Chapter 1: Why Do Research?
The nature of research

• Selection and formulation of research problem
• Research design and plan
• Experimental designs
• Sampling and sampling strategy or plan
• Measurement and scaling techniques
• Data collection methods and techniques
• Testing of hypotheses
• Statistical techniques for processing and analysis of data
• Analysis, interpretation and drawing inferences
• Report writing
Introduction To Research And Research Methodology

Definition:

‘Something that people undertake in order to find things out in a systematic way, thereby increasing their knowledge’

Saunders et al. (2009)

Characteristics:

• Data are collected systematically

• Data are interpreted systematically

• There is a clear purpose to find things out
SOCIAL RESEARCH

• A process in which people combine a set of principles, outlooks and ideas (i.e., methodology) with a collection of specific practices, techniques, and strategies (i.e., a method of inquiry) to produce knowledge.

• A collection of methods and methodologies that researchers apply systematically to produce scientifically based knowledge about the social world.

• He or she learn to organize and plan carefully and to select the appropriate technique to address a question.
• More than a collection of techniques, social research is a process for producing knowledge.

• It is a more structured, organized, and systematic process than the alternatives that most of us use in daily life.

• Knowledge from the alternatives is often correct, but knowledge based on research is more likely to be true and have fewer errors.
Non-Scientific Production of Knowledge

- Personal Experience and Common Sense
  1) Overgeneralization
  2) Selective Observation
  3) Premature Closure
  4) Halo Effect
  5) False Consensus
Overgeneralization

• Occurs when we have some believable evidence and then assume that it applies to many other situations as well.
• Statements that go far beyond what can be justified based on the data or empirical observation that one has.
• For example, blind people are outgoing and friendly.
Selective Observation

• When we take special notice of certain people or events and then generalize from them.

• Making observation in a way that it reinforces preexisting thinking, rather than observing in a neutral and balanced manner.
Premature Closure

• It occurs when we feel we have the answer and no longer need to listen, seek information or raise questions.

• Making a judgment, or reaching a decision and ending an investigation, before one has the amount or depth of evidence required by scientific standards.
Halo Effect

• Occurs when we overgeneralize from what we believe to be highly positive or prestigious.
• Allowing the prior reputation of person, places or things to color one’s evaluations, rather than evaluating all in a neutral, equal manner.
False Consensus

• It suggest that we are not good at distinguishing between what we personally think and what we think most other people believe.
• Social research helps address the errors of personal experience.

• Research standards, rules, and principles are designed to reduce this misjudgement, bias, and distorted thinking that frequently occurs with personal experience.
Non-Scientific Production of Knowledge

• Experts and Authority
  – Someone in power says so..

• Popular and Media messages
  – Window into a distorted reality
  – Road Rage
  – Holiday Havoc

• Ideological beliefs and values
  – “it’s the way things have always been”
AUTHORITY

- Someone in power says so..
- There are also limitations to relying on authority. This is using authority as a basis of knowledge. We can benefit from that person’s experience and efforts.

1. It is easy to overestimate the expertise of other people. You may assume that they are right when they are not. History is full of past experts whom we now see as being misinformed.

2. Authorities may not agree and all authorities may not be equally dependable. Whom should we believe if authorities disagree?

3. Authorities may speak on fields they know little about or be plain wrong. An expert who is very informed about one area may use his or her authority in an unrelated area. Also, using the halo effect (discussed later), expertise in one area may spill over illegitimately to be authority in a totally different area. Have you ever seen television commercials or football hero where a movie star uses his or her fame as authority to convince you to buy a car? We need to ask: Who is or is not an authority?

4. To learn about research and acquire the skills so we can evaluate strong from weak studies.
MEDIA MYTHS

– Window into a distorted reality
– Seriously overstated.

• Television shows, movies, and newspaper and magazine articles are important sources of information. Mass media "hype" can create a feeling that a major problem exists when it may not.
• Public relations campaigns try to alter what the public thinks about scientific findings, making it difficult for the public to judge research findings. For example, a large majority of scientific research supports the global warming thesis (i.e., pollutants from industrialization and massive deforestation are raising the earth's temperature and will cause dramatic climate change and bring about environmental disasters.)
Tradition

– “it’s the way things have always been”

• Some traditional social knowledge begins as simple prejudice. You might rely on tradition without being fully aware of it with a belief such as "You never can trust that type of person”.

• People may cling to traditional knowledge without real understanding; they assume that because something may have worked or been true in the past, it will continue to be true.
Common Sense

• “just makes sense”

• Common sense is valuable in daily living, but it allows logical fallacies to slip into thinking.

• Common senses an originate in tradition.

• It is useful and sometimes correct, but it also contains errors, misinformation, contradiction, and prejudice.
<table>
<thead>
<tr>
<th>Alternative Explanation to Social Research</th>
<th>Example Issue:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>In the division of household tasks by gender, why do women tend to do the laundry?</td>
</tr>
<tr>
<td></td>
<td>Experts say that as children, females are taught to make, select, mend, and clean clothing as part of a female focus on physical appearance and on caring for children or others in a family. Women do the laundry based on their childhood preparation.</td>
</tr>
<tr>
<td>Tradition</td>
<td>Women have done the laundry for centuries, so it is a continuation of what has happened for a long time.</td>
</tr>
<tr>
<td>Common Sense</td>
<td>Men just are not as concerned about clothing as much as women, so it only makes sense that women do the laundry more often.</td>
</tr>
<tr>
<td>Media Myth</td>
<td>Television commercials show women often doing laundry and enjoying it, so they do laundry because they think it’s fun.</td>
</tr>
<tr>
<td>Personal Experience</td>
<td>My mother and the mothers of all my friends did the laundry. My female friends did it for their boyfriends, but never the other way around. It just feels natural for the woman to do it.</td>
</tr>
</tbody>
</table>
What Research Involves: A Scientific Approach

• Enlightenment
• Industrial Revolution

Social theory A system of interconnected ideas that condenses and organizes the knowledge about the social world and explains how it works.

Data Numerical (quantitative) and non-numerical (qualitative) information and evidence that have been carefully gathered according to rules or established procedures.

Empirical Description of what we can observe and experience directly through human senses (e.g., touch, sight, hearing, smell, taste) or indirectly using techniques that extend the senses.
What Research Involves: A Scientific Approach

- **Pseudoscience** A body of ideas or information clothed in the jargon and outward appearance of science that seeks to win acceptance but that was not created with the systematic rigor or standards required of the scientific method.

- **Junk science** A public relations term used to criticize scientific research even if it is conducted properly that produces findings that an advocacy group opposes.

- **Scientific Community**
  - **Innumeracy** The lack of quantitative literacy; not having an ability to reason with numbers and other mathematical concepts.
  - **Scientific literacy** The capacity to understand and apply scientific knowledge, concepts, principles, and theories to solve problems and make decisions based on scientific reasoning and to interact in a way that reflects the core values of the scientific community.
What Research Involves:

Norms of the Scientific Community

• Universalism
• Organized Skepticism
• Disinterestedness
• Communalism
• Honesty
What Research Involves:
Norms of the Scientific Community

1. Universalism. Regardless of who conducts research (e.g., old or young, male or female) and of where it was conducted (e.g., United States, France, Harvard, or Unknown University), the research is to be judged only on the basis of scientific merit.

2. Organized skepticism. Scientists should not accept new ideas or evidence in a carefree, uncritical manner. They should challenge and question all evidence and subject each study to intense scrutiny. The purpose of their criticism is not to attack the individual but to ensure that the methods used in research can stand up to close, careful examination.

