It does not follow a system of pre-determined question and standardize techniques of recording information. The researcher is allowed much greater freedom to, if it is needed, supplementary questions or at times he may omit certain questions. Interviewer can change the sequences of question and he has also freedom in recording the response to

include some aspects and exclude the other. Unstructured interview is much more difficult and time consuming than that of the structured one.

It also demands deep knowledge and greater skill on the part of interviewer. This approach is used in exploratory research where as the structured interview is used in descriptive research. Because it is more economical, provide a safe basis for generalization and requiring relatively lesser skill on the part of the interviewer.

Merits of the personal interview method

- More information in greater depth can be obtained
- Interviewer by his own skill can over come the resistance, in any, of the respondent
- There is greater flexibility and the opportunity to restructure questions specially in unstructured interview
- Personal information can be obtained easily
- Sample can be controlled more effectively and non is minimum under this approach
- The interviewer can control which person will answer the question
- Misinterpretation of the answer for questions is easily avoided
- It is possible to collect supplementary information about the respondent and environment, which is often of great value in interpreting result.

Weakness of the personal interview

- It is very expensive method specially when large and wide spread geographical sample is taken
- There is still the possibility of the bias of interviewer as well as that of the respondent. Because the supervision and control of interview is still problem
- Certain group of respondent (such as important official) may not be easily approachable under this method.
- This method is relatively more time consuming specially when the sample is large
- The presence of the interviewer may over stimulate the respondent, sometimes he even give imaginary information to make the interview interesting

6.2.2. Telephone Interview

This method collecting information involves contacting respondents on telephone itself..

Strength of such method

- It is flexible compared to mailing method
- It is faster than other method
- It is relatively cheaper than personal interview
- Recall is easy and callback are simple and economical
- There is a higher rate of response
- Replies can be recorded without causing embarrassment to respondent
- Easy access to those respondent who are highly officials and can not be contacted personally
- No field staff is required
- Wider distribution of sample is possible

Weakness of this method

- Little time is given to respondent for considering possible answer. Mostly the interview will not exceed five minutes at most
- Surveys are restricted to respondents having telephone
- Cost consideration may restrict extensive geographical coverage
- There is high possibility of biasedness from the side of the interviewer
- Since questions have to be sort and to the point, probes are difficult to handle

Prerequisites of interview

For successful implementation of the interview method; interviewer should be carefully selected, trained and briefed. Moreover,

- Interviewer should be honest, sincere, hardworking, impartial and must posses the technical competence and necessary practical experience

- Occasional field checks should be also made in advance so that appropriate action must be taken if some of the selected respondent refuse to cooperate or are not available when an interviewers calls up on.
- Interviewer has to try to crate friendly atmosphere of trust and confidence so that the respondent may feel at ease while talking and discussing with the interviewer
- Interviewer must ask question properly and completely. At the same times the interviewer must answer legitimate questions if any asked by the respondent.
- The interviewer should not show surprise or disapproval of a respondent's answer, instead he must keep the direction of interview in his own hand.

Basic principles of Interviewing

Interviewers should follow the following principles while conducting interview

- Ask only one question at a time
- Repeat the question if necessary
- Listen carefully to the subjects answer
- Observe the subjects facial-expression, gesture and tone of the voice
- Allow the subject sufficient time to answer the question

1.3. Collection of data through Questionnaires

Questionnaire is a list of structured questions, which will be present, mailed or e-mailed to selected respondents to obtain reliable response from them. The objective is to find out what a selected group of respondents do, think or fell.

This method of data collection is used when the subject of study is very wide and direct observation is not possible. It is also used for such things, which cannot be known through direct observation (ideas, preference, motive, and so on).

In this approach a questionnaire present or sent to the respondent to answer the question and give back or sent back the questionnaire.

Types of Questionnaires

Questionnaires can be of the following type:

- ◆ Interview Questionnaires (Schedules)
- ◆ Mail Questionnaires (Self administered questionnaires)
- ◆ Questionnaires through Internet (Through electronics media)

6.3.1. Mail Questionnaires

This method of data collection is very popular especially for large study. The questionnaires are sent by post to the person concerned with a request to answer the question and return them back.

Questionnaires are mailed to respondents who are expected to read and understand the question and write down the answer.

Advantage (strength) of this method

- Low cost even for larger sample size and widely spread geographically
- It is free from bias of the interviewer. Answers are in respondents' word.
- Respondents have adequate time to give well though answers
- Respondents, who are not approachable, can be reached conveniently (especially, in mail and e-mail).

Limitations

- Low rate of return
- It can be used only for literate respondents
- The control over the questionnaire may be lost once it is sent
- There is inbuilt inflexibility
- The slowest method of all

Guide to question construction

The questionnaires should be very carefully constructed. In constructing questionnaires both questions and statements can be used to get information about the problem from respondents.

A) Forms of questions

Questions in a questionnaire can have either open or closed end form.

Open-end questions: The respondent is asked to provide his own answer to the question. His answer is not in any ways limited. E.g., the respondent might be asked, “What do feel the most important issue facing your community”?

The problem associated with such form of questioning is that, it is not possible to get uniform answers and hence is difficult to process.

Closed ended questions: The respondent is asked to select his answer from among a list provided by the researcher (yes, no, I don't know, etc). Closed ended questions are very popular in survey research since they provide a great uniformity response and because they are easy to process.

The major shortcoming of closed-ended questions on the researcher's structuring of response is that the checklist or the provided list of answers may not include all possible answers.

For example: In asking about “The most important issues facing your country?” the researcher may provide a checklist of issues, but in doing so he might overlook certain issues that respondent would have said were important.

To limit this shortcoming the following guidelines are helpful.

- The response categories provided should be exhaustive they should include all the possible response that might be expected.
- Often the researchers support this effort by adding a category leveled like “others (please specify)”

- The answer categories must be mutually exclusive; the respondent should not feel compelled to select more than one.

B) Make items clear

i. Make questionnaires item clear: Questionnaire items should be clear and unambiguous. Often the researcher become so deeply involved in the topic under examination that opinion and perspective are clear to him but may not be clear to his respondent. So question items should be precise so that the respondent knows exactly what the researcher want to an answer to be.

ii. Avoid double –barreled questions: Researcher often asks respondent for a single answer to combination of question.

E.g., “What do you think about the services like food and transportation provided by CBE office during the second phase of your CBTP program?”

Some respondent may want to answer as good to the transportation service and bad to the food service.

As a general rule whenever the word “and” appears in a question statement, the researcher should check whether he is asking a double-barreled question.

iii. Respondent must be competent to answer

The researcher should ask himself whether the respondents are able to answer the desired questions. Question should be relevant to most of respondents. Short items are commonly considered as the best (long and complicated item should be avoided).

i. Avoid Negative items:

The researcher should avoid negative items as much as possible: The appearance of negation in a question crates condition to easy misinterpretation.

E.g., “Ethiopia should not recognize the new Government of Somalia”. Large portion of respondents will read over the word “not” and answer on that basis. Some will

agree the statement when they are in favor of recognition, while others will disagree when they oppose it

C) General questionnaire format

The format of a questionnaire is as important as the nature and wording of the question asked. If the layout of the questionnaire is not appropriate it can confuse respondents and in the extreme, can lead respondents throwing the questionnaire away. Therefore, as a general rule, the questionnaire should be spread out and organized. The researcher should maximize the white space in his instrument. Putting more than one question in one line, leads to the probability of skipping the second question in case of some respondents.

i. Format for responses

A variety of methods are available for presenting response categories for respondents to check in answering a given question.

For closed-ended question: From experience boxes adequately spaced are the best. Most of the time closed-ended questions are followed by contingent. That is, the second question (contingent) imposed up on the response to the first one.

E.g., Have you ever....

Yes

No

8.3. Secondary Data Collection

Secondary information is information, which has already been collected by someone and which, have already been passed through statistical process. The researcher does not obtain them directly rather he gathered them from published and unpublished material.

Why a researchers use data from secondary sources? In most cases researchers use secondary data for different reasons like;

Secondary data may solve problem: If adequate data are available from secondary sources, primary data collection will not be necessary.

Search costs are substantially lower than primary sources. It is cheap and less time consuming than primary sources. A comprehensive search of secondary sources can almost always be made in a fraction of the time and cost required for collection of primary data

It has also important supplementary use, these includes:

- It helps to define the problem and formulate hypothesis about its solution. The assembly of available secondary data (information) always provides a better understanding of the problem and it may suggest reformulation and solution not considered previously.
- It will help to plan the collection of primary data. Examination of the methods and techniques employed by other investigators in similar studies may be useful in planning the present one.
- It will help to define the population and select the sample in primary data collection.

However, the researcher must be careful when using secondary data, particularly as the only sources of data. Secondary data to be useful, it must be:

- Available
- Relevant to the information needed
- Accurate and sufficient to meet data requirement.

Before using secondary data, we must see that they possess the following characters.

1. Reliability of the data

The reliability can be tested by finding answers to the following questions about the said data:

- Who collect the data? (How is the reputation of the collector?)
- What were the sources of the data?

- Were they collected using proper method?
- At what time were they collected?
- Was there any bias of the collector?
- What level of accuracy was desired?
- Was it achieved?

2. Suitability

The data that are suitable for one inquiry may not necessary be found suitable in another inquiry. The researcher must very carefully scrutinize the definition of various terms and units of collection used at the time of collecting the data from the primary sources originally. The object, scope and nature of the original inquiry must be studied. If the researcher finds difference in these, the data will remain unsuitable for the present inquiry and should not be used

3. Adequacy

If the area and scope of the study is narrower than the area of present study the data are considered as inadequate. Because of the fact that information will be missed and the researcher needs additional sources to make it complete and usable. .

Secondary data may be obtained either from:

- Internal (with in the company or organization)
- External sources (outside sources)

Internal secondary data: All companies or organizations or any other organs keep record of the every course of conducting business or any other activities.

- Orders received are filled
- Cost are recorded

- Sales' people reports are submitted. Such and the like data are some of the many sources of information collected by the company for other purpose and are useful to the researcher

External sources of secondary data: The major sources of external information are:

- Government (federal, state, local)
- Trade association and trade press
- Periodicals
- Institution (research, academic)
- Commercial services and the like

The secondary sources of information can be classified into

- i. Personal Document
- ii. Public document

7.1. Personal document

These include the entire published and unpublished information document by the individuals for different purpose:

- Personal documents are not written in scientific manner (style) nor do they have an objective basis.
- They generally represent some ideas, values and feeling etc.

In spite of being subjective unscientific they have been very much useful in social research. Personal documents have been classified in to four types

1. Biography / Autobiography

Some great political, business leaders, social reformers and eminent persons write their own autobiographies or some other people (biographer) write their biography. Such persons provide

useful information concerning, social, economic, political, religious and cultural conditions and incidents of their time.

Even, in some cases it is possible to get some information, which could not be known from any other sources.

Autobiographies are life histories, life experience and incidents of prominent individuals written by them. Biographies are life history, experience and events of some prominent person written by some biographer

Autobiography/ biography can be written for different purpose. It can be written in order to preserve specific feelings, incidents and events of writer's life. Such autobiography has objective basis and are useful source of information, if it is available indeed. Autobiography can also be written in order to publish and get financial benefit and popularity. Such autobiographies are less reliable as they are full of exaggeration and are full of deliberate distortion of facts.

1. Diaries:

Many educated people have a habit of writing diaries concerning their social relationship and life incidents. Most of the dairy writer has no intention to publish them. Some people daily write diaries to include program of the day.

Diaries are written with different intentions. Some write diaries to remember important incidents of their life. Some on the other hand write diaries to note things, which they cannot tell to anyone. They may write it to release their tension. Diary writing is a confidential and private performance. Therefore, if they are available they can be considered as a reliable.

2. Letters

Letters are often used by researchers as evidence especially in studies like, history and sociology and psychology. Most people write a number of letters during the course of their lives. Letters are the medium of expressions of feelings likes and dislikes attitudes, desires, emotion, ambitions and important incidents of life. Letters are in general, personal and very reliable. Thus, they constitute one of the most reliable sources of information about the inter relationship, such as, friendship, love, marital affairs, family tension and divorce and the like.

Limitations

- Difficult to collect private letters
- The letters do not provide detailed and complete description of incidents
- If letters of only one person is secured, they hardly provide scientific data since no comparable information is available.

3. Memories

Some people are interested in writing down memories for their travels, participation in different activities. Such memories provide useful information in social research

Limitations of personal documents

- Difficult in collection.
- They are rarely recorded and more seldom preserved
- Problem associated with the reliability of data: There is almost no criteria to judge their validity since they are written from subjective view point.
- It is not possible to arrive at some definite conclusion say about a social problem on the basis of personal document.

7.2. Public and Official document

In many research studies these sources of information are commonly and widely used. Public documents are information gathered from some governmental or non-governmental institutions.

Public document can be either unpublished or published documents. Unpublished documents are like reports of some big companies, confidential records of government departments and non-governmental organization.

Published document are those published documents in the general interest of the public. Such documents may be prepared by government or any other organs.

Some common public documents are of the following types

1. **Records:** These are the most important sources of secondary data. Most government and non-government institution preserves many types of records consisting of important information. For instant each police department keeps record of criminals. Company records like no employees, wage paid, growth rate sale etc.
2. **Census report and statistics:** A very important source of data collection is census report and the annual digest of statistics and statistical report of various state departments and national bodies. These reports are reported by experts and, therefore, their data are highly reliable. The data collected in these reports are arranged according to the administrative objective,
 - Health (concerning birth and death rate, number of hospitals, number of beds, number of doctors and the like)
 - Economic and related data: Annual production, average income, foreign trade, wage, hours of work, price level (inflation rate), interest rate, exchange rate etc.)
 - Education (number of schools, students, teachers, number of graduates and the like)

The Importance of census data can be summarized as:

- **Political importance:** It provides population statistics about the whole country and this information help government in formulating various plan and policies
- **Economic importance:** Economic plan of the country is based on population statistics. It provides data concerning income, expenditure and the like.
- **Sociological importance:** It also shows social condition, social evils, customs and tradition etc.
- **Commercial importance:** Commercial plans (business plans) require different types of information and statistical data. This is very much supplied by census report. Based on this information they will estimate the consumption (demand) and supply of different commodities.

3. **Journals and magazines:** These are common and widely used sources of information. Information obtained from these sources is very much reliable.
4. **Newspapers:** Published news (discussion on contemporary issues, reports of meetings and conferences) is very important sources. Economic news paper usually report data like,
 - Daily stock price
 - Exchange rate
 - Interest rate
 - Daily commodity price
 - Price indices (report on quarterly basis)
5. **Other documents:** Under this category we can have information sources like, television, film, radio and public speech. The investigator, however, should be capable of sorting out the reliable material and distinguish it from unreliable one.

Generally, information through secondary data is relatively easy to obtain but difficult to use them in social science. Thus, the information should be carefully judged before using it.