3. Disinterestedness. Scientists must be neutral, impartial, receptive, and open to unexpected observations and new ideas. They should not be rigidly wedded to a particular idea or point of view. They should accept, even look for, evidence that runs against their positions and should honestly accept all findings based on high-quality research.
What Research Involves:

Norms of the Scientific Community

4. Communalism. Scientific knowledge must be shared with others; it belongs to everyone. Creating scientific knowledge is a public act, and the findings are public property, available for all to use. The way in which the research is conducted must be described in detail. New knowledge is not formally accepted until other researchers have reviewed it and it has been made publicly available in a special form and style.

5. Honesty. This is a general cultural norm, but it is especially strong in scientific research. Scientists demand honesty in all research; dishonesty or cheating in scientific research is a major taboo.
# QUANTITATIVE AND QUALITATIVE SOCIAL RESEARCH

## QUANTITATIVE
- Measure objective facts
- Focus on variables
- Reliability is key
- Value free
- Theory and data are separate
- Independent of context
- Many cases, subjects
- Statistical analysis
- Researcher is detached

## QUALITATIVE
- Construct social reality, cultural meaning
- Focus on interactive process, events
- Authenticity is key
- Values are present and explicit
- Theory and data are focused
- Situationally constrained
- Few cases, subjects
- Thematic analysis
- Researcher is involved
## Qualitative v.'s Quantitative

<table>
<thead>
<tr>
<th></th>
<th>Qualitative Research</th>
<th>Quantitative Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of questions</strong></td>
<td>Probing</td>
<td>Limited probing</td>
</tr>
<tr>
<td><strong>Sample Size</strong></td>
<td>small</td>
<td>large</td>
</tr>
<tr>
<td><strong>Info. Per respondent</strong></td>
<td>much</td>
<td>varies</td>
</tr>
<tr>
<td><strong>Admin</strong></td>
<td>Requires skilled researcher</td>
<td>Fewer specialist skills required</td>
</tr>
<tr>
<td><strong>Type of Analysis</strong></td>
<td>Subjective, interpretative</td>
<td>Statistical</td>
</tr>
<tr>
<td><strong>Type of research</strong></td>
<td>Exploratory</td>
<td>Descriptive or causal</td>
</tr>
</tbody>
</table>
## Qualitative v.'s Quantitative

<table>
<thead>
<tr>
<th>Quantitative approaches</th>
<th>Qualitative approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Simple' numeric data</td>
<td>'Complex' rich data</td>
</tr>
<tr>
<td>Measurement</td>
<td>Meaning</td>
</tr>
<tr>
<td>Explanation</td>
<td>Understanding</td>
</tr>
<tr>
<td>Prediction</td>
<td>Interpretation</td>
</tr>
<tr>
<td>Generalisable account</td>
<td>Contextual account</td>
</tr>
<tr>
<td>Representative population sample</td>
<td>Purposive/ representative perspective sample</td>
</tr>
<tr>
<td>Hypothesis-testing</td>
<td>Exploratory</td>
</tr>
<tr>
<td>Claims objectivity</td>
<td>Accepts subjectivity</td>
</tr>
<tr>
<td>Closed system (experimental control)</td>
<td>Open system (ecological validity)</td>
</tr>
</tbody>
</table>
## Comparison of Qualitative and Quantitative Research

<table>
<thead>
<tr>
<th></th>
<th>Qualitative Research</th>
<th>Quantitative Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic research objective</strong></td>
<td>To gain a broad qualitative understanding of the underlying reasons and motivations; As a first step in multistage research</td>
<td>To quantify the data and generalize the results from the sample to the population of interest; Recommend a final course of action</td>
</tr>
<tr>
<td><strong>Type of sample used</strong></td>
<td>Small numbers of non-representative cases</td>
<td>Large number of representative cases</td>
</tr>
<tr>
<td><strong>Data collection Method</strong></td>
<td>Unstructured</td>
<td>Structured</td>
</tr>
<tr>
<td><strong>Nature of data analysis</strong></td>
<td>Non-statistical</td>
<td>Statistical</td>
</tr>
</tbody>
</table>
Steps in the Research Process

Quantitative Approach

FIGURE 1.1  Steps in the Quantitative Research Process
Quantitative Example 1
Lowery and colleagues (2007)

- **Select a topic**
  - Priming and academic performance

- **Focus the question**
  - Do students who are primed improve academic performance

- **Design the study**
  - experiments

- **Collect the data**
  - Collected data from social psychology courses

- **Analyze the data**
  - Statistical analysis employed

- **Interpret the data**
  - Students who were primed scored higher on exams

- **Inform others**
  - Published in Applied Social Psychology
Steps in the Research Process

Qualitative Approach

FIGURE 1.2 Steps in the Qualitative Research Process
Qualitative Example 1
McCammon and colleagues (2008)

- **Select a topic**
  - Women gaining full citizenship

- **Socio-cultural context/ Adopt perspective**
  - Women gained citizenship differently in different states

- **Design the study**
  - State archives, local newspapers and magazines, legal and political documents

- **Collect and analyze data**
  - Analysis of when and how women gained citizenship in each state

- **Interpret the data**

- **Inform others**
  - American Journal of Sociology
Varieties of Social Research

Quantitative
• Objective observation
• Focus on variables
• Reliability
• Separation between theory and data
• Generalizable
• Large N
• Statistical analysis
Approaches to Social Research

Qualitative
- Cultural meanings
- Focus on events
- Authenticity
- Merging between theory and data
- Situational
- Small N
- Thematic analysis
CHAPTER 2

THE RESEARCH PROCESS:

STEPS 1 TO 3: THE BROAD PROBLEM AREA, PRELIMINARY DATA GATHERING, PROBLEM DEFINITION
TOPICS

• The Broad Problem Area
• Preliminary data gathering
• Some information vital for research
• Literature Review
• Problem definition
• The research proposal
CHAPTER OBJECTIVES

• Identify problem areas that likely to be studied in organizations
• State research problems clearly and precisely
• Explain how primary and secondary data help the researcher to develop a problem statement.
• Write a literature review on any given topic, documenting the references in the prescribed manner
• Develop a research proposal.
Figure 1.2
The research process
Source: © Mark Saunders, Philip Lewis and Adrian Thornhill 2009.
The Research Process

1. OBSERVATION
   Broad area of research interest identified

2. PRELIMINARY DATA GATHERING
   - Interviewing
   - Literature survey

3. PROBLEM DEFINITION
   Research problem delineated

4. THEORETICAL FRAMEWORK
   Variables clearly identified and labeled

5. GENERATION OF HYPOTHESES

6. SCIENTIFIC RESEARCH DESIGN

7. DATA COLLECTION, ANALYSIS, AND INTERPRETATION

8. DEDUCTION
   Hypotheses substantiated? Research question answered?

9. REPORT WRITING

10. REPORT PRESENTATION

11. MANAGERIAL DECISION MAKING

No → Yes

No → Report Writing

No → Report Presentation

Yes → Report Writing

Yes → Report Presentation

Yes → Managerial Decision Making
• Formulating and clarifying the research topic is the starting point of your research project.
• Once you are clear about this, you will be able to choose the most appropriate research strategy and data collection and analysis techniques.
• The formulating and clarifying process is time consuming and will probably take you up blind alleys.
• However, without spending time on this stage you are far less likely to achieve a successful project.
<table>
<thead>
<tr>
<th>Rational thinking</th>
<th>Creative thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Examining your own strengths and interests</td>
<td>• Keeping a notebook of ideas</td>
</tr>
<tr>
<td>• Looking at past project titles</td>
<td>• Exploring personal preferences using past projects</td>
</tr>
<tr>
<td>• Discussion</td>
<td>• Relevance trees</td>
</tr>
<tr>
<td>• Searching the literature</td>
<td>• Brainstorming</td>
</tr>
<tr>
<td>• Scanning the media</td>
<td></td>
</tr>
</tbody>
</table>
Demand for Transport

Ability to afford travel
- Income
- Cost of travel

Need to travel

Leisure travel
- Visits to places
  - Holiday visits
  - Day trips
- Visits to people
  - Relatives
  - Friends

Work travel
- Location of people
- Location of work
- Work activities
<table>
<thead>
<tr>
<th>Research idea</th>
<th>General focus research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising and share prices</td>
<td>How does the running of a TV advertising campaign designed to boost the image of a company affect its share price?</td>
</tr>
<tr>
<td>Job recruitment via the Internet</td>
<td>How effective is recruiting for new staff via the Internet in comparison with traditional methods?</td>
</tr>
<tr>
<td>The use of aromas as a marketing device</td>
<td>In what ways does the use of specific aromas in supermarkets affect buyer behaviour?</td>
</tr>
<tr>
<td>The use of Internet banking</td>
<td>What effect has the growth of Internet banking had upon the uses customers make of branch facilities?</td>
</tr>
<tr>
<td>Research question</td>
<td>Research objective</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1 Why have organisations introduced team briefing?</td>
<td>1 To identify organisations’ objectives for team briefing schemes</td>
</tr>
<tr>
<td>2 How can the effectiveness of team briefing schemes be measured?</td>
<td>2 To establish suitable effectiveness criteria for team briefing schemes</td>
</tr>
<tr>
<td>3 Has team briefing been effective?</td>
<td>3 To describe the extent to which the effectiveness criteria for team briefing have been met</td>
</tr>
<tr>
<td>4 How can the effectiveness of team briefing be explained?</td>
<td>4a To determine the factors associated with the effectiveness criteria for team briefing being met</td>
</tr>
<tr>
<td></td>
<td>b To estimate whether some of those factors are more influential than other factors</td>
</tr>
<tr>
<td>5 Can the explanation be generalised?</td>
<td>5 To develop an explanatory theory that associates certain factors with the effectiveness of team briefing schemes</td>
</tr>
</tbody>
</table>
• A current situation that needs to be rectified immediately.
• A problem could also indicate an interest in an issue where finding the right answers might help to improve an existing situation.
Broad Problem Area

- Broad problem area refers to the entire situation where one sees a possible need for research and problem solving.
- Such issues might pertain to:
  - Problems currently existing in an organizational setting that need to be solved
  - Areas that a manager believes need to be improved in the organization
  - A conceptual or theoretical issues that needs to be tightened up for the basic researcher to understand certain phenomena
Issues need to be researched

- Problems currently existing
- Areas requiring improvement
- Conceptual issue that needs to be tightened
- Researcher wanting to answer empirically
Examples of Broad Problem Areas that Could be Observed at the Work Place

- The sales volume of a product is not picking up.
- Training programs are not as effective as anticipated.
- Inventory control is not effective
- Some members in organization are not advancing in their careers.
- The newly installed information system is not being used by the managers for whom it was primarily designed.
- The introduction of flexible work hours has created more problems than it has solved in many companies.
• A specific problem statement after some preliminary information is gathered.
• Interviews and literature review.
Preliminary Information Gathering

- Unstructured interviews, structured interviews, a review through existing sources of information will help us to narrow the broad problem area and to define a problem statement.

- Nature of information to be gathered:
  - Background information of the organization.
  - Prevailing knowledge on the topic—that is, relevant findings from previous research.
• Data gathered through such existing sources are called **secondary data**.

• Data that already exist and do not have to be collected by the researcher.

• Data are statistical bulletins, government publications, published or unpublished information available from either within or outside the organization, data available from previous research, case studies and library records, online data, company websites, and the internet in general.
• Observing events, people, and objector by administering questionnaires to individuals.

• Such data gathered for research from the actual site of occurrence of events are called **primary data**.

• It is often beneficial to simultaneously gather primary and secondary data.
Secondary Data

- Secondary data – data someone else has collected
Secondary Data – Examples of Sources

- Vital Statistics – birth, death certificates
- Hospital, clinic, school nurse records
- Private and foundation databases
- City and county governments
- Surveillance data from state government programs
- Federal agency statistics - Census, etc.
Primary Data

- Primary data – data you collect
Preliminary Data Collection

- Other types of information such as the perceptions and attitudes of employees are best obtained by talking to them; by observing events, people, and objects; or by administering questionnaires to individuals.

- Such data gathered for research from the actual site of occurrence of events are called **primary data**.
Primary Data - Examples

- Surveys
- Focus groups
- Questionnaires
- Personal interviews
- Experiments and observational study
Background information on the organization

- The origin and history of the company
- Size in terms of employees, assets or both.
- Location - regional, national, or other.
- Purpose
- Resources-human and others.
- Information on the management philosophy.
- Financial position during the previous five to ten years.

Depending on the situation, the type of problem investigated, the nature of some initial response received, certain aspects may have to be explored in greater depth than others.
A literature review should help the researcher to identify and highlight the important variables that are related to the problem.
LITERATURE REVIEW

• Step by step process that involves the identification of published and unpublished work from secondary data sources on the topic of interest, the evaluation of this work in relation to the problem, the documentation of this work.
Literature Review

• A good literature survey:
  – Ensures that important variables are not left out of the study.
  – Helps the development of the theoretical framework and hypotheses for testing.
  – Ensures that the problem statement is precise and clear.
  – Enhances testability and replicability of the findings.
  – Reduces the risk of “reinventing the wheel”.
  – Confirms that the problem is perceived as relevant and significant.
Conducting the literature review

Data sources

- Textbooks
- Academic and professional journals
- Theses
- Conference proceedings
- Unpublished manuscripts
- Reports of government departments and corporations
- Newspapers
- The Internet
Searching for Literature

• Most libraries have the following electronic resources at their disposal:
  – Electronic journals
  – Full-text databases
  – Bibliographic databases
  – Abstract databases
Reasons for the Literature Survey

1. Helps to find the important variables that are likely to influence the problem situation are not left out of the study.
2. Helps the development of the theoretical framework and hypotheses for testing.
3. The problem statement can be made with precision and clarity.
4. Testability and replicability of the findings of the current research are enhanced.

5. One does not run the risk of wasting efforts on trying to rediscover something that is already known.

6. The problem investigated is perceived by the scientific community as relevant and significant.
Evaluation the literature

• To assess the quality of recent research you could ask the following questions:
  • Is the main research question or problem statement presented in a clear and analytical way?
  • Is the relevance of the research question made transparent?
  • Does this study build directly upon previous research?
  • Will the study make a contribution to the field?
  • Is there a theory that guides the research?
  • Is the theory described relevant and is it explained in an understandable, structured, and convincing manner?
  • Are the methods used in the study explained in a clear manner?
  • Is the sample appropriate?
  • Are the research design and/or the questionnaire appropriate for the study?
• Are the measures of the variables valid and reliable?
• Has the author used the appropriate quantitative and/or qualitative techniques?
• Do the conclusions give a clear answer to the main research question?
• Has the author considered the limitations of the study?
• Do the conclusions result from the findings of the study?
Documenting the literature review

• To convince the reader that
  – The researcher is knowledge about the problem area and has done preliminary homework that is necessary to conduct the research
  – The theoretical framework will be structured on work already done and will add to the solid foundation of existing knowledge.
After the interviews and the literature review, the researcher is in a position to narrow down the problem from its original broad base and define the issues of concern more clearly.
“It is a clear and precise statement of the question or issue that is to be investigated with the goal of finding an answer or solution.”
What makes a good problem statement?