Judgment of such information involves

- Verification of reliability of facts before using them in any study.
- Verification of honesty, ability, methods and tools of the investigator himself.
- Verification of the method of data collection
- Verification of representative-ness of sample used in the primary data collection
- The organization for collection of data should be scrutinized as well

After all this preliminary arrangement, the investigator should select some facts and verify them so that he may have some idea about the reliability of total secondary data. Beside reliability, the adequacy of facts should be judged before utilizing them in social research.

Adequacy is evaluated by verifying whatever the collected secondary data have an objective identical with the study. The unit of available data should be verified so that adequacy of facts may be observed.

Check your progress

1. List the Primary Sources of data

2. List and explain the methods/techniques to collect primary data

3. List the sources of secondary data

4. List and explain the methods/techniques to collect primary data

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CHAPTER NINE: SAMPLING AND SAMPLE DESIGN

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9.0 learning Objectives

After you study this Chapter, you will be able to explain:

- aims of sampling
- steps in developing a sample plan
- sampling methods
- sample size determination
- factors determining the sample size
- determining the sample size
- sampling and non- sampling errors

9.1 Introduction

Once the measurement instruments have been constructed, data pertinent the research problem can be collected. Data are collected to test hypotheses. To provide empirical support, to explanations and predictions; Explanations and predictions must be general to be of scientific

value. Generalization constitutes a major stage of the research process. The research process consists of seven principal stages: problem, hypotheses, research design, measurement, data collection, data analysis and generalization. Each of these stages is interrelated with theory in the sense that it is affected by it as well as affects it.

Generalizations are important not only for testing hypotheses but also for descriptive purposes. For example, questions such as “what is the level of political trust among Americans? Or “Are voters more conservative now than they were a decade ago? Call for descriptive generalizations.

This unit focuses on the fundamentals of sampling theory. That is, the aims of sampling, followed by the definitions and discussion of central concepts: population, the sampling unit, sampling frame and the sample. The section on sampling designs describes procedures of probability and non-probability sampling designs. Further more the consideration involved in determining the sample size. And finally the procedures for estimating non sampling errors.

Sample versus Census

9.2 Aims /Reasons of Sampling

Empirically supported generalizations are usually based on partial information. This is the case because often it is impossible, impractical or extremely expensive to collect data from all the potential units of analysis encompassed in the research problem. Yet, precise inferences on all the units (a set) based on a relatively small number of units (a subset) can be drawn when subsets accurately represents the relevant attributes of the whole set. In marketing research, the preferences of a small subset of households are used to target new products to millions of customers.

When the data are partial and used to make generalizations on the whole, and subset is called a sample, and the whole is called a population. A particular value of the population such as the average income or the level of formal education is called a parameter. Its counterpart in the sample is termed a statistic. The major objective of sampling theory is to provide accurate estimates of unknown parameters from sample statistics that can be easily calculated.

In order to estimate accurately unknown parameters from known statistics three major problems have to be dealt with effectively: (1) the definition of the population, (2) the sample design, and (3) the size of the sample.

(i) The Population

A population is the “aggregate of all cases that conform to some designated set of specifications. For example, by the specifications “people” and “residing in Ethiopia”, we define a population consisting of all people reside in Ethiopia. Similarly, by the specifications “students” and “enrolled in UUC in Ethiopia, “we define a population consisting of all students enrolled in UUC in Ethiopia. A population may be a group of people houses records, legislators, and so on. The specific nature of the population depends on the researcher problem.

One of the first problems facing a researcher who wishes to estimate a population value form a sample value is the determination of the population involved.

The population, then, has to be defined in terms of (1) content, (2) Extent, and (3) time.

For example, (a) all citizens over eighteen years of age living in private dwelling units, (b) in Ethiopia; (c) on December 31st, 2004.

ii) The Sampling Unit

A single member of a sampling population (for example, a household, an event) is referred to as a sampling unit. Usually, sampling units have numerous attributes, one or more of which are relevant to the research problem. For example, if the population is defined as all third graders in a given town attending public schools on a particular day, the sampling units are all third graders. Third-graders, however, have many traits (variables), including grades, habits, opinions, and expectations. A research project may examine only one variable, such as arithmetic grades; or relations between several variables, for example, arithmetic grades, IQ scores, and family backgrounds.

iii) Sampling Frame

Once the population has been defined, a sample is drawn that adequately represents the population. The actual procedures involve a selection of a sample from a complete list of sampling units called a sampling frame.

Ideally, the sampling frame should include all sampling units in the population. In practice, a physical list rarely exists, and thus an equivalent list is substituted for it. In smaller-scale studies, the sampling frame may be based on telephone directories, city directories, or membership lists that are held by many private and public organizations.

There should be a high degree of correspondence between a sampling frame and the sampling population. A sample can be only as accurate as the sampling from which it was drawn. Indeed, every aspect of the sample design – the population coverage, the stages of sampling, and the actual selection process – is influenced by the sampling frame. Prior to the selection of a sample, the sampling frame has to be evaluated for potential problems.

A useful classification of typical problems in sampling frames is: (1) incomplete sampling frames, (2) clusters of elements, and (3) blank foreign elements.

1) Incomplete Frames

The problem of incomplete sampling frames occurs when sampling units included in the population are missing from the list. For example, if the population includes all new residents in a community, a sampling frame based on the multiple listing service in the community would be incomplete because it consists only of new home owners and does not include renters.

2) Clusters of Elements

The second potential problem of sampling frame is the clusters of elements. This problem occurs when sampling units are listed in clusters rather than individually. For example, the sampling frame may consist of city blocks, whereas the study focuses on individuals, heads of households. A possible solution of this problem would be to take a sample of blocks and then to list all the individuals households in each of the selected blocks.

3) Blank Foreign Elements

The problem of blank foreign elements is quite common and occurs when the sampling units of the sampling frame are not included in the original population, for example, when the population is defined as consisting only of eligible votes whereas the frame contains some individuals who are too young to vote. This is often a problem when the listing used as a frame is outdated.

9.3 Steps in Developing a Sample Plan

The process of developing a sampling plan can be separated into seven steps. Each steps in the process is discussed here

1. Defining the population of interest

The basic issue is to specify the characteristics of those individuals or things (e.g., companies, stores, etc) from which information is needed to meet the objectives of the research. The population of interest is often specified in terms of some combination of the following characteristics: geography, demographic characteristics, product use characteristics, or awareness measures.

Even if we have a list of the population and sample from the list, screening questions are still used to quality the potential respondent.

2. Choosing a Data collection Method

The selection of a data collection method is to be considered in the sampling process. For example, telephone interviewing has certain inherent advantages and mall-intercept interviewing has certain disadvantages in regard to sampling.

3. Choosing a Sampling Frame

The third step in the process is to identify the sample frame. Previously, we defined the sampling frame is a list of the population elements or members from which we select units to be sampled. In the ideal situation, we have such a list and it is complete and accurate. Unfortunately all too often, we have no such list.

For example, a telephone book might be the sample frame for a telephone survey sample. This example also illustrates that there seldom is a perfect correspondent between the sampling frame and the population of interest. The population of interest might be all households in the city in question. However, the telephone book would not include households that do not have telephone and those with unlisted numbers.

Unfortunately, there is substantial evidence that those with listed numbers and those with no listing are significantly different in regard to a number of important characteristics.

It has been shown that voluntarily in listed subscribers are more likely to be renters, live in the central city, have recently moved, have larger families, have younger children, and have lower incomes than their counterparts with listed numbers.

There are also significant differences between the two groups in terms of purchase, ownership, and usage patterns of certain products’.

4. Selecting a Sampling Method

The fourth step in the process involves the selection of a sampling method. The selection of a particular sampling method will depend on the objectives of the problem under investigation. The major alternative sampling methods can be grouped under the headings: probability sampling method and non-probability sampling methods. A number of alternatives are available under each of these headings.

5. Determining Sample Size

The next step in the process is to determine the appropriate sample size. The issue of sample size determination is discussed in the preceding chapter.

In the case of non probability sampling, we can rely on budget available, rules of thumb, and number of subgroups to be analyzed in determining sample size. However, with probability sample, formulae are used to calculate the sample size required, given target levels of acceptable error (difference between sample result and population value) and levels of confidence (likelihood that the confidence interval, which is the sample result plus or minus the acceptable error.

6. Developing Operational Procedures of selecting sample elements

The sample selection procedure for the data collection phase of a project should specify whether a probability or non-probability sample is being used.

The procedures are much more critical to the successful execution of a probability than to a non-probability sample. Probability sample procedures should be detailed, clear, and unambiguous and should take all the discretion regarding the selection of specific sample elements away from the interviewer. Failure to develop a proper operational plan for selecting sample elements can jeopardize the entire sampling process.

7. Executing the Sampling Plan

The final step in the sampling process involves the execution of the operational sampling plan. It is important that this step include adequate checking to make sure that data collectors are following specified procedures.

9.4 Sampling Methods

The two major sampling methods used are: probability sampling methods and non-probability methods. A number of alternatives are available under each method, as discussed below.

9.4.1. Probability Sampling

Probability samples must be selected in such a way that every elements of the population has a known, non-zero probability of selection. Probability sampling method includes: simple random samples, systematic sample, stratified samples and cluster samples.

Types of Probability Samples

a) Simple random sampling

Simple random sampling is considered to be the purest form of probability sample. A probability sample is a sample in which every element of the population has a known and equal probability of being selected into the sample. For a simple random sample, that known and equal probability is computed as follows:

$$\text{Probability of Selection} = \frac{\text{Sample Size}}{\text{Population Size}}$$

For example, if the population size is 10,000 and the sample size is 400, then the probability of selection is 4 percent. It is computed as follows

$$.04 = \frac{400}{10,000}$$

If a sampling frame (listing of all the elements of the population) is available, the researcher can select a simple random sample as follows:

- i) Assign a number to each element of the population. A population of 10,000 elements would be numbered from 1 to 10,000
- ii) Using a table of random numbers, you would begin at some arbitrary point and move up, down, or across until 400 (sample size) five digit numbers between 00001 and 10,000 are chosen.
- iii) The numbers selected from the table identify specific population elements to be included in the sample.

Simple random sampling is appealing because it seems simple and meets all necessary requirements of a probability sample. It allows research to project sample results to the target population.

The procedure guarantees, that every member of the population has a known and equal chance of being selected for the sample. It can be employed quite successfully in telephone surveys through the use of random digit dialing. Also, simple random sampling can be used to select respondents from computer files. Computer programs are available or can be readily written to select random samples from computer files such as customers' lists.

Simple random samples are not without disadvantage. The process can result in expensive interviewing costs. Large samples or samples spread over a large geographic area can make data collection time consuming and costly.

Also, in the real world of marketing research simple random samples may not be feasible, because all elements in the population have to be identified and then labeled or numbered. Otherwise, you can't draw the sample many population defy identifications and/or labeling.

2. Systematic Sampling

Systematic sampling is a sampling method that uses a fixed skip interval to draw elements from a numbered population. This method is often used as a substitute for simple random sampling. Its popularity is based on its simplicity. Systematic sampling produces samples that are almost identical to those generated via simple random sampling.

To use this approach, it is necessary to obtain a listing of the population, just as in the case of simple random sampling. The researcher must determine a skip interval and select names based on this skip interval. This interval can be computed through the use of the following formula.

$$\text{Skip Interval} = \frac{\text{Population Size}}{\text{Sample Size}}$$

For example, if you were using the local telephone directory and computed a skip interval of 100, every hundredth name would be selected for the sample. The use of this formula ensures that the entire list will be covered.

A random starting point should be used in systematic sampling. For example, if you were using a telephone directory, you would draw a random number to determine the page on which to start, suppose page 53 is drawn. Another random number would be determined to decide the column on that page. Assume the third column is drawn. A final random number would be drawn to determine the actual starting position in that column. Say, the seventeenth name. From that beginning point, the skip interval would be employed.

The main advantage of systematic sampling over simple random sampling is economy. It is often simpler, less time consuming, and less expensive to use systematic sampling than simple random sampling. The greatest danger in the use of systematic sampling lies in the listing of the

population. Some populations may contain hidden patterns that the researcher may inadvertently pull in to the sample. However, this danger is remote when alphabetical listings are used.

3. Stratified samples

Stratified sampling is used primarily to ensure that different groups of a population are adequately represented in the sample, so that the level of accuracy in estimating parameters is increased. Furthermore, all other things being equal, stratified sampling reduces the cost of execution considerably. The underlying idea in stratified sampling is that available information the population is used. “To divide it into groups such that the elements within each group are more alike than are the elements in the population as a whole.”

If a series of homogenous groups can be sampled in such a way that, when the samples are combined, they constitute a sample of a more heterogeneous population, then increased accuracy will result.

For example, suppose that it is known that there are 700 whites, 200 blacks, and 100 Mexican Americans in a given population. If a random sample of 100 persons were drawn, one would probably not get exactly 70 whites, 20 blacks, and 10 Mexican – Americans. The proportion of Mexican – American would assure better representation of these groups. It should be emphasized that stratifications does not violate the principle of random selection because a probability sample is subsequently drawn within each stratum.

The necessary condition for division in to homogeneous strata is that the criteria for division be correlated with the variable being studied. A second condition is that the criteria used do not require so many sub samples as to increase the size of the sample over that required by a simple random sample.

Sampling from the different strata can be either proportional or disproportional. If one draws into the sample the same number of sampling units from each stratum, or a uniform sampling fraction (n/N), the sample is known as a proportionate stratified sample. The sample size from each stratum is proportional to the population size of the stratum. On the other hand, if there are variable sampling fractions (that is, the total number in each stratum is different), the sample is disproportionate stratified sample.

Disproportionate stratified samples are used either to compare two or more particular strata or to analyze one stratum intensively. When a disproportionate stratified sample is used, the population's parameters have to be in lighted by the number of each stratum.

4. Cluster Samples

The types of samples discussed up until now have all been single-unit samples, where each sampling unit is selected separately. In the case of cluster samples, the sampling units are selected in groups. There are two basic steps in cluster sampling.

- a) The population of interest is divided into mutually exclusive and exhaustive subsets.
- b) A random sample of the subsets is selected.

If the researcher samples all elements in the subsets selected, the procedure is a one-stage cluster sample. However, if a sample of elements is selected in some probabilistic manner from the selected subsets, then the procedure is a two-stage cluster sample.

Both stratified and cluster samplings involve dividing the population into mutually exclusive and exhaustive subgroups.

All of the probability sampling methods discussed up to this point require sample frames that list or provide some organized breakdown of all the elements in the target population. Under cluster sampling, the researcher develops sample frames that include groups or cluster of elements of the population without actually listing individual elements. Sampling is executed with such frames by taking a sample of the clusters in the frame and generating lists or other breakdowns for only those clusters that have been selected for the sample. Finally, a sample is selected from the elements of the clusters selected.

The area sample, where the clusters are units of geography (e.g., city blocks), is the most popular type of cluster sample. A researcher, conducting a door-to-door survey in a particular metropolitan area, might randomly choose a sample of city blocks from that metropolitan area. After selecting a sample of clusters, a sample of consumers would be interviewed from each cluster. All interviews would be conducted in the clusters selected and none in other clusters. By

interviewing only within the clusters selected, the researcher would dramatically reduce interviewer travel time and expenses.

Cluster sampling is considered to be a probability sampling technique because of the random selection of clusters and the random selection of elements within each cluster selected.

Under cluster sampling it is assumed that the elements in a cluster are just as heterogeneous as the total population. If the characteristics of the cluster elements are very similar, then that assumption is violated and the researcher has a problem.

<i>Type of Sampling</i>	<i>Description</i>
Simple random	Assign to each sampling unit a unique number; select sampling units by use of a table or random digits.
Systematic	Determine the sampling interval (N/n); select the first sample unit randomly; select remaining units according to interval.
Stratified	Determine strata; select from each stratum a
Proportionate	random sample proportionate to the size of the strata in the population.
Disproportionate	Determine strata; select from each stratum a random sample of the size dictated by analytical considerations.
Cluster	Determine the number of levels of clusters; from each level of clusters select randomly; ultimate units are groups.

b) Advantages and Disadvantages of Probability Sampling

Probability samples offer several advantages, including the following.

- i) The researcher can be sure of obtaining information from a representative cross section of the population of interest.
- ii) Sampling error can be computed
- iii) The survey results are project able to the total population. For example, if 5 percent of the individuals sampled in a research project based on a probability sample gave a particular response, the researcher can project this percentage, plus or minus the sampling error, to the total population.

On the other hand, certain disadvantages are associated with probability samples:

- i) They are more expensive than non probability sample of the same size in most cases. A certain amount of professional time must the spent in developing the sample design.
- ii) Probability samples take more time to design and execute than non-probability samples. The procedures that must be followed in the execution of the sampling plan will increase the amount of time required to collect data.

9.5 Non-Probability Sampling

In a general sense, any sample that does not meet the requirement of a probability sample is, by definition, a non-probability sample. Four types of non-probability samples are frequently used: convenience, judgment, quota, and snowball samples.

Types of non-probability samples

i) Convenience samples

A convenience sample is obtained when the researcher selects whatever sampling units are conveniently available. Thus, a college professor may select students in his class; a researcher may take the first 200 people he or she meets on the street who are willing to be interviewed. There is no way of estimating the representative ness of convenience samples, and thus of estimating the population's parameters.

ii) Judgment samples

With judgment samples, occasionally referred to as purposive samples, the sampling units are selected subjectively by the researcher, who attempts to be obtaining a sample that appears to him or her to be representative of the population. The chance that a particular sampling unit will be selected for the sample depends upon the subjective judgment of the researcher. Because it is impossible to determine why different researchers judge each sampling unit they select to contribute to the representative ness of the sample, it is impossible to determine the probability of any specific sampling unit being included in the sample.

iii) Quota Samples

The chief aim of quota samples is the selection of a sample that is as similar as possible to the sampling population. For example, if it is known that the population has equal number of males and females, the researcher selects an equal number of males and females in the sample. If it is known that 15 percent of the population is black 15 percent of the total sample would be black.

In quota sampling, interviewers are given an assignment of quota groups specified by variables such a way that demographic characteristics of interest to the researcher are represented in the sample in the sample proportion as they are in the population, it is easy to understand how quota samples and stratified samples might be confused. There are, however, two key differences between a quota sample and a stratified sample. First, respondents for a quota sample are not selected on a random basis, as they must be for a stratified sample, second, in a stratified sample, the classification factors used for stratification must be selected on the basis of the existence of correlation between the classification factor and the behavior of interest. There is no such requirement in the case of a quota sample. The demographic or classification factor of interest in a quota sample is selected on the basis of researcher judgment.

iv) Snow ball samples

Snowball sample use sampling procedures that select additional respondents on the basis of referrals from the initial respondents. This procedure is used to sample from low – incidence or rare population. By low-incidence or rare populations, we are referring to populations that make up a very small percentage of the total population. the costs of finding members of these rare

populations may be so great as to force the researcher to use a technique like snow ball sampling for cost efficiency.

For example, an insurance company might be interested in obtaining a national sample of individuals who have switched from the indemnity form of health care coverage to a health maintenance organization in the last six months. It would be necessary to sample an extremely large number of consumers nationally to locate 1,000 consumers who fall into this population.

It would be far more economical to conduct an initial sample to identify 200 people who fall into the population to identify 200 people who fall into the population of interest and obtain the names of an average of four other people from each of the respondents to the initial survey to complete the sample of 1,000.

The main advantages of snowball sampling relates to the dramatic reduction in search costs. However, this advantage comes at some cost. The total sample is likely to be biased because the individuals whose names were obtained from those sampled in the initial phase are likely to be very similar to those initially sampled. As a result, the sample may not be a good cross section of the total population.

There should be some limits on the number of respondents obtained through referral, though these limits should be. Also, this approach may be hampered by the fact that respondents may be reluctant to give referrals.

Advantages and Disadvantages of non-probability Sampling

Non-probability sample offer several advantages, including the following:

- i) Non probability samples cost less than probability samples. These characteristics of non-probability samples may have considerable appeal in situation where accuracy is not of at most importance. Exploratory research is an example of this type of situation.
- ii) Non probability samples ordinarily can be gathered more quickly than probability samples.
- iii) Non probability samples can produce samples of the population that are reasonably representative if executed properly.

On the other hand, certain disadvantages are associated with non-probability samples. The disadvantages of non-probability samples are essentially the reverse of the advantages of probability samples:

- i) sampling error cannot be computed
- ii) The researcher does not know the degree to which the sample is representative of the population from which it was drawn.
- iii) The results of non-probability samples cannot be projected to the total population.

9.5 Sample Size Determination

The process of determining sample size for probability samples involves financial, statistical and managerial issues. If other things are equal, the larger the sample, the less is the sampling error. However, larger samples cost more money, and the funds available for a particular project are always limited. In addition, though the costs of larger samples tend to increase on a linear basis, the level of sampling error decreases at a rate only equal to the square root of the relative increase in sample size.

In some cases, there is a need to be very precise (small sampling error) and very confident that population values fall in the small range of sampling error (confidence interval). In other cases, you may not need to be as precise or confident.

9.5.2 Factors determining the sample size

i) Budget Available

Frequently, the sample size for a project is determined by the budget available. Sample size, in essence, is frequently determined backwards. A brand manager may have \$20,000 available in the budget for a part war marketing research project. After deducting other projects costs (e.g., research design, questionnaire development, data processing, analysis, etc), the remainder determines the size of the sample that can be surveyed. There are limits; of course if the dollars available are enough for only a clearly inadequate sample, a decision must be made. Either additional funds must be found or the project should be cancelled.

ii) Rules of Thumb

Potential clients may specify in requests for proposal that they want a sample of 200,400, 500, or some other specific size. Sometimes this number is based on some consideration of sampling error, and in other cases it is based on nothing more than past experience and sample size used in the past for similar studies. If the clients reject the arguments for a larger sample size, the researcher may decline to submit a proposal in the belief that the sample size is so inadequate as to fatally cripple the research effort.

iii) Number of Subgroups to be analyzed

In any sample-size determination problem, the number and anticipated size of subgroup's to be analyzed must be considered. For example, we might decide that a sample of 400 is quite adequate overall. However, if male and female respondents must be analyzed separately and the sample is expected to be 50 percent male and 50 percent female, then the expected sample size for each subgroup is only 200. Is this number adequate to make the desired statistical inferences about the characteristics of the two groups? If in addition; the results are to be analyzed by both sex and age, the problem gets even more complicated. Assume that it is important to analyze four subgroups of the total sample as follows.

Men under 35

Men 35 and over

Women under 35

Women 35 and over

If each group is expected to make about 25 percent of the total sample, then there will be only 100 respondents in each subgroup. Is this an adequate number of permit us to made the kinds of statistical inferences about these groups that the objective of the research require?

A sample is any subset of sampling units from a population. A subset is any combination of sampling units that does not include the entire set of sampling units that has been defined as the population. A sample may be one sampling unit, all but one sampling unit, or any number in between. How do we determine the size of a sample?

There are numerous suggestions about the necessary size of a sample. One is that the sample size be a regular proportion (often put at 5 percent) of the population. Another is that the sample

should total about 2000. Still another is that any increase in the sample size will increase the precision of the sample results. No such rule of thumb practice is adequate.

The size of the sample is properly estimated by deciding what level of accuracy is required and, hence, how large an error is acceptable.

(i) Standard Error

The idea of a standard error (some use the terms error margin or sampling error) is central to sampling theory and to the understanding of how to determine the size of a sample. We will illustrate the idea of a standard error (S.E) by examining a small hypothetical population from which simple random samples are drawn.

The population consists of five individuals earning \$500, \$650, \$400, \$700 and \$600 per month; so that the population's mean monthly income (denoted by μ) is \$570. Say we draw a sample of two with the purpose of estimating μ , and that the draw results in the selection of two persons earning \$500 and \$400. The sample mean (\bar{x}) is therefore \$450 and we take it as the estimate of μ , the population mean. Since we already know that the population mean is \$570, the estimate of \$450 is inaccurate. Had we selected the two individuals earning \$650 and \$700 the sample mean would have been \$675, which is also an inaccurate estimation of the population mean. We can draw all the sample of size $n = 2$ from this population. Consider the following table.

Table 4.4 Estimates of the population's mean

Possible Samples n = 2 (Incomes of Individuals selected)	\bar{x} Estimate of μ
500 and 650	575
500 and 400	450
500 and 700	600
500 and 600	550
650 and 400	525
650 and 700	675
650 and 600	625
400 and 700	550
400 and 600	500
700 and 600	650
Total	5700

The above table present the ten possible samples and the estimates of μ derived from each. None of these samples accurately estimates μ . However, some sample means (for example, \$500 and \$650) are closer to the population mean than others. If we continue indefinitely to draw samples of $n = 2$ each of the samples in the above table would be selected more than once. We can then plot the distribution of all sample means. The distribution that result from the value of the sample mean (\bar{x}) derived from an infinite number of samples is termed the sampling distribution of the mean.

In our example, each of the ten samples has an equal chance of being drawn (a simple random sample), and if we continue the selection indefinitely samples would be drawn an equal number of times. Consequently, the mean of the estimates derived from all the possible samples is $5700/10 = 570$, which equals the population mean.

In general, the mean distribution of an infinite number of samples is assumed to equal the mean of the population. The more dispersed the distribution of samples about its mean, the greater will be the variability of findings obtained by samples, and the greater the risk in making a larger error in estimating a parameter from a sample statistic.

The distribution obtained from a single sample serves as an indicator of the entire sampling distribution, and the dispersion which the single sample is measured by the standard deviation(s). The distribution of all samples about the mean of the sample is the standard error (S.E). The standard deviation of the sampling distribution in our example is:

$$\begin{aligned} & [(575 - 570)^2 + (450 - 570)^2 + (600 - 570)^2 + (550 - 570)^2 + \\ & (525 - 570)^2 + (675 - 570)^2 + (625 - 570)^2 + (550 - 570)^2 + \\ & (500 - 570)^2 + (650 - 570)^2] \div 10 = \sqrt{4350} = 65.95 \end{aligned}$$

The S.E can be estimated by dividing the standard deviation of the sample by the square root of the sample size (n).

$$S.E = \frac{s}{\sqrt{n}}$$

If the population is small, the factor $1 - n/N$, called the finite population correction, has to be included in the equation:

$$S.E = \frac{s^2}{n} \left(1 - \frac{n}{N} \right)$$

In this formula n refers to the sample size and N stands for the size of the population. In our example, $N = 5$ and $n = 2$ thus,

$$\begin{aligned} S^2 &= \frac{(500 - 570)^2 + (650 - 570)^2 + (400 - 570)^2 + (700 - 570)^2 + (600 - 570)^2}{4} \\ &= \frac{58000}{4} = 14500 \end{aligned}$$

Therefore,

$$S.E(\bar{x}) = \sqrt{\frac{14,500}{2} \times \frac{5.2}{5}} = \sqrt{4350} = 65.95$$

This agrees with the previous result.

ii) Confidence Intervals

We need to discuss one more concept before presenting the method for determining the sample size. In the last section we pointed out that the population mean equals to the mean of all the sample means that can be drawn from a population and that we can compute the standard deviation of these sample means.

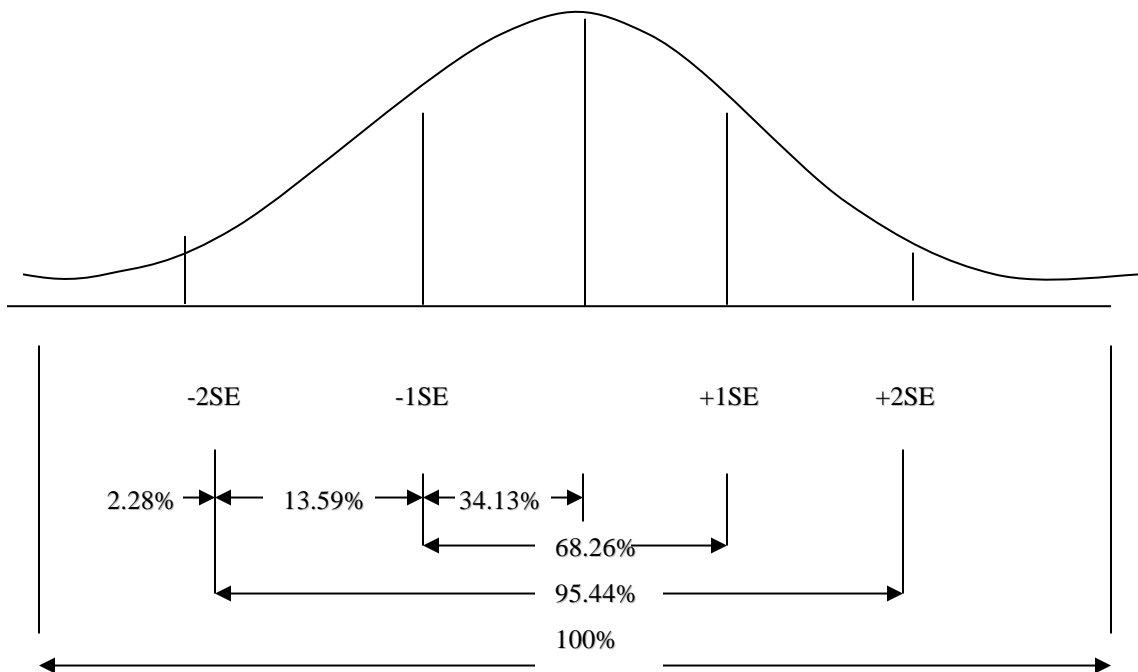
If the distribution of sample mean is normal or approximates normally, we can use the properties of the normal curve to estimate the location of the population mean. If one knew the mean of all sample means (the population mean) and the standard deviation of these sample means (standard error of the mean), one could compute Z scores and determine the range within which any percentage of the sample means can be found. Between $-1 Z$ and $+1 Z$, one would expect to find 68 percent of all sample means; between $-1.96Z$ and $+1.96 Z$, one would expect to find 95

percent of all sample means; and between $-2.58Z$ and $+2.58 Z$, one would expect to find 99 percent of all sample means. However, it is this mean of the population that is unknown and that we have to estimate on the basis of a single sample.