• A clear, precise, statement of the specific issue that a researcher wishes to investigate.

• Three key criteria to assess the quality of the problem statement:
  – Relevant
  – Feasible
  – Interesting
The Problem Statement

- **Examples of Well-Defined Problem Statements**
  - To what extent do the structure of the organization and type of information systems installed account for the variance in the perceived effectiveness of managerial decision making?
  - To what extent has the new advertising campaign been successful in creating the high-quality, customer-centered corporate image that it was intended to produce?
  - How has the new packaging affected the sales of the product?
  - What are the effects of downsizing on the long-range growth patterns of companies?
The Research Proposal

• Key elements:
  – Purpose of the study
  – Specific problem to be investigated.
  – Scope of the study
  – Relevance of the study
  – Research design:
    ▪ Sampling design
    ▪ Data collection methods
    ▪ Data analysis
  – Time frame
  – Budget
  – Selected Bibliography
The content of the research proposal

• **Title**-This may be your first attempt at the title. It may change as your work progresses. At this stage it should closely mirror the content of your proposal.

• **Background**-This is also the section where you will demonstrate your knowledge of the relevant literature. Moreover, it will clarify where your proposal fits into the debate in the literature. You will be expected to show a clear link between the previous work that has been done in your field of research interest and the content of your proposal.

• In short, **the literature should be your point of departure**. This is not the same as the critical literature review you will present in your final project report. It will just provide an **overview of the key literature sources from which you intend to draw**.
• *Research questions and objectives*—Be careful here to ensure that your objectives are precisely written and will lead to observable outcomes. Do not fall into the trap of stating general research aims that are little more than statements of intent (e.g. ‘to discover the level of effectiveness of the team briefing scheme’).
• Method-These two aims may be met by dividing your method section into two parts:
  – research design and data collection.
  – Will it be based, for example, on a questionnaire, interviews, examination of secondary data or use a combination of data collection techniques? Here again it is essential to explain why you have chosen your approach.

• Your explanation should be based on the most effective way of meeting your research objectives.

• For example, if you are using a survey strategy you should specify your population and sample size. You should also clarify how the survey instrument such as a questionnaire will be distributed and how the data will be analysed.
• If you are using interviews, you should explain how many interviews will be conducted, their intended duration, whether they will be audio-recorded, and how they will be analysed.

• In short, you should demonstrate to your reader that you have thought carefully about all the issues regarding your method and their relationship to your research objectives.
• *Timescale* - This will help you and your reader to decide on the viability of your research proposal. It will be helpful if you divide your research plan into stages. This will give you a clear idea as to what is possible in the given timescale.

• *Resources* - Conducting research costs money. This may be for travel, subsistence, help with data analysis, or postage for questionnaires. Think through the expenses involved and ensure that you can meet these expenses.

• *References* - A few key literature sources to which you have referred in the background section and which relate to the previous work that is directly informing your own proposal should be all that is necessary.
CHAPTER 3

THE RESEARCH PROCESS:

STEPS 4 TO 5: THEORETICAL FRAMEWORK HYPOTHESIS DEVELOPMENT
• The need for a theoretical framework

• Variables
  – Dependent variable
  – Independent variable
  – Moderating variable
  – Mediating variable

• Hypothesis development
  – Definition
  – If-then statements
  – Null and alternate hypotheses
The Research Process

1. Observation
   - Broad area of research interest identified

2. Preliminary Data Gathering
   - Interviewing
   - Literature survey

3. Problem Definition
   - Research problem delineated

4. Theoretical Framework
   - Variables clearly identified and labeled

5. Generation of Hypotheses

6. Scientific Research Design

7. Data Collection, Analysis, and Interpretation

8. Deduction
   - Hypotheses substantiated? Research question answered?

9. Report Writing

10. Report Presentation

11. Managerial Decision Making
Theoretical Framework

- A theoretical framework represents your beliefs on how certain phenomena (or variables or concepts) are related to each other (a model) and
- an explanation on why you believe that these variables are associated to each other (a theory).
The process of building a theoretical framework includes:

- Introducing definitions of the concepts or variables in your model.
- Developing a conceptual model that provides a descriptive representation of your theory.
- Coming up with a theory that provides an explanation for relationships between the variables in your model.
Araştırma sorusu

Araştırma sorusunda yer alan unsurların tanımlanması

Söz konusu unsurlara ilişkin kuramların, yaklaşımların, modellerin tartışılması

Mantıksal modelin oluşturulması (Şematik gösterim)

TEORİK ÇERÇEVE
Theoretical Framework

Basic steps:

- Identify and label the variables correctly
- State the relationships among the variables: formulate hypotheses
- Explain how or why you expect these relationships

*The theoretical framework offers the conceptual foundation to proceed with the research. It is essential what a variable means and what the different types of variables are.*
Variable

- Anything that can take on differing or varying values.
- Any concept or construct that varies or changes in value
  Simply, something that varies.
- Specifically, variables represent persons or objects that can be manipulated, controlled, or merely measured for the sake of research.
- **Variation**: How much a variable varies. Those with little variation are called *constants*. 
Main types of variables:

- Dependent variable
- Independent variable
- Moderating variable
- Mediating variable
Dependent Variables

• The researcher’s goal is to understand and describe dependent variable, or to explain its variability or predict it.

• Dependent variables are not controlled or manipulated in any way, but instead are simply measured or registered.

• These vary in relation to the independent variables, and while results can be predicted, the data is always measured.

• There can be any number of dependent variables, but usually there is one to isolate reason for variation.
A manager is concerned that sales of a new product, introduced after test marketing it, do not meet with his expectations.

The dependent variable is “sales”.
Independent Variables

- One that influences the dependent variable in either a positive or negative way.

- These variables are ones that are more or less controlled.

- Scientists *manipulate* these variables as they see fit.

- They still vary, but the variation is relatively known or taken into account.

- Often there are *many* in a given study.
A change in the independent variable causes a change in the dependent variable, all four of the following conditions should be met:

- The independent and the dependent variable should covary - a change in the dependent variable should be associated with a change in the independent variable.
- The independent variable should precede the dependent variable - the cause must occur before the effect.
- No other factor should be possible cause of the change in the dependent variable
- A logical explanation is needed about why the independent variable affects the dependent variable.
Independent V. Dependent

- Intentionally manipulated
- Controlled
- Vary at known rate
- Cause

- Intentionally left alone
- Measured
- Vary at unknown rate
- Effect

- A dependent variable changes in response to changes in other variables;
- An independent variable causes changes in a dependent variable;
The higher the temperature of water, the faster an egg will boil.
- Independent variable – temperature of water
- Dependent variable – time to cook an egg
- Controlled variable – type of egg
Examples

- List the variables, and label them as dependent or independent, explaining why they are so labeled.

Example 1
An applied researcher wants to increase the performance of organizational members in particular bank.
The **dependent variable** is **organizational performance** because it is the primary variable of interest to the applied researcher, who wants to increase the commitment of the members in the bank.
Example 2

• A marketing manager wonders why the recent advertisement strategy does not work. **What would be the dependent variable here?**

• Answer: The **dependent variable** is **advertisement strategy** because the marketing manager is interested in knowing why the recent strategy does not work.
Example 3

• Research studies indicate that successful new product development has an influence on the stock market price of the company. That is, the more successful the new product turns out to be, the higher will be the stock market price of the firm.
Answer to the Example 3

- **Independent Variable** is the success of the new product.
- **Dependent Variable** is the stock market price.
New product success

Stock market price

Independent variable

Dependent variable
Example 4

• Cross-cultural research indicates that managerial values govern the power distance between superiors and subordinates.

Dependent V. : the power distance.
Independent V. : Managerial values.
Figure 4.3: Diagram of the relationship between the independent variable (managerial values) and the dependent variable (power distance).
Example 5

• A manager believes that good supervision and training would increase the production level of the workers.

• **Answer**

  **Dependent V.**: *Production* (Main variable of interest)

  **Independent V.**: *Supervision and Training* (Help to explain the variance in production)
Moderators

- Moderating variable
  Moderator is qualitative (e.g., gender, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of relation between independent and dependent variable.

Figure 4.4: (a) Diagram of the relationship between the independent variable (availability of reference manuals) and the dependent variable (rejects); (b) diagram of the relationship between the independent variable (availability of reference materials) and the dependent variable (rejects) as moderated by the moderating variable (interest and inclination).
A variable that influences, or moderates, the relation between two other variables and thus produces an interaction effect.

The presence of a third variable (the moderating variable) modifies the original relationship between the independent and the dependent variables.
A prevalent theory is that the diversity of the workforce (according to different ethnic origins, races, and nationalities) contributes more to organizational effectiveness because each group brings its own special expertise and skills to the workplace.

This synergy can be exploited, however, only if managers know how to harness the special talents of the diverse work group; otherwise, they will remain untapped.

(See Figure 4)
• **Situation 2**

Another research study indicates that the willingness of the employees to learn new ways of doing things is *not influenced* by the quality of the training programs offered by the organizations to *all people* without any distinction.

**Only those with high growth needs** seem to have the yearning to learn to do new things through specialized training.
The **dependent variable** in this case is the employees willingness to learn.

The **independent variable** is the quality of the training program.

The **moderating variable** is the growth need strength (only those with high growth needs show a greater willingness and adaptability to learn to do new things when the quality of the training programs is improved. 

(See Figure 5B)
Figure 5B

The graph illustrates the relationship between training programs and willingness to learn, comparing the effects for those high and low in growth needs.
Mediating variable

- surfaces between the time the independent variables start operating to influence the dependent variable and the time their impact is felt on it.

Figure 4.6: (a) Illustration of the influence of independent variables on the dependent variable when no moderating variable operates in the situation; (b) illustration of the influence of independent variables on the dependent variable when a moderating variable is operating in the situation.
Mediating variable

• Synonym for intervening variable.

• Example: Parents transmit their social status to their children directly, but they also do so indirectly, through education.

• Parent’s status ➔ child’s education ➔ child’s status
Causal relationships 3: mediating and moderating variables

Mediating variable:

A → D → B

Moderating variable:

A → B
  ↓
  E

(Baron & Kenny, 1986)
Example 9

• In Example 8 where:

• A prevalent theory is that the diversity of the workforce (according to different ethnic origins, races, and nationalities) contributes more to organizational effectiveness because each group brings its own special expertise and skills to the workplace.

• This synergy can be exploited, however, only if managers know how to harness the special talents of the diverse work group; otherwise, they will remain untapped.
• The dependent variable: the organizational effectiveness.

• The independent variable: the workforce diversity.

• The intervening variable that surfaces as a function of the diversity in the workforce is creative synergy.
The Intervening Variable

- This creative synergy results from the "diverse" workforce interacting and bringing together their expertise in problem solving.

- Note that creative synergy, the intervening variable, surfaces at time $t_2$, as a function of workforce diversity, which was in place at time $t_1$, to bring about organizational effectiveness in time $t_3$. The dynamics of these relationships are illustrated in Figures 6 and 7.
Figure 6

Time: $t_1 \rightarrow t_2 \rightarrow t_3$

- Workforce diversity
- Creative synergy
- Organizational effectiveness

Independent variable → Intervening variable → Dependent variable
Figure 7

Time: $t_1$

Workforce diversity → Creative synergy → Organizational effectiveness

Independent variable → Intervening variable → Dependent variable

Managerial expertise

Moderating variable
“Managerial expertise” would change the model or affect the relationships.

Managerial expertise moderates the relationship between workforce diversity and creative synergy.

Creative synergy will not result from the multifaced problem-solving skills of the diverse workforce unless the manager is capable of harnessing that synergy by creatively coordinating the different skills.
Theoretical Framework

• Having examined the different kinds of variables that could operate in a situation and how the relationships among these can be established, it is now possible to see how we can develop the conceptual model or the theoretical framework for our research.
The theoretical framework is the foundation on which the entire research project is based. It is a logically developed, described, and elaborated network of associations among the variables deemed relevant to the problem situation.
The components of the theoretical framework

1. The **variables** considered relevant to the study should be clearly defined.

2. A **conceptual model** that describes the relationships between the variables in the model should be given.

3. A **clear explanation** of why we expect these relationships to exist.
The Relationship Between the Literature Survey and the Theoretical Framework

- The *literature survey* provides a solid foundation for developing the theoretical framework.
- The *literature survey* identifies the variables that might be important, as determined by previous research findings.
The Relationship Between the Literature Survey and the Theoretical Framework

- The **theoretical framework** elaborates the relationships among the variables, explains the theory underlying these relations, and describes the nature and direction of the relationships.

- The **theoretical framework** provides the logical base for developing testable hypotheses.
Theoretical Framework for Example

- The **dependent variable** is safety violation, which is the variable of primary interest.
- The variance in the safety violation is attempted to be explained by the **four independent variables** of (1) communication among crew members, (2) communication between ground control and the cockpit crew, (3) training received by the cockpit crew, and (4) decentralization.
Theoretical Framework for Example

• The **less the communication** among the crew members themselves, **the greater is the probability of air-safety violations** since very little information is shared among them.
Theoretical Framework for Example

• When ground crew fail to give the right information at the right time, misfortunes are bound to occur with aborted flights and collisions.

• Coordination between ground and cockpit crew is at the very heart of air safety. Thus, the less the coordination between ground control and cockpit crew, the greater the possibility of air-safety violations taking place.
Both of the above factors are exacerbated by the management philosophy of Delta Airlines, which emphasizes decentralization.

Centralized coordination and control assume great importance when increased flights overall in midair, and with all airlines operating many more flights.

Thus, the greater the degree of decentralization, the greater is the scope for lower levels of communication both among in-flight staff and between ground staff and cockpit crew, and the greater the scope for air-safety violations.
When cockpit crew members are not adequately trained, they may not have the requisite knowledge of safety standards or may suffer from an inability to handle emergency situations and avoid collisions.

Thus, poor training also adds to the probability of increased safety violations. These relationships are diagrammed in Figure 8.
Figure 8

- Communication among cockpit members
- Communication between ground control and cockpit
- Decentralization
- Training of cockpit crew

Air-safety violations

Independent variables

Dependent variable
We may say that lack of adequate training makes the pilots nervous and diffident, and this in turn explains why they are not able to confidently handle situations in midair when many aircraft share the skies.

Nervousness and diffidence are a function of lack of training, and help to explain why inadequate training would result in air-safety hazard.

This scenario can be depicted as in Figure 9.
Poor Training as a Moderating Variable

- We may change the model by using (poor) training as a **moderating variable**.
- We are theorizing that poor communication, poor coordination, and decentralization are likely to result in air-safety violations only in such cases where the pilot in charge has had inadequate training.

See Figure 10
Figure 10

- Communication among cockpit members
- Communication between ground control and cockpit
- Decentralization

Training

Independent variables

Moderating variable

Dependent variable

Air-safety violations
These examples illustrate that the same variable could be independent, intervening, or moderation, depending on how we conceptualize our theoretical model.
Example 11

- Define the problem and develop the theoretical framework for the following situation.