The normal curve can be used for this purpose. A sample mean that is $+1.96Z$ scores (or standard error of the mean) above the population mean has a .025 probability of occurrence; 97.5 percent of all sample means will be smaller than $+1.96$ standard errors of the mean. If we construct an interval of -1.96 to $+1.96$ about the sample mean, we can be confident that the population mean is located in the interval.

If we construct an interval of ± 1.96 standard errors of the mean about the sample mean, we expect the population mean to be within this interval with 95 percent confidence. There is a five percent risk of being incorrect. That is that the population mean is not within the interval. Consider the following figure.

Figure 4.5 Normal curve: Percent Areas from the mean to specified standard error distance



If you do not wish to run a 5 percent risk of being incorrect, you can use a different confidence interval. The chance that the population mean will be within ± 2.58 standard errors of the sample mean is 99 out of 100, and this is the 99 percent confidence interval.

The width of the confidence interval around the sample mean is decided by the researcher.

The confidence interval can be narrow if the researcher is willing to run a large risk of being wrong. The researcher could use an interval of ± 0.68 standard errors of the mean and have only a 50 percent chance of being correct in assuming that the population mean is within the interval.

To sum up: if a given sampling distribution is known to be approximately normal, one can infer that about 68 percent of the sample estimates of which is comprised will lie between its mean and one standard error, about 95 percent between its mean and twice the standard error and so on.

9.5.4 Determining the Sample Size

We are now in a position to deal with the size of samples. If cost and other practical limitations do not enter into the decision about the sample size, there is no difficulty in determining the desired size. Recall the formula for the standard error of the mean:

$$S.E = \frac{s}{\sqrt{n}}$$

It is the standard deviation of the variable under study in the population. Inverting, we then have

$$n = \frac{s^2}{(S.E)^2}$$

In order to calculate the sample size, n , the researcher has to have some idea of the standard deviation in the population and must also decide how big a standard error can be tolerated.

If for example, a random sample is to be drawn from a population consisting of 10,000 sampling units; and $s^2 = .20$ and the desired S.E - .016, the estimated sample size is

$$n = \frac{.20}{.000256} = 781.25$$

If the sample size is too large relative to the population, the finite population correction is added. In such cases, the final sample size is calculated by

$$n' = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

Where N is the population size, in our example, if N = 10,000, then

$$n' = \frac{781.25}{1 + \frac{781.25}{10,000}} = 725$$

In practice, decision concerning the sample size is more complicated. The first difficulty relates to the precision regard. Researcher must decide how precise they want their sample results to be, that is, how large a standard error they can tolerate. Second, the decision on a sample size also depends on the way the results are analyzed. Third, if more than one variable is to be studied, a sample that is adequate for one variable may be unsatisfactory for another.

9.6 Sampling and Non- sampling Errors

Consider a situation where our goal is to determine the average age of the members of a particular population. If we can obtain accurate information about all members of the population, we can compute the population parameter “average age”.

A population parameter is a value that defines a time characteristics of a total population. Assume that μ (population parameter or, in this case, average age) is 36.3 years. As already noted, it is almost always impossible to measure the entire population. Instead the researcher takes a sample and makes inferences about population parameters from sample results. To compute average age, the analysis might take a sample of 400 from a population of 250,000. An estimate of the average age of the members of the population (\bar{x}) would be calculated from the sample values.

Assume the average age of the sample members is 35-8 years. A second random sample of 4000 might be drawn from the same population and the average again computed. In the second case, the average might be 36.8 years.

Additional samples might be chosen and means computed for the various samples. The researcher would find that the means computed for the various samples would in most cases be fairly close but not identical to the true population value.

The accuracy of sample results is affected by two general types of error: sampling error and non sampling (measurement) error. The following formula portrays the effect of these two types of error on the problem of estimating populations mean:

$$\bar{X} = \mu \pm \epsilon_s \pm \epsilon_{ns}$$

$$\bar{X} = \text{sample mean}$$

$$\mu = \text{true population mean}$$

$$\epsilon_s = \text{sampling error}$$

$$\epsilon_{ns} = \text{non sampling or measurement error}$$

Sampling error results when the sample selected is not perfectly representative of the population. There are two types of sampling error: random and administrative error.

Administrative error relates to problems in the administration or execution of the sample. That is, there are flaws in the design or execution of the sample that cause it to be not representative of the population. This type of error can be avoided or minimized by careful attention to the design and execution of the sample. Random sampling error is due to chance and cannot be avoided. This type of error can only be reduced by increasing sample size. Measurement or non sampling error includes everything other than sampling error that can cause inaccuracy and bias in the study results.

Check Your Progress Questions

1. Discuss the major types of probability sampling?

2. Discuss the major types of non-probability sampling?

3. List & explain the steps in developing a sample plan?

4. Discuss the sample size determination techniques?

5. Discuss factors that determine the sample size?

6. Differentiate sampling and non- sampling errors?

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CHAPTER TEN: DATA PREPARATION AND ANALYSIS

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 - 10.8.2 Hypotheses Tests

10.0 Aims and Objectives

After studying this unit, you will be able to explain:

- to learn how survey are tabulated and cross tabulated
- to understand how to state and test hypothesis
- to describe several common statistical test of differences
- to understand the data entry process and data entry alternatives

10.1 Introduction

From a managerial perspective, information can be viewed as recorded experience useful for making decisions. Responses on measurement instruments convey little information as such. These raw data must be compiled, analyzed, and interpreted carefully before their complete meanings and implications can be understood.

Analysis can be viewed as the ordering, the breaking down into constituent parts, and the manipulating of data to obtain answer to the research question or questions underlying the research project. Tightly interwoven with analysis is interpretation. It is so closely related to analysis that is a special aspect of analysis rather than a separate activity.

The process of interpretation involves taking the results of analysis, making inferences relevant to the research relationship studied and drawing conclusions about these relationships.

Since analysis represents the end of the research process, everything done prior to this stage has been done for the sole purpose of analysis.

From a decisional context, all conclusions, recommendations, and decisions are based on the analysis of the raw data obtained from the research project.

The competent analysis of research obtained data requires a blending of art and science, of intuition and informal insight, of judgment and statistical treatment, combined with a thorough knowledge of the context of the problem being investigated.

Some of these qualities commonly be acquired by experience, while others are heavily dependant on the nature abilities of the analyst still others can be acquired through education and training.

10.2 DATA PROCESSING

Data processing is the link between data collection and data analysis. It involves the transformation of observation gathered in the field into a system of categories and the translation of these categories into codes amenable to quantitative analysis. The codes are then recorded in images amenable to automatic data processing.

The transformation of raw data into useful information requires that the data be validated, edited, coded, and key punched so that it may be transferred to a computer or any other data storage device. If the amount of data gathered is large, then, there are many advantages in utilizing a computer for data processing.

1. Validation

Validation is the process of ascertaining that interviews actually were conducted as specified. The first step is to determine, to the extent possible, that each questionnaire represents a valid interview. Validation means determining that all interviews were actually conducted properly. The goal is to detect interviewer fraud or failure to follow key instructions. While designing a questionnaire, there is almost always a place to record the respondents name, address, and telephone number. This information is ordinarily not used in anyway in the analysis of the data. It is collected only to provide a basis for validation.

Professional researcher knows that interviewer cheating is not uncommon. Studies have documented the existence of various types of interviewer falsification. For this reason, validation is an integral and necessary step in the data processing stage of a marketing research project.

After all the interviews are completed, the research firm re-contacts by telephone a certain percentage of the respondents surveyed by each interviewer. This applies to door-to-door, mall intercept, and telephone surveys. Telephone validation typically covers five areas:

- Was the person actually interviewed?
- Was the interview conducted in the required manner?
- Did the interviewer cover the entire survey?
- Did the interviewer speculate about the client's identify or the purpose of the survey?
- Did the person who was interviewed actually qualify to be interviewed, according to the screening questions on the survey?

2. Editing

Once the data collection instruments have been validated, the customary second phase of data preparation involves editing the raw data. Researchers edit the data to discover errors and omission, and when possible correct them.

The work calls for a keen eye, through knowledge of the information sought in the survey, and speed combined with accurate observation. The best procedure is to have a single person specialize in all the editing for a given study, and when more than one editor is needed, for efficiency each should work through complete questionnaires.

A number of faults may call for editorial correction, of which the following are fairly common:

a. Fictitious Interviews

The editor needs to be attentive to evidence of cheating. For the experienced editor, such activities become evident by spotting a common pattern of responses from the questionnaires of a particular interviewer.

b. Inadequate Answers

The response shown on the form may not be complete, or it may be ambiguous. Ambiguous or indefinite responses pose puzzles, and the editor must judge whether they can be clarified with any must judge whether they can be classified with any confidence.

c. Inconsistencies

A watchful editor may not responses to the questions that are unlikely to both be true, for example, the individual who reports an income of 100,000 and later, in answer to another question, indicate his age to be 14 years old.

d. Irrelevant Answers

Information may be given that does not concern the purpose of a question, perhaps because the respondent misunderstood what was being asked.

e. Illegible Responses

There are times when the individual's handwriting is not clear, thereby making it difficult for the editor to code properly.

It is inevitable that some of the data collection instruments would contain a number of the foregoing faults. The question that arises when such a situation exists is: "what do we do with them?" there are three basic approaches used to handle such "bad" data

- Go back to the interviewer or respondent for clarification
- Infer from other responses and
- Discard the response altogether.

3. Coding

Coding refers to the process of grouping and assigning numeric codes to the various responses to a particular question. Most questions on surveys are closed-ended and preceded. This means that numeric codes have been assigned to the various responses on the questionnaire itself. All closed-ended questions should be preceded.

Open-ended questions are another matter. They were stated as open-ended questions because the researcher either had no idea what answers to expect or wanted a richer response than is possible with a closed-ended question. As with editing, the process of coding responses to open-ended question is tedious and time consuming. In addition, the procedure is, to some degree, subjective. For these reasons there is some tendency to avoid open-ended questions if possible. There are four steps in the process of coding responses to open-ended questions:

a) Listening Responses:

Codes at the research firm prepare lists of the actual responses to each open-ended question on the survey. Responses given by a sample of all respondent is listed.

The listing may be done as part of editing or a separate step.

b) Consolidating Responses

The number of responses can be interpreted to mean essentially the same thing. And they can be appropriately considered into a single category.

c) Setting Codes

After the final consolidated list of responses has been derived, numeric codes are assigned to each category on the list.

d) Entering Codes

After listing responses, consolidating responses and setting codes, the final step is the actual entry of codes. Entering codes involves several sub steps:

- Read responses to individual open-ended questions on questionnaires

- Match individual responses with consolidated list of response categories developed.
- Get the numeric code for the category is to which you classified the particular response.
- Write the numeric code in the appropriate place on the questionnaire for the response to the particular question.

10.3 THE DATA Processing Cycle

Data processing's total task in carrying out the analytical program is this: to convert crude fragments of observations and responses that we just coded into orderly statistics that are ready for interpretation. Methods of processing data can be placed in to the types: manual and computer.

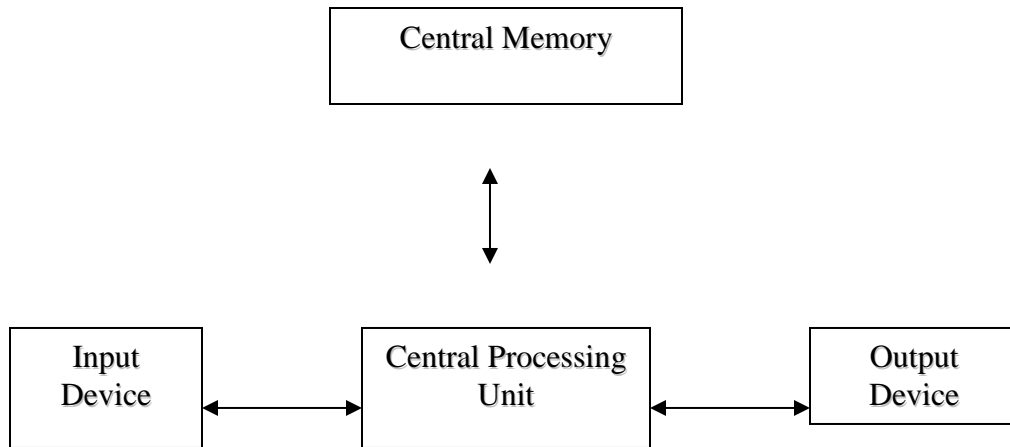
Manual methods can be divided into two types. One of these, tallying, is completely by hand, entering the responses in appropriate categories on worksheet. In this simple method, the "sorting" is done individually for each observation by selecting the line on which to tally it.

The sort and count method is exactly that: first, sort all questionnaires or data forms into piles, one for each answer category; then count each pile. This avoids the tallying danger of making entries on the wrong line and can be speedier, provided that it is easy to read and sort the entries for all questions and categories.

Computers is a term embracing the entire variety of machines that electronically records, stores, performs any calculations from the simple to the most complicated, and prints or displays its results and any other data that have been entered.

The data processing cycle consists of the following components: Input device; central processing unit (CPU); central memory, and output device.

These components are depicted in the following figure.

Figure 5.1 The Data Processing Cycle**i) Input Devices**

The input device transmits the data to the central processor of the computer to which the device is connected. A computer manipulates the data only after they have been converted into electrical impulses. The conversion is made after the data have been transferred from documents such as questionnaires or coding sheets to acceptable media such as magnetic tapes or disks.

ii) Central Processing Unit

The central processing unit (CPU) is the heart of the computer system, controlling and coordinating all activities. The CPU decides which program to run next, executes the program instructions, and monitors the operation of the input and output devices.

iii) Central Memory

The central memory is used to store information during the time the data are being manipulated. The information may include program instructions and data. Unlike other storage media such as tapes or disks, the central memory stores information only temporarily.

iv) Output Devices

The computer processes results in the form of electrical impulses. These are then translated by output devices, such as a printer, to human language, so that the data can be interpreted easily

and used effectively. Output data can also be recorded on magnetic tape or disks for further processing.

Types of Data Processing

The researcher generally has one or more of these types of data processing available: (i) batch, (ii) rapid or remote batch, and (iii) interactive.

i) Batch Processing

In batch computing the computer handles a job that usually includes a set of data and instructions for processing and analyzing these data. In batch processing, the job is read in with a batch of other jobs and waits its turn before its execution.

ii) Rapid Batch Processing

The “rapid” batch or “remote job entry” batch system has a limit on the amount of computer storage that can be used by the job being processed or by the length of time it can execute.

Whenever you access the mainframe computer (via rapid or batch or interactive processing) at a site where the main frame is not itself housed, you are accessing it from a “remote site”. These sites typically house a bank of computer terminals and service station from which you can retrieve your hard copy output.

ii) Interactive Processing

Interactive processing is a recent phenomenon. It allows the researcher to interact directly and continuously with the computer typically via a computer terminal of some sort.