The probability of cancer victims successfully recovering under treatment was studied by a medical researcher in a hospital. She found three variables to be important for recovery:
Exercise

1. Early and correct diagnosis by the doctor.
2. The nurse’s careful follow-up of the doctor’s instructions.
3. Peace and quit in the vicinity.
In a quiet atmosphere, the patient rested well and recovered sooner. Patients who were admitted in advanced stages of cancer did not respond to treatment even though the doctor’s diagnosis was performed immediately on arrival, the nurses did their best, and there was plenty of peace and quiet in the area.
Exercise (Cont.)

• Thus, *stage of cancer* is a *moderating variable*.

• Also, we could use *the patient rest* as an *intervening variable* as shown in Figure 11.
EXERCISE 5.11: SCHEMATIC DIAGRAM

QUICK & CORRECT DIAGNOSIS
FOLLOWING INSTRUCTIONS
PEACE & QUIET

REST

STAGE OF CANCER

RECOVERY

INDEPENDENT VARIABLE
INTERVENING VARIABLE
MODERATING VARIABLE
DEPENDENT VARIABLE
Hypothesis

• A proposition that is empirically testable. It is an empirical statement concerned with the relationship among variables.

• Good hypothesis:
  – Must be adequate for its purpose
  – Must be testable
  – Must be better than its rivals

• Can be:
  – Directional
  – Non-directional
Characteristics of Causal Hypotheses

• At least 2 variables
• Expresses a cause-effect relationship
• Can be expressed as a prediction
• Logical link between hypothesis and theory
• Falsifiable
Hypotheses Development

• **Definition of Hypotheses**: Is a logical relationship between two or more variables expressed in the form of a testable statement.
Statement of Hypotheses: Formats

• *If-Then Statements*
  Can be used to test whether there are differences between two groups. It takes two forms:
  
  ➢ (1) Employees who are more healthy will take sick leave less frequently.
  
  ➢ (2) *If* employees are more healthy, *then* they will take sick leave less frequently.
Directional and Nondirectional Hypotheses

- **Directional hypotheses**: the direction of the relationship between the variables (positive/negative) is indicated.
Example 12

- The greater the stress experienced in the job, the lower the job satisfaction of employees.
  
  Or

- Women are more motivated than men are.
Nondirectional hypotheses

• Nondirectional hypotheses: there are no indication of the direction of the relationships between variables.
Example 13

- There is a relationship between age and Job satisfaction.
  
  Or
  
- There is a differences between the work ethic values of American and Arabian employees.
Null and Alternate Hypotheses

• The **null hypotheses** is a proposition that states a definitive, exact relationship between two variables.

• It states that the population correlation between two variables is equal to zero (or some definite number).

• **In general**, the **null statement** is expressed as no (significant) difference between two groups.
The Alternate Hypotheses

- The **alternate hypotheses** is the **opposite** of the **null hypotheses**, is a statement expressing a relationship between two variables or indicating differences between groups.
Examples for the Directional Relationships

- The **null hypotheses**: In past example were we state that: *Women are more motivated than men are*. Then,
  - $H_0: \mu_M = \mu_w$
  - Or
  - $H_0: \mu_M - \mu_w = 0$

Where $H_0$ represents the **null hypotheses**, $\mu_M$ is the mean motivational level of the men, $\mu_w$ is the mean motivational level of women.
• The **alternate hypotheses** for the above example:
  \[ H_A : \mu_M < \mu_w \]

• Which is the same as
  \[ H_A : \mu_M > \mu_w \]

Where \( H_A \) represents the alternate hypotheses.
Examples for the nondirectional relationship

- There is a difference between the work ethic of American and Arabian employees.
- The **null hypotheses** would be:
  
  $$H_0: \mu_{AM} = \mu_{AR}$$
  
  Or
  
  $$H_0: \mu_{AM} - \mu_{AR} = 0$$

Where $\mu_{AM}$ is the mean work ethic value of Americans and $\mu_{AR}$ is the mean work ethic value of Arabs.
Examples for the nondirectional relationship

- The alternate hypotheses for the above example would statistically be set as:
  \[ H_A: \mu_{AM} \neq \mu_{AR} \]
  where \( H_A \) represents the alternate hypotheses.
Examples for the nondirectional relationship

- For the example: The greater the stress experienced in the job, the lower the job satisfaction of employees.
- The **null hypotheses** would be:
  - \( H_0 \): There is no relationship between stress experienced on the job and the job satisfaction of employees.
  
  This would be statistically expressed by:
  - \( H_0: P = 0 \)

  where \( P \) represents the correlation between stress and job satisfaction, which in this case is equal to 0 (no correlation).
Examples for the nondirectional relationship

- The alternate hypotheses for the above null, can be stated as:
  HA: \( P < 0 \) (the correlation is negative)
Examples for the nondirectional relationship

• For the example: *There is a relationship between age and job satisfaction.*

• For this **nondirectional statement**, the **null hypotheses** would be statistically expressed as:
  \[ H_0: p=0 \]

• The **alternate hypotheses** would be expressed as:
  \[ H_0: P \neq 0 \]
After formulating the null and alternate hypotheses, the **appropriate statistical tests** (t tests, F tests) can be applied, which would indicate whether or not support has been found for these hypotheses.
Example 14

- A production manager is concerned about the low output levels of his employees.

- The articles that he read of job performance mentioned four variables as important to job performance:
  - skill required for the job,
  - rewards,
  - motivation, and
  - satisfaction.

- In several articles it was also indicated that only if the rewards were (attractive) did motivation, satisfaction, and job performance increase, not otherwise.
Example 14 (cont.)

• Given the above situation, do the following:
  1. Define the problem.
  2. Evolve a theoretical framework.
  3. Develop at least six hypotheses.
Example 14 (cont.)

- Problem Statement
  How can the job performance (output) of the employees be increased through enriched jobs and rewards?
EXERCISE 5.13: SCHEMATIC DIAGRAM

SKILLS REQUIRED BY JOB

REWARDS

VALENCE OF REWARDS

SATISFACTION

MOTIVATION

PERFORMANCE

INDEPENDENT VARIABLES

MODERATING VARIABLE

INTERVENING VARIABLES

DEPENDENT VARIABLE
Hypotheses for Example 14

• $H_{A1}$: If the job is enriched and utilizes all the skills possessed by the employee, then employee satisfaction will be high.

• $H_{A2}$: If the job is enriched and utilizes all the skills possessed by the employee, then employee motivation will be high.

• $H_{A3}$: There will be a positive correlation between satisfaction and motivation.
Hypotheses for Example 14

• $H_{A4}$: Greater rewards will influence motivation and satisfaction only for those employees who find the rewards attractive, not for the others.

• $H_{A5}$: Satisfaction and motivation will positively influence performance.

• $H_{A6}$: The more enriched the job and the greater the skills utilized by the job, the higher the level of employee performance.
Exercise

Here are eight variables:

1) Understanding student needs (by teacher);
2) Developing appropriate teaching strategies (by teacher);
3) In-class examples and exercises;
4) Student entry level skills;
5) Student understanding;
6) Student exam performance;
7) Difficulty of exam;
8) Stress.
Exercise

a. With these eight variables, develop a theoretical framework, treating #4 (Student entry level skills) as a moderator, and variable #5 (Student understanding) as an intervening variable.

b. Develop four hypotheses.
a. The variance in the performance of students in the exam can be accounted for by the four independent variables – teacher’s understanding of the needs of the students, the different teaching strategies developed by the teacher, the number of in-class examples and exercises that the teacher gives, and how difficult the exam itself happens to be.
When the teacher understands students’ difficulties and needs, he tries to develop appropriate teaching strategies in order to meet the needs of the students to understand what is being taught, students understanding will increase.
In addition, if the teacher uses several examples to put across the points and gives exercises in class to test the extent to which students have understood, then, the students’ level of understanding of what is being taught will increase.