The most important feature of interactive analysis is that turn around time is almost instantaneous. Despite the complexity of computers, most researchers do not need to know a great deal about computing operations in order to use them.

However, certain statistical packages are now in use to meet almost all particular needs arising in the processing and analysis of data.

10.4 TABulation of survey results

At this point the survey results are stored in a computer file and should be free of all logical data entry and interviewer recording error. By logical error we mean violated skip patterns and

impossible codes (a 3 was entered when 1 and 2 are the only possible codes). The procedures, described previously, cannot identify situations where an interviewer or data-entry operator entered a 2 for a “no” response instead of the correct 1 for “yes” response. The next step is to tabulate the survey results.

5.4.1. One-way Frequency Tables

The most basic tabulation is the one-way frequency table. A one-way frequency table shows the number of respondents who gave each possible answer to each question. An example of one-way frequency table is a described below.

	Total	Total
Total	300	(100%)
To a hospital in Nazareth	144	(48%)
To a hospital in Addis Ababa	146	(48.7%)
Don't know/No Response	10	(3.3%)

The above table shows that 144 consumers (48%) said they would choose a hospital in Nazareth, 146 (48.7%) said they would choose a hospital in Addis Ababa, and 10 people (3.3%) said they didn't know which one they would choose.

The computer printout will be generated showing one-way frequency tables for every question on the survey. In most instances, this will be the first summary of survey results seen by the research analyst. In addition to frequencies, one-way frequency tables typically indicate the percentage of those responding to a question that gave each possible response.

When running one-way frequency tables, researchers must determine the bases to be used for the percentages. There are three choices:

a) Total Respondents

If 300 people are interviewed, and the decision is to use total respondents as the base for calculating percentages, then the percentages in each one-way frequency table will be based on 300 respondents.

b) Number of people asked the particular questions

Because most questionnaires have skip patterns, not all respondents will be asked all questions. In such instances, it is appropriate to consider only of individuals who have been asked as the base for percentages associated with one-way frequency tables.

c) Number answering

An alternative base for computing percentages in one-way frequency tables is the number of people who actually answered a particular question. Under this approach, if 300 people were asked a particular question but 28j indicated “don’t know” or gave no response to the question, then the base for the percentage would be 272.

Ordinarily, the number of people who were asked a particular questions is used as the base for all percentages throughout the tabulations, but there may be special cases where other bases are judged appropriate. One way frequency tables using three different bases for calculating percentages are shown in the following figure.

Table 10.2 One-way Frequency Table with Percentages

Q1. Why would you not consider going in Addis Ababa for Hospitalization	Total	Total	Total
	Respondents	Asked	Answering
Total	300	60	52
	100%	100%	100%
They aren’t good/poor service	18	18	18
	6%	30%	34.6%
They do not have the Services/equipment that Nazareth does	17	17	17
	5.7%	28.3%	32.7%
Addis Ababa is too small	6	6	6
	2%	10%	11.6%
Bad publicity	4	4	4
	1.3%	6.7%	7.7%
Other	11	11	11
	3.7%	18.3%	21.2%
Don’t know/ No response	8	8	
	2.7%	13.3%	

5.4.2. Cross Tabulations

Cross tabulation are likely to be the next step in analysis which is a powerful analytical tool. Many marketing research studies, possibly most, go no further than cross tabulations in terms of analysis. The idea is to look at the responses to one question in relation to the responses to one or more other questions. The following table shows a simple cross tabulation.

Table 10.3 Simple Cross tabulation

Q1. If you or a member of your family were to require hospitalization in the future, and the procedure could be performed in Nazareth or Addis Ababa, where would you choose to go					
AGE					
	Total	18.34	35.54	55.64	65 or over
Total	300 100%	65 100%	83 100%	51 100%	100 100%
To a hospital in Addis Ababa	144 48%	21 33.3%	40 48.2%	25 49%	57 57%
To a hospital in Nazareth	146 48.7%	43 66.2%	40 48.2%	23 45.1%	40 40%
Don't know/no response	10 3.3%	1 1.5%	3 3.6%	3 5.9%	3 3.0%

Table 10.4 Cross tabulation with Row, column and total percentages

Q1 To which of the following towns and cities would you consider going for hospitalization			
	Total	Male	Female
Total	300 100% 100% 100%	67 100% 22.3% 22.3%	233 100% 77.7% 77.7%
A.A	265 88.3% 100% 88.3%	63 94% 23.6% 21%	202 86.7% 76.2% 67.3%
Nazareth	240 80% 100% 80%	53 79.1% 21.1% 17.7%	187 80.3% 77.9% 62.3%
Others	112 37.3% 100% 37.3%	22 32.8% 19.6% 7.3%	90 38.6% 80.4% 30%

The cross tabulation shows frequencies and percentages, and the percentages are based on column totals. The table shows an interesting relationship between age and the likelihood of choosing Addis Ababa or Nazareth for hospitalization. Consumers in successively older age groups are increasingly likely to choose Addis Ababa and increasingly less likely to choose Nazareth. There are a number of considerations regarding the set up and percentage of cross tabulation tables. Some of the more important ones are as follows:

- i) The previous discussion regarding the selection of the appropriate base for percentages and the appropriate base for the percentage of tables with multiple responses apply to cross tabulation tables as well.
- ii) Three different percentages may be calculated for each cell in a cross tabulation table: column, row, and total percentages, column percentages are computed on the basis of the column total, row percentages are based on the row total, and total percentages are based on the total for the table. Table shows a cross tabulation table with frequencies and all three of the percentages shown for each cell in the table 5.4.
- iii) A common way of setting up cross tabulation table is to create a table where the columns represent various factors, such as demographics and lifestyle characteristics that are expected to be prediction of the state of mind, behavior or intentions data shows as rows of the table. In such tables, percentages are normally calculated on the basis of column totals. This approach permits easy comparisons of the relationship between the state of mind, behavior, or intentions data and expected predictors, such as sex or age. An example of this type of table is shown in Table 5.3

Cross tabulations provide a powerful and easily understood approach to the summarization and analysis of survey research results. However, it is easy to become swamped by the sheer volume of computer printouts if a careful tabulation plan has not been developed. The cross tabulation plan should be developed with the research objectives and hypotheses in mind. The results to a particular survey might be cross tabulated in an almost endless number of ways. This is why it is important for the analyst to exercise some judgment and select from all possibilities those cross tabulations truly responsive to the research objectives of the project.

5.4.3. Graphic Representation of Data

Graphic presentation involves the use of “pictures” rather than tables to present research results. Results, particularly key results, can be presented more powerfully and efficiently by means of graphs. Cross tabulations and statistical analysis help us identify important findings. Graphs are the best way to present those findings to the users of our research.

Marketing researchers have probably always known that result could be best presented graphically. The advent of personal computers coupled with graphics software and laser printers, add up value to the graphic presentation. All the major spread sheet programs (e.g., Excel and Quattro pro) have extensive graphics capabilities.

In addition, programs designed for creating presentation (e.g., power point, freelance, astound, and Harvard Graphics) permit the user to create a wide variety of high-quality graphics with ease. With these programs, it is possible to:

- Quickly produce graphs
- Display those graphs on the computer screen
- Make desired changes and redisplay
- Print final copies on a laser or dot matrix graphic printer.

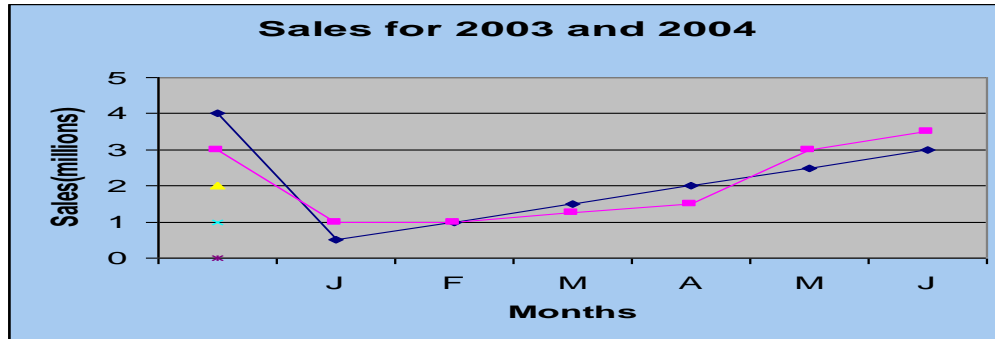
The major types of graphic representation of data includes: line charts, pie charts, and bar carts are discussed in the preceding section.

d. Line Charts

Line charts are perhaps the simplest form of graphs. They are particularly useful for presenting a measurement taken at a number of points over time.

The specimen of a line charts depicted in the following figure

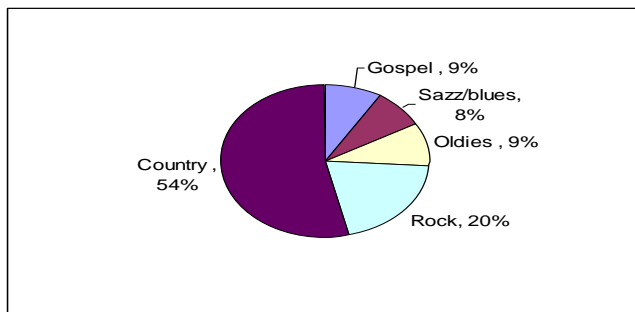
Figure 10.2 Sales for 2003 and 2004



b) Pie Charts

Pie charts are another frequently used type of graph. They are appropriate for displaying marketing research results in a wide range of situations. The specimen of pie charts is depicted in the following figure.

Figure 10.3 3-D pie chart (Type of music hastened)



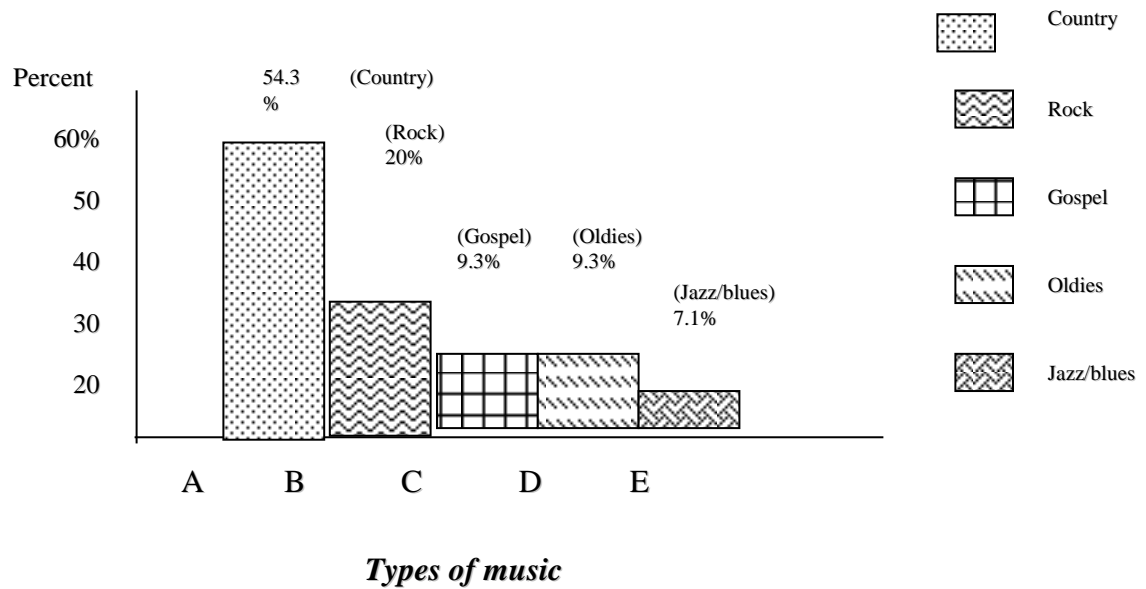
b) Bar Charts

Bar charts are the most flexible of the types of graphs discussed in this section. Anything that can be shown in a line graph or a pie chart can also be shown in a bar chart. In addition, many things that cannot be shown, or effectively shown, with other types of graphs can readily be shown with bar charts. Four types of bar charts are discussed here.

ii) Plain bar Chart

As the name suggests, plain bar charts are the simplest form of bar chart. The same information displayed in a pie chart is shown Bar chart as shown in figure 5.4 below.

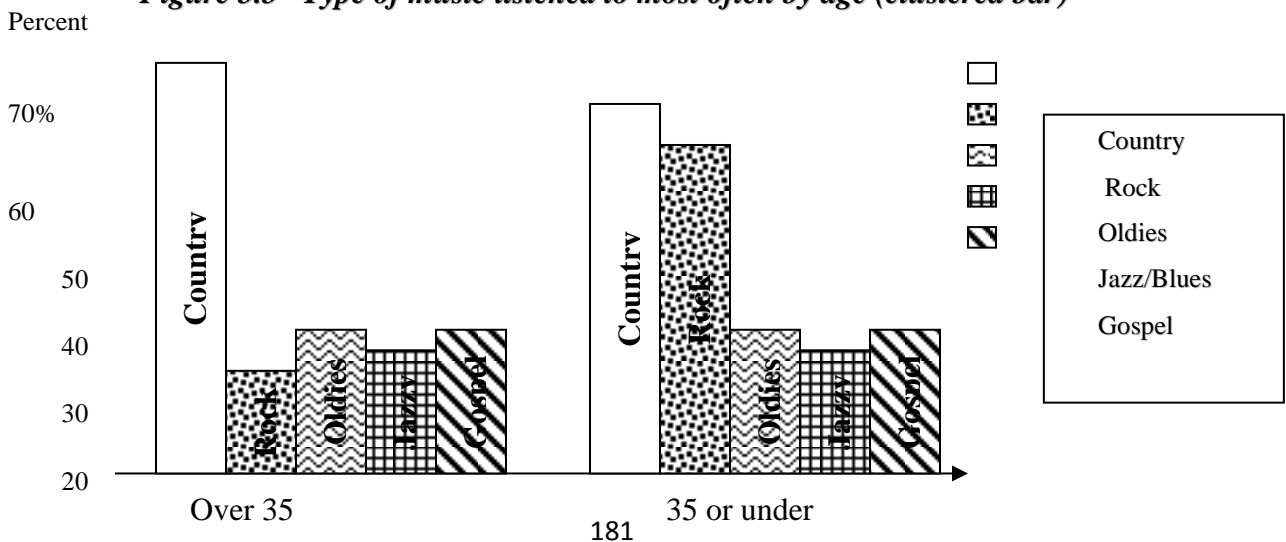
Figure 5.4 Simple 2D Bar Chart (Type of music Listened).



ii) Clustered bar charts

Clustered bar charts represent the first of three types of bar charts that are useful for showing the results of cross tabulations. The music preference results cross tabulated by age are shown in the following figure.

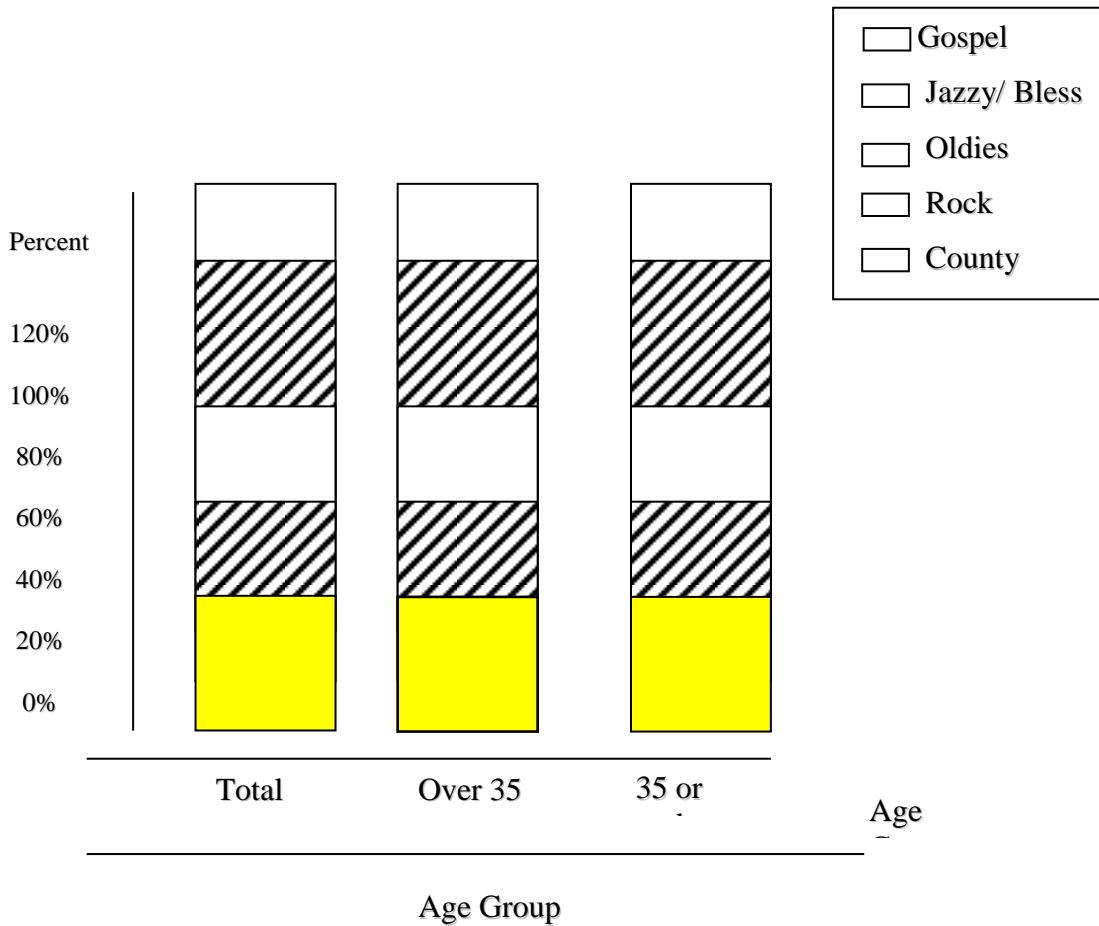
Figure 5.5 Type of music listened to most often by age (clustered bar)



iii) Stacked bar charts:

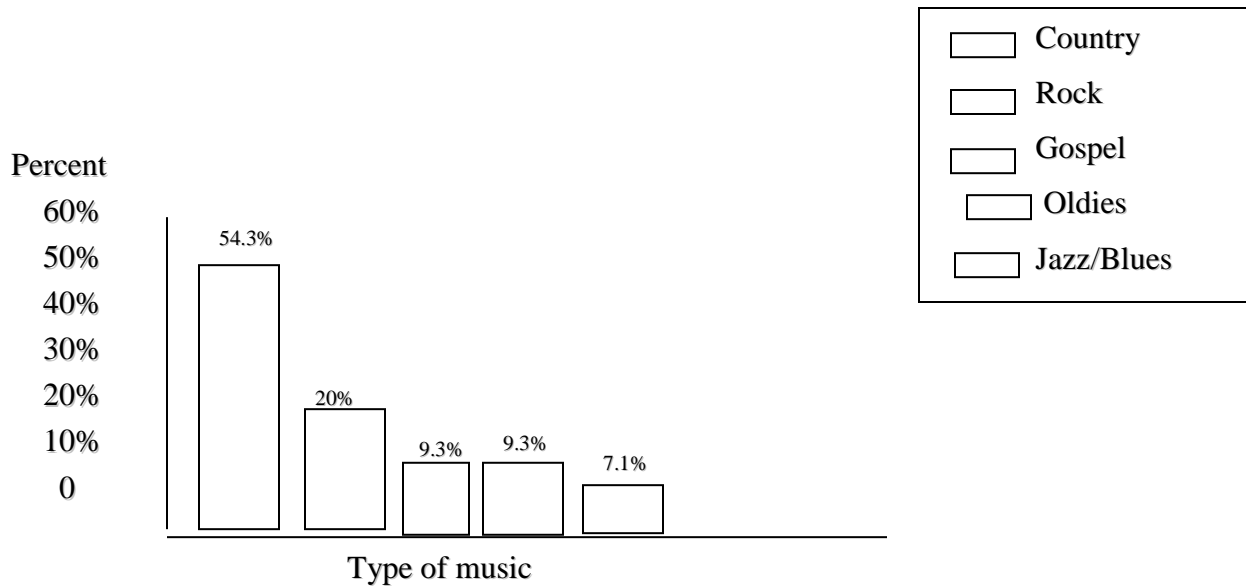
The same information presented in the following figure presented in the form of stacked bar charts.

Figure 5.6 Type of music listened to most often by age (Multiple Row 3D-Bar)



iv) Multiple rows, three-dimensional bar charts

This approach provides what we believe to be the most visually appealing way of presenting cross tabulation information. The following figure presented in a multiple row, three-dimensional bar chart.

Figure 5.7 Type of music listed to most often (Simple 3-D-Bar)

10.5 The Frequency Distribution

The data that have been coded and prepared for automatic processing are now ready for analysis. The first task is to construct frequency distribution to examine the pattern of response to each of the independent and dependent variables under investigation.

A frequency distribution of a single variable, sometimes referred to as a uni-variant frequency distribution, is the frequency of observations in each category of variables. For example, an examination of the pattern of response to the variable “religious affiliation” would involve a description of the number of respondents who claimed they were Orthodox, Protestants, and Catholics.

To construct a frequency distribution, the researcher simply lists the categories of the variable and counts the number of observations in each. Table 10.4 is an example of the standard form of a uni-variant frequency distribution. The table has five rows, the first four being the categories of the variable, which appear in the left hand column, and the right hand column shows the number of observations in each category. This number is called a frequency, and is usually denoted by the letter *f*. The last row (marked *N*) is the total of all frequencies appearing in the table.

When the categories are mutually exclusive so that each observation is classified only once, the total number of frequencies is equal to the total number of observation in the sample.

Table 10.5 The General form of a univariate frequency distribution

Category	Frequency (f)
I	f_i
II	f_{ii}
III	f_{iii}
IV	f_{iv}
Total	N

With nominal variables, the categories may be listed in any arbitrary order. Thus, the variable “sex” may be described with the category ‘male’ or the category “female” listed first. However, the categories of ordinal variables represent different rankings and are therefore arranged in order. Consider the following frequency distribution table.

Table 10.6 Authority Patterns in the family

Authority Patterns	f
Democratic	1,858
Mixed	759
Autocratic	105
Total	2,722

The above table examined the effects of parent-child authority patterns on educational aspirations. The variable “authority patterns” is listed according to the degree of authoritativeness in family relationship, frequency distributions with interval variables. When summarizing interval variables in frequency distributions, one must first decide on the number of categories to use a cutting point between them. As interval variables are ordinarily continuous, the classification into distinct categories may be quite arbitrary. For example, age may be classified into one-year, two-year, or five-year groups. Similarly, income can be classified in a number of ways.

The intervals are usually of equal width, but the width depends both on the number of observations to be classified and the research purpose. The larger the number of observations, the wider the intervals become. However, wider categories also result in greater loss of detailed

information. A general guideline to follow is that the intervals should not be so wide that the measurements include in it have a difference between them that is considered important.

For example, if an age difference of one year is not of special significance of cognitive development, but a difference of two is especially important, the interval chosen may be 1 – 2, 3 – 4, and 5 – 6. The intervals and their frequency for a hypothetical population are presented in the following table.

Table 10.7 A Frequency Distribution of Family Size

Age in Years	f	Real Limits	Interval mid point X_i
1 – 2	6	0.5 – 2.5	1.5
3 – 4	4	2.5 – 4.5	3.5
5 – 6	10	4.5 – 6.5	5.5
7 – 8	3	6.5 – 8.5	7.5

The real limits express the interval boundaries that extend one-half of the years on either side of the interval. The interval width, expressed as w_i , where the subscript i refers to the i_{th} interval, is the difference between the real limits of the interval:

$$w_i = U_i - L_i$$

Where U_i is the upper real limit and

L_i is the lower real limit

For the last interval of Table 5.7 the width is

$$2 = 8.5 - 6.5$$

The mid point of each interval, symbolized by X_i , is a single value, representing the class interval. It is obtained by adding half the interval width to the lower real limit of a class

$$Y_i = L_i + \frac{w_i}{2}$$

Thus for the second class interval of Table 5.7 the mid point is:

$$Y_i = 2.5 + \frac{2}{2} = 3.5$$

Summarizing the data by constructing frequency distribution of single variables is only the first step in data analysis. Next, the frequencies must be converted into measures that can be

interpreted meaningfully. An absolute frequency is meaningless in itself. It needs to be compared with other frequencies. For instance, the significance of 2,000 registered democrats in one community can be assessed only in relation to the number of all registered voters, to the number of registered republicans, or to the number of registered democrats in other communities.

Frequencies expressed in comparable numbers are called proportions or percentages. A proportion is obtained by dividing the frequency of a category by the total number of responses in the distribution. When multiplied by 100, a proportion becomes a percentage. Proportions are usually expressed as f_i/N and percentages as $f_i/N \times 100$, with f_i denoting the frequency of category i and N denoting the total number of responses. Both proportions and percentages reflect the relative weight of a specific category in the distribution.

For example, the relative weight of the category “autocratic” in Table 5.6 is expressed by the proportion of $105/2,722 = 0.038$ or by the percentage $105/2,722 \times 100 = 3.8$ percent.

These figures indicate that only about four out of every hundred families in the group have autocratic interaction patterns with their children.

Proportions and percentages permit the comparison of two or more frequency distributions. Note, for instance, the social class distributions of rural and urban populations displayed in the following tables.

Table 10.8 Social-class Distribution: Rural population (in Absolute frequencies and percentages)

Social class	f	Percentage
Upper middle	60	15%
Middle	300	75
Lower	40	10
Total	400	100

Table 10.9 Social class distribution: Urban population (in Absolute frequencies and in percentages)

Social class	f	Percentage
Upper middle	20	5%
Middle	200	80
Lower	30	12
Total	250	100

In the above tables, although there are more middle class respondents in rural areas (300 versus 200), a straightforward comparison of the absolute frequencies is misleading since the total N is different in each population. Instead, to assess the relative weight of the classes within each distribution, the frequencies should be expressed in percentages, which reveal that the impression gained from the absolute frequencies was indeed misleading.

Whereas the middle class constituted 75 percent of the rural population, it was 80 percent of the urban group. The new figures make it easier to compare the two frequency distributions.

10.6 Measures of central tendency

When only a short summary of the data is required, the entire distribution need not be presented. In most distribution, the observations tend to cluster around a central value. For instance, an income distribution can be characterized by the most frequent income or an average income.

Similarly, attitude distributions cluster around a certain age. This property can be used when attempting to represent a distribution by a single value. The use of such a value not only allows for economy in describing the distribution but also facilitate comparison of different distributions.

Statistical measures that reflect a “typical” or an “average” characteristics of a frequency distribution are referred to as measures of central tendency. The three most commonly used are the mode, the median, and the arithmetic mean.

1. The mode

The mode is the category or the observation that appears most frequently in the distribution. It is used as a measure of central tendency mostly with distributions of nominal variables. To identify the mode, one singles out the category containing the largest number of responses.

As an illustration, consider the following table:

Table 10.10 Frequency distribution of religions groups

Religions Group	f
Orthodox	62
Catholic	52
Protestant	10
Muslim	12
Buddhist	2
Total	138

The distribution of the above table includes five categories. The first, the orthodox group, is the most predominant. This category is thus the mode of the distribution.

Most distributions are uni-modal. That is, they include only one category in which most of the cases are concentrated. At times, however, the distribution is bimodal: it includes two such maximum points. Such a pattern usually exists in distributions that combine two populations. For instance, the distribution of the heights of adults is bimodal. It comprises both men and women, and each sex is characterized by a different typical height.

The advantage of the modal is that it can be easily identified by inspection, and therefore it can be used as a first and quick indicator of the central tendency in a distribution. However, though easy to calculate, the modal is sensitive indicator. Its position might shift whenever the manner of the distributions division into categories is altered. Therefore, it is not a very stable measure of central tendency.

2. The Median

The median is a positional measure that divides the distribution into two equal parts. It is defined as the observation that is located halfway between the smallest and the largest observations in the distribution. For example, in the series 1, 3, 4, 6, 7, the median is 4.

The median can be calculated with observations that are ranked according to size, and as such it can be employed with variables that are at least ordinal. The median is obtained for ungrouped data by locating the middle observation. For an odd number of cases, it is the observation $(N+1)/2$, where μ is the total number of cases, consider, for example, the following set of nine observations: 6, 9, 11, 12, 16, 18, 21, 24, 30

Median

The fifth observation $[(9+1)/2]$ divides the distribution in half. The median is therefore the value of the fifth observation, 16, with an even number of observations; the median is located half way between the two middle observations and is calculated as an average of the observations $N/2$ and $N/2+1$. For example, in the following set of observations 1, 3, 4, 5, 6, 7, 8, 9. The median is the average of the fourth $(8/2)$ and the fifth $(8/2+1)$ observation $(5+6)/2 = 5.5$. For grouped data, the median is located by interpolating within the interval containing the middle observation. The formula for finding the median is

$$Md = Li + \frac{(N/2 - Cumfi)}{fi} w_i$$

Where Md = median

Li = the lower real limit of the interval containing the median.

Cum_{fi} = the accumulated sum of the frequencies of all intervals preceding the interval containing the median.

f_i = the frequency of the interval containing the median.

w_i = the width of the interval containing the median.

Consider the following table to illustrate the computation of the median.