However, the entry-level skills of the students should be sufficiently adequate to enable them to understand what is being taught. If the student entry level skills and comprehension are very low, then the teachers’ efforts will not work.
• The level of difficulty of the exam is also another factor that would account for the variance in student performance. The more difficult the exam, the more stressed the students will feel while answering the exam, and the lower will be their performance level in the exam. Thus, stress is the intervening variable here. (see next Figure).
Figure: Schematic Diagram on student performance

Understanding Student Needs → Teaching Strategies → In-Class Examples and Exercises → Exam Difficulty → Stress → Exam Performance

M.V. (Outcome) → Entry-Level Skills

I.Vs (Independent Variables)

I.V.Vs (Intermediate Variables)

D.V. (Dependent Variable)
Hypotheses

• $H_{A1}$: Only for those who have the requisite entry level skills, will more in-class exercises and examples help increase the students’ level of understanding of the subject taught.

• $H_{A2}$: The more difficult the exams, the greater the stress experienced by the students.
Hypotheses

• $H_{A3}$: The higher the level of stress experienced by the students, the lower their level of performance in the exam.

• $H_{A4}$: When students understand the subject better, they will perform better in the exam.
CHAPTER 6

MEASUREMENT OF VARIABLES: SCALING, RELIABILITY, VALIDITY
HISTORICAL-COMPARATIVE RESEARCH
Scale

- Scale: tool or mechanism by which individuals are distinguished as to how they differ from one another on the variables of interest to our study.
There are four basic types of scales:
1) Sözde (nominal) ölçüm
2) Sıralı (ordinal) ölçüm
3) Aralı (interval) ölçüm
4) Oranlı (rasyo) ölçüm
## Primary Scales of Measurement

**Figure 8.1**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Nominal</th>
<th>Ordinal</th>
<th>Interval</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Numbers Assigned to Runners</td>
<td>Rank Order of Winners</td>
<td>Performance Rating on a 0 to 10 Scale</td>
<td>Time to Finish, in Seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8.2</td>
<td>15.2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Third place</td>
<td>9.1</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Second place</td>
<td>9.6</td>
<td>13.4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>First place</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Nominal Scale

• A **nominal scale** is one that allows the researcher to assign subjects to certain categories or groups.

• What is your department?
  - O Marketing
  - O Production
  - O Sales
  - O Maintenance
  - O Servicing
  - O Public Relations
  - O Finance
  - O Personnel
  - O Accounting

• What is your gender?
  - O Male
  - O Female
Nominal Scale

• The information that can be generated from nominal scaling is to calculate the percentage (or frequency) of males and females in our sample of respondents.

• Belli bir gruba ait olup olmamayı gösterir.

• Nesnelerin sadece gruplandırıldığı bir ölçme seviyesidir. Sayılar ve harfler bir kimlik olmaktan öteye gitmemektedir. Nesnelere verilen sayıların sayısal anlamları yoktur ve miktar belirtmezler.
  Göz rengi (mavi, yeşil..), cinsiyet (kadın, erkek), illere göre kod numarası verilmesi gibi.
Example 1

• **Nominally scale** the nationality of individuals in a group of tourists to a country during a certain year.

• We could nominally scale this variable in the following **mutually exclusive and collectively exhaustive categories**.

  - American
  - Russian
  - Chinese
  - Arabian
  - Japanese
  - Malaysian
  - German
  - Other
Nominal Scales

Nominal scales focus on only requiring a respondent to provide some type of descriptor as the raw response.

Example.

Please indicate your current martial status.
__Married  __ Single  __ Single, never married  __ Widowed
Nominal-Scaled Responses (Cont’d)

• Which one of the following media influences your purchasing decisions the most?
  – Television
  – Radio
  – Newspapers
  – Magazines
  – Internet
Ordinal Scale

- **Ordinal scale**: not only categorizes variables in such a way as to denote differences among various categories, it also rank-orders categories in some meaningful way.

- What is the highest level of education you have completed?
  - O Less than High School
  - O High School/GED Equivalent
  - O College Degree
  - O Masters Degree
  - O Doctoral Degree
Sıralı (ordinal) Ölçüm (1)

• Sıra bildiren ölçekler verir.
• Bir özelliğe en az sahip olandan en çok sahip olana ya da en çok sahip olandan en az sahip olana doğru bir sıralama yapmak mümkündür.
• Sıralanıların birbirleri arasındaki farkın mutlak boyutu konusunda bir şey söylemek imkansızdır.
Sıralı (ordinal) Ölçüm (2)

Satış hacimlerine göre ilk 500 firma listesi:
1. Tüpraş
2. Arçelik
3. Petrol Ofisi

Kalite açısından otomobil markalarını sıralayınız?
...volkswagen
...toyota
...mercedes

Bölümleri iş olanaklarının fazlalığına göre sıralayınız?
..İktisat
..İşletme
..Maliye
Ordinal Scale

- The preference would be ranked (from best to worse; or from first to last) and numbered as 1, 2, 3, and so on.
Ordinal Scales

Ordinal scales allow the respondent to express “relative magnitude” between the raw responses to a question.

Example.
Which one statement best describes your opinion of an Intel PC processor?
___ Higher than AMD’s PC processor
___ About the same as AMD’s PC processor
___ Lower than AMD’s PC processor
An ordinal scale is more powerful than a nominal scale in that the numbers possess the property of rank order.

How long do you spend reading newspapers on a typical weekday?

- Less than 5 minutes
- 5 minutes to less than 15 minutes
- 15 minutes to less than 30 minutes
- 30 minutes or more
Rank the following five characteristics in a job in terms of how important they are for you. You should rank the most important item as 1, the next in importance a 2, and so on, until you have ranked each of them 1, 2, 3, 4, or 5.
Example 2 (Cont.)

<table>
<thead>
<tr>
<th>Job Characteristic</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>The opportunity provided by the job to:</td>
<td></td>
</tr>
<tr>
<td>1. Interacts with others</td>
<td>_______</td>
</tr>
<tr>
<td>2. Use different skills</td>
<td>_______</td>
</tr>
<tr>
<td>3. Complete a task to the end</td>
<td>_______</td>
</tr>
<tr>
<td>4. Serve others</td>
<td>_______</td>
</tr>
<tr>
<td>5. Work independently</td>
<td>_______</td>
</tr>
</tbody>
</table>
Example 2 (Cont.)

• This **scale** helps the researcher to determine **the percentage** of respondents who consider interaction with others as most important, those who consider using a number of skills as most important, and so on. Such knowledge might help in designing jobs that would be seen as most enriched by the majority of the employees.
Example 2 (Cont.)

- We can see that the **ordinal scale** provides more information than the nominal scale. Even though differences in the ranking of objects, persons are clearly known, **we do not know their magnitude**.
- This deficiency is overcome by **interval scaling**.
Interval Scale

- **Interval scale**: whereas the nominal scale allows us only to qualitatively distinguish groups by categorizing them into mutually exclusive and collectively exhaustive sets, and the **ordinal scale** to rank-order the preferences, the **interval scale** lets us measure the distance between any two points on the scale.
Aralı (interval) Ölçüm (1)

- Sayısal olarak eşit aralıkların eşit mesafeleri temsil ettiği bir Ölçek olup nesnelerin sıralanmasında kullanılır.
- 1 ile 2 arasındaki mesafe ile 4 ile 5 arasındaki mesafe eşittir.
Aralı (interval) Ölçüm (2)

“Şirketinizin ücret politikası hakkında düşünceniz nedir?”