Table 10.11 Age distribution of 134 cases (Hypothetical)

Age	Real class limit	Frequency (f ₁)	Cumulated frequency (Cumf _i)
1 – 10	0.5 – 10.5	10	10
11 – 20	10.5 – 20.5	12	22
21 – 30	20.5 – 30.5	17	39
31 – 40	30.5 – 40.5	21	60
41 – 50	40.5 – 50.5	25	85
51 – 60	50.5 – 60.5	20	105
61 – 70	60.5 – 70.5	18	123
71 – 80	70.5 – 80.5	11	134

The table shows the age distribution of 134 persons, divided into eight ten-year age groups. Because there are 134 observations ($N = 134$), the median has the value of the sixty seventh observation $(134/2) = 67$. The cumulated frequency column shows that there are sixty observations preceding the interval 41 – 50. The interval 41 – 50 contains twenty five more

observations. Hence, the sixty seventh observations are located within that interval. It is necessary to find the exact age corresponding to the seventh case in this interval. These seven cases constitute $7/25$ or 28 percent of the case in the interval. As the width of the interval is 10, we must add 28 percent of 10, namely 2 – 8 years, to the lower real limit of the interval containing the median. The median is therefore $40.5 + 2.8 = 43.3$. These steps can be summarized as follows

$$\begin{aligned} md &= 40.5 + \left(\frac{134/2 - 60}{25} \times 100 \right) = 40.5 + \left(\frac{7}{25} \times 10 \right) \\ &= 40.5 + 2.8 \\ &= 43.3 \end{aligned}$$

3. The Arithmetic mean

The arithmetic mean is the measure of central tendency most frequently used. It is suitable for representing distributions measured on an interval level and is amenable to mathematical calculations. It also serves as a basis for other statistical measures. The arithmetic mean is defined as the sum total of all observations divided by their number. In symbolic notations, the mean is defined as

$$\bar{x} = \frac{\sum_{i=1}^N X_i}{N}$$

Where \bar{x} the arithmetic mean

$$\sum_{i=1}^N X_i = \text{the sum of total observations}$$

N = the number of observations

According to this equation, the mean (\bar{x}) of the series 6, 7, 12, 11, 10, 3, 4, 1 is $54/8 = 6.75$

When the mean to be computed from a frequency distribution, it is not necessary to add up all the individual observations. Instead, each category can be given its proper weight by multiplying it by its frequency. The following equation can be used.

$$\bar{x} = \frac{\sum_{i=1}^N f_i X_i}{N}$$

Where $\sum_{i=1}^N f_i X_i$ = the sum total of all categories multiplied by their respective frequencies

consider the following table to illustrate the computation of the arithmetic mean.

Table 5.12 Distribution of years of study

(1)	(2)	(3)
Years of Study	f	f _i x _i
2	3	6
3	2	6
6	5	30
8	10	80
10	8	80
12	4	48
14	2	28
Total	N = 34	∑f_i x_i = 278

The above table presents data on the amount of schooling received by thirty-four individuals. The mean education of this group can be calculated as follows. To calculate the value of $\sum f_i x_i$ (column 3), each category (column 1) is multiplied by its frequency (column 2), and the products are added up. The mean number of years of schooling is therefore:

$$\bar{x} = \frac{278}{34} = 8.18$$

Unlike the mode and the median the arithmetic mean takes into account all the value in the distribution making it especially sensitive to extreme values. The mean will thus be a misleading measure of central tendency whenever there are some observations with extremely high or low values.

10.7 Measures of dispersion

Measures of central tendency identify the most representative value of the distribution. However, a complete description of the distribution requires that we measure the extent of dispersion about this central value. The actual observations are distributed among many values, and the extent of

this spread varies from one distribution to another. For example, two classes may have the same average grade. However, one class may include some excellent students as well as some very poor ones, whereas all the students in other may be of average ability. Similarly, income distributions with an identical mean may present different patterns of dispersion.

In some distributions, most incomes are clustered around the mean. In others, the incomes are widely dispersed. The description of the extent of dispersions about the central value is obtained by several measures designated as measures of dispersion. In this section, we shall discuss the measure of standard deviation

Standard Deviation

Standard deviation is the square root of the sum of the squared deviations from the mean divided by the number of observations.

The computation of the variance and standard deviation is similar to the mean deviation, except that, instead of taking the deviations absolute values, they are squared and then summed and divided by the total number of observations.

The formula for computing the standard deviation for a sample of observations is as follows:

$$S = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{x})^2}{N}}$$

where:

S = standard deviation

X_i = the value of the i th observation

\bar{x} = sample mean

n = sample size

Consider the survey results of the beer drinker in the following table. The results for both markets are shown:

Table 10.13 measures of dispersion and measures of central Tendency

Respondents	Number of class	
	Market one	market 2
1	2	1
2	2	1
3	3	1
4	2	1

5	5	1
6	1	1
7	2	3
8	2	10
9	10	10
10	1	3
Total	30	32

$$\text{Mean } (\bar{x}) = \frac{\sum_{i=1}^N X_i}{N}$$

$$\text{Market 1} = \frac{30}{10} = 3$$

$$\text{Market 2} = \frac{32}{10} = 3.2$$

Standard Deviation

$$S = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{N}}$$

: - market 1 = 2.57

2 = 3.51

Very often the data are grouped, and then a different procedure for computing the standard deviation and the variance has to be employed .Consider the following table

Table 10.14 Age distribution of 20 respondents

Age	Midpoint (Xi)	f	Xi ²	FiXi ²	FiXi
1-3	2	4	4	16	8
4-6	5	3	25	75	15
7-9	8	10	64	640	80
10-12	11	3	121	363	33
Total			$\sum f_i X_i^2$ =1094	$\sum f_i X_i$ = 136	

In such instances, the intervals mid point are represented by Xi and f_i stands for the corresponding frequencies. The formula to be applied is therefore:

$$S = \sqrt{\frac{\sum fixi^2 - (fixi)^2 / N}{N}}$$

$$\text{Therefore, } \frac{1094 - (136)^2/20}{20} = \frac{1094 - 18490/20}{20} = \frac{1094 - 924.8}{20} = \frac{169.2}{20} = 8.46$$

The standard deviation can be obtained by simply taking the square root of 8.46

$$\text{Thus } S = \sqrt{8.46} = 2.91$$

The standard deviation has various advantages over other measures of dispersion. First, it is more stable from sample to sample.

Second, it has important mathematical properties that enable the researcher to obtain the standard deviation for two or more groups combined. Furthermore, its mathematical properties make it a useful measure in more advanced statistical work, especially in the area of statistical inferences.

10.8 Hypothesis Testing

A hypothesis can be defined as an assumption or guess that a researcher or manager makes about some characteristic of the population being investigated. The marketing researcher is often faced with the question of whether research results are different enough from the norm to conclude that some element of the firm's marketing strategy should be changed. Consider the following situations:

- ☞ The results of a tracking survey show that awareness of the product is lower than it was in a similar survey conducted six months ago. Is the result significantly lower? Is the result sufficiently lower to call for a change in advertising strategy?
- ☞ A product manager believes that the average purchase of his product is 35 years of age. A survey is conducted to test this hypothesis, and the survey shows that the average purchaser of the product is 38.5 years of age. Is the survey result enough different from the product manager's belief to conclude that the belief is incorrect?
- ☞ The marketing director of a fast food chain believes that 60 percent of her customers are female and 40 percent are male. She does a survey to test this hypothesis and finds that according to the survey, 55 percent are female and 45 percent are male. Is this result sufficiently different from her original theory to permit her to conclude that her original theory was incorrect?

All these questions can be evaluated with some kind of statistical test. In hypothesis testing, the researcher determines whether a hypothesis concerning some characteristics of the population is likely, given the evidence.

A statistical hypothesis test allows us to calculate the probability of observing a particular result if the stated hypothesis is actually true.

There are two basic explanations for observing a difference between a hypothesized value and a particular research result: either the hypothesis is true and the observed difference is quite likely due to sampling error, or the hypothesis is most likely false and the true value is some other value.

10.8.1 Steps in Hypothesis Testing

Five basic steps are involved in testing a hypothesis.

1. Stating the hypothesis
2. choosing the appropriate test statistic
3. Developing a decision rule
4. Calculating the value of the test statistic
5. Stating the conclusion

1. Stating the hypothesis

Hypothesis is stated using two basic forms: the null hypothesis H_0 and the alternative hypothesis H_a . The null hypothesis H_0 (sometimes called the hypothesis of the status quo) is the hypothesis that is tested against its compliments, the alternative hypothesis, H_a (sometimes called the research hypothesis of interest).

For example, the manager of Burger City believes that his operational procedures will guarantee that the average customer will have to wait two minutes in the drive-in window line. He conducts research based on the observation of 1,000 customers at randomly selected stores at randomly selected times. The average customer observed in this study spent 2.4 minutes in the drive-in window line. The null hypothesis and the alternative hypothesis might be stated as follows:

Null hypothesis H_0 mean waiting time = 2 minutes alternative hypothesis H_a mean waiting time \neq 2 minutes.

It should be noted that the null hypothesis and the alternative hypothesis must be stated in such a way that both cannot be true. The idea is not to use the available evidence to ascertain which hypothesis is more likely to be true.

2. Choosing the Appropriate test statistic

The analyst must choose the appropriate statistical test, given the characteristics of the situation under investigation.

3. Developing a Decision Rule

The problem is one of determining whether the difference or deviation between the value of the actual sample mean and its expected value based on the hypothesis could have occurred by chance 5 times out of 100, for example, if the statistical hypothesis is true. A decision rule or standard is needed to determine whether to reject or fail to reject the null hypothesis. Statisticians state such decision rules in terms of significant levels.

The significant level is critical in the process of choosing between null and alternative hypothesis. The level of significance is the probability that is considered too low - .10, .05, or .01, for example – to justify acceptance of the null hypothesis.

4. Calculating the Value of the test Statistic in this step we

- i) Use the appropriate formula to calculate the value of the statistics for the test chosen.
- ii) Compare the value calculated (previously) to the critical value of the statistic based on the decision rule chosen.
- iii) Based on your comparison, state the result in terms of either reflecting or failing to reject the null hypothesis (H_0)

5. Stating the Conclusion

Make a statement of your conclusion that summarizes the results of your test. State your conclusion from the perspective of the original research questions.

10.8.2 Hypothesis Tests

Many statistical tests have been developed and are used. Of many, three commonly used statistical hypothesis tests of difference are the Z-distribution, the t-distribution, and the chi-square (X^2) distribution. However, a full discussion of all the three commonly used hypothesis test of differences is beyond the scope of this text. But this text is focused only on Chi-square sample test.

Chi-Square

Data collected in surveys are often analyzed by means of one-way frequency and cross-tabulations. The purpose of cross tabulations is to study relationships among variables. The question is, does the number of responses that fall into different categories differ from what one would expect? This could involve partitioning users into groups, such as general (male, female), age (under 18, 18 – 35, over 35), or income level (low, middle, high), and cross tabulation by the results to questions such as preferred brand or level of use.

The Chi-square (X^2) test enables the research analyst to determine whether an observed pattern of frequencies corresponds to or fits an expected pattern. We will describe the application of this technique to test distributions of cross tabulated categorical data for two independent samples.

1. Chi-square test of a single sample

Consider a situation in which the marketing manager of a retail electronics chain needs to test the effectiveness of three special deals (Deal 1, Deal 2, Deal 3). Each deal will be offered for a month. The manager wants to measure the effect of each deal on the number of customers visiting a test store during the time the deal is on. The number of customers visiting the store under each deal was as follows:

Deal	month	Customers per month
1	April	11,700
2	May	12,100
3	June	11,780
Total		35,580

The marketing manager needs to know whether there is a significant difference between the numbers of customers visiting the store during one time period covered by each deal. The Chi-square (X^2) one-sample test is the appropriate way to answer this question. This test would be applied as follows:

a) Specify the null and alternative hypothesis

- Null hypothesis H_0 – The number of customers visiting the store under the various deals is equal.
- Alternative hypothesis H_a – There is a significant difference in the number of customers visiting the store under the various deals.

b) Determine the number of visitors that would be expected in each category if the null hypothesis were correct (E_i). In the example, the null hypothesis states that there is no difference in the number of customers attracted by the different deals. Therefore, an equal number of customers would be expected under each deal of course, this assumes that no other factors influenced the number of visits to the store. Under the null (no difference) hypothesis, the expected number of customers visiting the store in each deal period would be 11,860, computed as follows:

$$E = \frac{TV}{N}$$

Where

TV = total number of visit

N = Number of months

$$\begin{aligned} \therefore E &= \frac{35,580}{3} \\ &= 11,860 \end{aligned}$$

The researcher should check for cells in which small expected frequencies occur because they can distort X^2 results. No more than 20 percent of the categories should have expected frequencies less than 5, and none should have an expected frequency less than 1. This is not a problem in this case.

c) Calculate the X^2 value using the formula

$$X^2 = \sum_{i=1}^k \frac{(O_i - \epsilon_i)^2}{\epsilon_i}$$

Where

O_i = Observed number in i th category

ϵ_i = Expected number in i th category

k = Number of categories

For our example,

$$\begin{aligned} X^2 &= \frac{(11,700 - 11860)^2}{11,860} + \frac{(12,100 - 11860)^2}{11860} + \frac{(11780 - 11860)^2}{11860} \\ &= 7.55 \end{aligned}$$

d) Select the level of significance. If the .05 level of significance is selected, the tabular X^2 value with 2 degree of freedom ($k-1$) is 5.99. (as per the statistical appendix).

e) Because the calculated X^2 value (7.55) is higher than the table value (statistical appendix) for $k - 1 = 2$ d.f, $\alpha = .05$), we would reject the null hypothesis. Therefore, we conclude with 95 percent confidence that customer response to the deals was significantly different.

Unfortunately, this test tells us only that the overall variations among the cell frequencies are greater than would be expected by chance. It does not tell us whether any individual cell is significantly different from the others.

The previous example used the Chi-square goodness-of-fit test in a situation where only one variable was to be tested. Chi-square is also used to test the relationship between two variables, thus making the test applicable for analysis cross tabulation. However, in this text, the Chi-square is limited to measure only one variable.

2. Chi-square test of the independent samples

Marketing researcher often need to determine whether there is any association between two or more variables. Questions such as, are men and women equally divided into heavy, medium and light user categories? Or, Are purchasers and non-purchasers equally divided into low, middle

and high income groups? Such questions may be needed to be answered prior to formulation of a marketing strategy.

The chi-square (X^2) test for two independent samples is the appropriate test in this situation.

For example, a convenience store chain wants to determine the nature of the relationship, if any, between gender of customers and frequency of visiting stores in the chain.

Frequency of visits has been divided into three categories: 1 – 5 visits per month (light user), 6 – 14 visits per month (medium users), and 15 and above visits per month (heavy users). The steps necessary for conducting this test is as follow.

1. State the null and alternative hypothesis

- Null hypothesis H_0 : There is no relationship between gender and frequency of visit
- Alternative hypothesis H_a : There is a significant relationship between gender and frequency of visit.

2. Place the observed (sample) frequencies in a table (cross tabulation or contingency table) using the k column for the sample group and the r rows for the conditions or treatments. Calculate the sum of each row and column. Record those totals at the margins of the table (they are called marginal totals). Also, calculate the total for the entire table (N). Suppose the summaries table looks like the following.

Frequency of visits	male	Female	Totals
1 – 5	14	26	40
6 – 14	16	34	50
15 and above	15	11	26
Totals	45	71	116

3. Determine the expected frequency for each cell in the contingency table by calculating the product of the two marginal tools common to that cell and dividing the value by N.

Frequency of Visit	Male	Female
1 – 5	$\frac{45 \times 40}{116} = 15.52$	$\frac{71 \times 40}{116} = 24.48$
6 – 14	$\frac{45 \times 50}{116} = 19.40$	$\frac{71 \times 50}{116} = 30.60$
15 and above	$\frac{45 \times 26}{116} = 10.09$	$\frac{71 \times 26}{116} = 15.91$

The X^2 value will be distorted if more than 20 percent of the cells have an expected frequency of less than 5 or if any cell has an expected frequency of less than 1. The test should not be used under these conditions.

4. Calculate the value of X^2 using

$$X^2 = \sum_{i=1}^n \sum_{j=1}^k \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

where

O_{ij} = Observed number in the i th row of the j th column

E_{ij} = Expected number in the i th row of the j th column for our example,

$$X^2 = \frac{(14 - 15.52)^2}{15.52} + \frac{(26 - 24.48)^2}{24.48} + \frac{(16 - 19.4)^2}{19.4} + \frac{(34 - 30.6)^2}{30.6} + \frac{(15 - 10.09)^2}{10.09} + \frac{(11 - 15.91)^2}{15.91}$$

$$X^2 = 5.12$$

5. The tabular X^2 value at a .05 level of significance, and $(r - 1)(k - 1) = 2$ degrees of freedom is 5.99 (see statistical appendix). Because the calculated $X^2 = 5.12$ is less than the tabular value, we fail to reject the null hypothesis and conclude that there is no significant difference between males and females in terms of frequency of their visits.

Check Your Progress

1. Discuss in detail the measure of central tendency?

5. Explain in brief the principles of tabular presentation.

6. Give the mean, median, and mode of the following distribution

22, 41, 43, 56, 33, 22, 20, 37

7. The following is the income distribution of a group of workers:

Income	Frequency
\$ 5000	6
6010	3
6500	3
7000	2
24,000	1
	N = 15

- a) Which measure of central tendency would you use to represent the income of this group?
- b) Compute the measure.

8. Calculate the mean, median, mode, and standard deviation from the data set below.

Respondents	Time visited	Time visited	Time visited
	Male 'A'	male 'B'	male 'c'
1	4	7	2
2	5	11	16
3	13	21	3
4	6	0	1
5	9	18	14
6	3	6	8
7	2	0	1
8	21	3	7
9	4	11	9
10	14	13	5
11	7	7	12
12	8	3	25
13	8	3	9

9. Using data from newspaper or magazine article create the following types of graphs: line and bar

10. Determine the mean and standard deviation form the following data

Respondents	Consumption of	Consumption of
	Product A	Product B
	Market 1	market 2
1	4	3
2	4	3
3	5	3
4	3	3
5	5	4
6	2	4
7	2	4
8	2	7
9	8	7
10	3	3

Chapter Eleven: Presentation and Reporting of research findings

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11.4 Principles of Report Writing

11.0 Learning Objectives

After you study this Chapter, you will be able to explain:

- Types of a Report
- Contents of a Report
- Principles of Report Writing

11.1 Introduction

The technical research work has ended with the interpretation of the data into findings relevant to the problem. The researcher's task, though, has not ended, and for several steps remain that would be important to the usage of the findings and to the future of the researcher and his or her organization. The unit considers the preparation and transmittal of a clear, accurate, and convincing report of the findings, which is a demanding task with a high potential payoff.

The successful report breathes life into the statistical and logical findings and wins the acceptance of those who will translate the findings into action. The report serves three chief functions.

- Report is the means whereby the data, analyses, and findings are placed in an organized and permanent form. As it is the only systematic record of the research, it serves as an essential reference for future research along related lines.
- The quality of the research work is likely to be judged mainly by the report. The key decision-making persons whom the research serves seldom have much personal contact with a researcher within their firm and still less with an outside research agency. Since, the report is their index of the researcher's skill and performance, the time thought and effort spent on it are vital to his or her future.
- The effectiveness of the report may determine the action taken. Properly organized and wide reports lead to appropriate action or policies.

In urgent situations too, convincing reports may inspire decision makers to promptness. The ability of the project findings to induce correct action or perceptions is the main criterion of its success, and that hinges greatly on the report.

11.2 Types of Reports

To write an effective report, it is essential to plan its content well. Each report is a tailor made job that is adapted to the character of the problem, the information contained there in, and the thought modes and preferences of those who will be utilizing the report.

In a broad way, however, we may distinguish several types of reports that would require differing general formats.

1. Basic Report

This is the first report prepared on the project's findings, written by the researcher for his or her own use, composed of working papers and preliminary drafts. It provides the basis for the final report and then becomes a record for the files.

2. Reports for Publication

Often such reports are prepared from research findings for articles in trade and professional journals, popular magazines, bulletins.

Publications and their audiences vary, so no single description can cover this category of report. If a report or article is to be accepted, it is very important that the writer of the report determine the character and interests of the audience to be reached as well as the publisher's policies and write appropriately.

3. Technical Reports

These reports are usually intended for scientific or technically trained persons. They would be interested typically in specific descriptions of the entire procedure employed, which usually would follow the introductions of the problem and hypothesis researched.

They are also interested the logical and statistical details that led to conclusions, so they may be given these step by step progressions toward the interpretations.

4. Reports for Executives

These are reports intended for decision makers. These are the busy people who want primarily the "core" of a research project, its major conclusions and recommendations.

11.3 Contents of the Report

The character of an executive report must be determined from the characteristics called for by the persons concerned. Most executives are more conservative and want a plain straight forward report. Brevity and ease of reading are important to such an audience, of course, but the statements made should be complete, explicit, and supported with data and /or reasoning.

A general useful outline of the report for executives runs as follows:

- 1. Title page; 2. Table of contents; 3. Executive synopsis (summary); 4. Introduction ;*
- 5. Methodology; 6.Findings; 7.Limitations; 8.Conclusions (drawn from the data) and recommendation (stemming from the conclusions); 9. Appendix; 10.Bibliography (if pertinent)*

This outline shows the conventional and logical arrangement of the steps in report preparation. Each section should incorporate the following information.

Letter of transmittal: - The letter of transmittal indicates to whom the report is directed, the reasons for doing the work, and the official authorization for the research.

1. Title Page

The title page should be simple and dignified. The title page should show the subject of the report for whom and by whom it is prepared, and the dates of completion and submittal.

2. Table of Contents

If the report is lengthy, inclusion of a guide to its contents would be desirable. The table of contents is an outline on the order of appearance of the numerous divisions of the report, with page numbers. Also, if the report includes a number of tables, charts, figures and/or illustrations, a separate table for each category would immediately follow the table of contents.

These additional tables may be constructed either as a continuation of the table of contents or as a separate tables on individual pages.

3. Executive Synopsis (Summary)

To many executives, the synopsis is the heart of the report and cannot be underestimated it enables an executive to grasp quickly the import of the research. Many busy executive may read only the synopsis, when time permits or when particular findings are pertinent, he or she can turn to the body of the report and study more carefully that particular portion, which should be referenced or tabbed so that it cannot be found quickly. The synopsis precedes detailed reasoning or evidence. It summarizes, all the essential parts of the report, which include the major facts as well as major findings and conclusions.

4. Introduction

The introduction serves to orient the reader to the detailed discussion of the problem at hand. Usually include in this section are the reasons for doing the work, the scope of the work, the

formulation of the problem(s) to be studied, the objectives to be achieved, and the hypothesis upon which the research is based. Historical background may be included in this section if it is relevant to an understanding of the problem.

5. Methodology

A description of the procedure employed to achieve the objectives follows the introductory section. This section is difficult for the report writer to communicate, for he or she must remember that most executives are not deeply interested in research methodology, nor do they typically understand the technical language. However, the writer needs to convey to the executives some essentials of the research methodology, thus enabling the reader to understand 'why' a particular method was employed rather than another.

6. Findings

The discussion of findings will normally be the longest section of the report. If the problem is to be solved, the data gathered must be examined as they relate to the objectives of the study. Usually, such data are voluminous in their raw form. If they are to be interpreted, they must first be organized such that their meaning can be conveyed to the reader. This task is achieved through the use of the various analytical and statistical techniques. To facilitate, the reader understands of the significance of the results, it may be quite helpful to discuss, in general terms, the method utilized in the analysis. The presentation of the findings is accomplished by a number of devices, tables, charts, and graphs are frequently used to explain relationship of the data analyzed. Whenever, they are used, they should be explained with sufficient clarity to aid the reader to understand their meaning.

7. Limitations

Problems may arise during the research that are of sufficient importance to warrant discussion in a separate section of the report. The researcher should state such limitations to provide the reader with insight into special conditions pertaining to the work. The limitations should be reported within their proper perspective, indicating the accuracy of the interpretation of the results.

8. Conclusions and Recommendations

The conclusions are drawn by inference, either inductive or deductive, from the findings. The conclusions verify or deny the premises or hypothesis upon which the investigation has been conducted.

Conclusions should flow logically from the findings. But drawing conclusions involves the human process of interpretation, faulty conclusions may result.

The recommendations concerning the action to be taken follow the conclusions where recommendations involve policy decisions, some researchers prefer to report only conclusions and leave recommendations to those at the policy making level of management. The researcher is often in the best position to determine recommendations and, if asked to do so, should state them as completely as possible, including who should do what, where, when, and why.

9. Appendix

The appendix provides materials supplementary to those given in the body of the report. Generally, the appendix material contains detailed and/or expanded information, such as detailed computations from which the tables in the report are generated, a copy of the questionnaire used in gathering the data, interviewer, instructions, detailed statistical tables, calculations used to support the sample size chosen, and so on.

10. Bibliography

If pertinent, the bibliography is usually the final section of the report presentation. It contains detailed information on references or source materials found in various forms of communications, such as proceedings of conferences, books, pamphlets, and periodicals.

11.4 Principles of Report Writing

The fundamental medium of communicating research findings is words. Regardless of what statistics and graphs the report may show, there should be communication mode. The report writer must have a complete grasp of the investigation and then be able to use various means of communications (words, symbols, illustrations) to bring that understanding to others.

If one fails in this, much of the time, effort and money spent on the research has been wasted. Good English, of course, is imperative for making good impressions, but that is just the minimum requirement. As important as correctness, skillful use of language is vital in presenting ideas effectively and making them meaning clear. Such mastery is not acquired easily and comes from reading others' effective writing and practicing report preparation. Patience is needed for it may take many report-writing jobs to become reasonably proficient. Here are some pointers in making written reports suitable for executives.

1. Make it easy to follow

The logical structure of the material, especially in the body of the report, should be self evident and the topics easy to find. Have explicit headlines to indicate every different subject. Often subheadings for subtopics should be used in addition to major headings.

2. Make it Clear

Clarity in writing is a quality of communication that good writers develop only after considerable experience. Few people can write so clearly that they cannot be misunderstood. Any vagueness, that there critical reading reveals, ought to be corrected, because vagueness can produce wrong decisions and substantial losses.

3. Use Good Sentence Structure

Well-constructed sentences are a mark of skill in writing, and to write such sentences you must first know what you want to say. Sentence should be short. Long, involved sentences are difficult to read, even though they may be grammatically correct. Sentence should follow pleasantly. Poorly constructed sentences lead to confusion, whereas well-constructed sentences made the reader think clearly.

4. Use Non-Technical Language

The leaders of your research reports are busy people. And very few of them can balance a research report. Therefore, replace technical terms such as "linear equations" and others with

descriptive explanations. Aim the report at the experience level of the reader. If it is necessary to use technical terms, a brief description and/or explanation should be included in the report.

5. Make it Brief

The report should be long enough to cover the objectives of the study. Highlight major points by stressing the big issues and taking them up first, omit detail unless it is really needed to comprehend significant points. Write concisely and to the point. Value clarity rather than impressing the reader with your expertise and vocabulary.

6. Stress Practical Action

The non-technical person of affairs may feel that the statement of researchers or technicians are true theoretically under idealized conditions but not in reality. This usually results from not fully appreciating the evidence that has been presented. Use analogies, specific examples, or comparisons drawn from experiences familiar to the reader. These show that the researcher has taken a realistic point of view.

7. Vary Typography

Variations in type sizes and skillful use of white space may attract attention to major and minor parts or ideas in the report, as well as facilitating reading. Use capitalization to emphasize central ideas. Use quotation marks, italics, or underlining to fortify further key words or ideas. Dots, exclamation marks, and lead lines will direct attention to significant parts of a page.

Overuse of such devices, however, may cheapen the appearance of a report or delude the reader into superficial consideration of it.

8. Use Visual devices in the Report

Visual devices may be used, including graphs, pictures, or maps, to give the report a dynamic quality and emphasis. Such devices need to be selected sparingly and used to supplement, not replace, the written text.

10.9.5 Principles of Tabular Presentation

Proper handling of statistical material is essential in good report writing. Part of the statistics mentioned in report can be incorporated in its statements, particularly where they are relatively brief and are described in the context. Large statistical exhibits should be placed in tables separate from the reading matter but adjacent to the discussion of the particular data shown.

The ten most important principles of tabular presentation are explained below:

1. Title

This should be written after the table is furnished so that it may be a proper description. It should be brief, self explanatory, clearly stating the nature, classification, and time reference of the information given.

2. Number

Tables are numbered to show their position in a series, using Arabic numbers.

3. Arrangement of Items

Items should be arranged using whatever scheme brings out the most significant aspect of the data. When data relate to time, arrangement may be by appropriate period years, months, and so forth. When order of magnitude is most important, data are arranged in that order.

4. Captions and Stubs

Captions are the designations placed over the vertical columns. Stubs are those at the left, opposite the horizontal lines of figures. They should be brief and descriptive. The heading over the stubs should describe them as a whole, etc.

5. Units of Measurement

Units of measurement should be stated in the caption unless they are self-indent.

6. Ruling, spaces, and leaders

Rather than ruling the tables across or vertically, white spaces are often used to set figures apart. Skipping lines between different sections of the data or between every three to five lines also

aids the eye. Vertical ruling is needed when complicated captions are used. Horizontal rulings are used after the captions and below the figure.

7. Totals

Totals should in most cases be shown in the bottom, although the top may be preferred when special emphasis is to be given to certain categories. Which ever method is chosen, it should be employed consistently in all tables.

8. Sources of the Data

Unless they are primary data, sources of data should be cited in order that the source may be referred to if necessary. Place the citation below the table at the left.

9. Footnotes

Footnotes are given to explain anything that cannot be incorporated in the table, including certain qualifications on the data or methods of computation. They follow the table but precede the source. They should be indicated by symbols or letters, and not by numbers, which might be mistaken for part of the table.

10. Emphasis

Emphasis is obtained by contrasting typeface among the figures, stubs, and possibly captions. Use of light and heavy lines or of double lines also gives emphasis or directs the eye.

Check Your Progress

1. Explain briefly the types of report.

2. Outline and explain the contents of the report.

3. Explain briefly the principles of report writing.

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