Adil 1 – 2 – 3 – 4 – 5 Adil Değil

“Farklı bir işte çalışmamı tercih ederdim”

1...Hiç Katılmıyorum
2...Kısmen Katılmıyorum
3...Emin Değilim
4...Kısmen Katılıyorum
5...Tamamen Katılıyorum
Interval scale
Example 3a

• Indicate the extent to which you agree with the following statements as they relate to your job, by circling the appropriate number against each, using the scale given below.

  strongly disagree 1, Disagree 2
  Neither Agree Nor Disagree 3
  Agree 4, Strongly Agree 5.
**Interval Scales**

Interval scales demonstrate the absolute differences between each scale point

Example.

How likely are you to recommend the Santa Fe Grill to a friend?

<table>
<thead>
<tr>
<th>Definitely will not</th>
<th>Definitely will</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
The following opportunities offered by the job are very important to me:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interacting with others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using a number of different skills</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Completing a task from beginning to end</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Serving others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working independently</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Suppose that the employees circle the numbers 3, 1, 2, 4, and 5 for the five items.

The **magnitude of difference** represented by the **space** between points 1 and 2 on the scale **is the same** as the magnitude of difference represented by the space between points 4 and 5, or between any other two points. Any number can be added to or subtracted from the numbers on the scale, still retaining the magnitude of the difference.
Example 3a (Cont.)

- If we add 6 to the five points on the scale, the interval scale will have the numbers 7, 8,......, 11 (instead of 1 to 5).

- The magnitude of the difference between 7 and 8 is still the same as the magnitude of the difference between 9 and 10. It has an arbitrary origin.
Example 3b

- Circle the number that represents your feelings at this particular moment best. There are no right or wrong answers. Please answer every question.

1. I invest more in my work than I get out of it

   I disagree completely  1  2  3  4  5  I agree completely

2. I exert myself too much considering what I get back in return

   I disagree completely  1  2  3  4  5  I agree completely

3. For the efforts I put into the organization, I get much in return

   I disagree completely  1  2  3  4  5  I agree completely
Ratio Scale

- **Ratio scale**: overcomes the disadvantage of the arbitrary origin point of the interval scale, in that it has an absolute (in contrast to an arbitrary) zero point, which is a meaningful measurement point.

- Daha önceki ölçeklerin tüm özelliklerini taşımakla beraber mutlak sıfır noktasına da sahiptir.

- En üst ölçüm seviyesidir ve her türlü istatistiksel ve matematiksel işleme imkan tanıımaktadır. Cevaplayıcı 0’dan herhangi uygun bir sayıya kadar cevap verebilir. Yıllık kazancınız ne kadar, kaç çocuğunuz var gibi.
Ratio Scales

Ratio scales allow for the identification of absolute differences between each scale point, and absolute comparisons between raw responses

Example 1.

Please circle the number of children under 18 years of age currently living in your household.

0 1 2 3 4 5 6 7 (if more than 7, please specify ___.)
Ratio Scale
Ratio Scale

• The **ratio scale** is the **most powerful** of the four scales because it has a **unique zero origin** (not an arbitrary origin).

• The differences between scales are summarized in the next Figure.
The differences between scales

SCALES

NOMINAL: Splits data into groups; e.g., men, women

ORDINAL: Ranks data in some order; e.g., exercising for 20 minutes is good, for 30 minutes is better, for 40 minutes is best.

INTERVAL: Sets data on a continuum; e.g.,

\[ \begin{array}{cccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
\end{array} \]

Very Low \hspace{1cm} Very High

RATIO: Starts with absolute zero and indicates proportion e.g.,

\[ \begin{array}{cccc}
0 & 5 & 10 \\
\end{array} \]

Ten is twice as big as five
### Properties of the Four Scales

<table>
<thead>
<tr>
<th>Ölçüm Düzeyleri</th>
<th>Temel Mukayese</th>
<th>Tipik Örnekler</th>
<th>Ortalama Değer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal/sözde</td>
<td>Kimlik</td>
<td>Cinsiyet</td>
<td>Mod</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Göz/saç rengi</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meslekler</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Araba plakaları</td>
<td></td>
</tr>
<tr>
<td>Ordinal/sıralı</td>
<td>Sıra/sıralama</td>
<td>Marka tercihi</td>
<td>Medyan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toplumsal sınıf</td>
<td></td>
</tr>
<tr>
<td>Interval/aralı</td>
<td>Aralıklar</td>
<td>Sıcaklık ölçüsü</td>
<td>Aritmetik ortalama</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Başarı puanı</td>
<td></td>
</tr>
<tr>
<td>Rasyo/oranlı</td>
<td>Mutlak büyüklükler</td>
<td>Satış miktarı Müşterilerin sayısı</td>
<td>Bütün işlemler</td>
</tr>
</tbody>
</table>
Developing Scales

• The **four types of scales** that can be used to measure the operationally defined dimensions and elements of a variable are: **Nominal, Ordinal, Interval, and Ratio** scales.

• It is necessary to examine **the methods of scaling** (assigning numbers or symbols) to elicit the **attitudinal responses** of subjects toward objects, events, or persons.
Developing Scales

- **Categories of attitudinal scales**: (not to be confused with the four different types of scales)
  - The **Rating** Scales
  - The **Ranking** Scales
Developing Scales

• **Rating scales** have several response categories and are used to elicit responses with regard to the object, event, or person studied.

• **Ranking scales**, make comparisons between or among objects, events, or persons and elicit the preferred choices and ranking among them.
Rating Scales

• The following rating scales are often used in organizational research.

1. Dichotomous scale
2. Category scale
3. Likert scale
4. Numerical scale
5. Semantic differential scale
6. Itemized rating scale
7. Fixed or constant sum rating scale
8. Stapel scale
9. Graphic rating scale
10. Consensus scale
Dichotomous Scale

- Is used to elicit a Yes or No answer.
  (Note that a **nominal scale** is used to elicit the response)
- Example 4
  Do you own a car? Yes        No
Category Scale

- It uses multiple items to elicit a single response.
- Example 5
  Where in Jordan do you reside?
  Amman
  Mafraq
  Irbid
  Zarqa
  Other
Likert Scale

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Kategori sayısı olarak 5, 7, 9 ve 11’li olabilir. En sık kullanılanı 5’li olanıdır.

*Is designed to examine how strongly subjects agree or disagree with statements on a 5-point scale as following:*


217
Örnek: Oteldeki oda hizmetleri yeterlidir

( ) Hiç katılmıyorum ( ) Katılmıyorum ( ) Kararsızım
( ) Kısmen katılıyorum ( ) Tamamen katılıyorum

Ölçekte en olumlu ifadeye 5, en olumsuza 1 değeri verilir. Bu durumda değer verme 1 2 3 4 5 olarak yapılır. Ya da tersi.
Semantic Differential Scale

- We use this scale when several attributes are identified at the extremes of the scale. For instance, the scale would employ such terms as:
  - Good – Bad
  - Strong – Weak
  - Hot – Cold
Semantic Differential Scale

- This scale is treated as an Interval scale.

Semantik Farklılıklar Ölçeği
- Mamul, marka ve firma imaj çalışmalarıında yaygın olarak kullanılır.

Semantik farklılıklar ölçeği;

- Sizce devlet hastaneleri;
  Temiz / ..../....../....../....../....../...... Temiz değil
  Doktorlar güleç/....../....../....../....../ Güleç değil
Example 8.10 Semantic Differential Scale Format

Now with respect to Tiger Woods as the spokesperson for Nike golf apparel, we would like to know your opinions about the expertise, trustworthiness, and attractiveness that you believe he brings to the advertisement. Each dimension has five factors that may or may not represent your opinion. For each listed factor, please check the line that best expresses your opinion about that factor.

<table>
<thead>
<tr>
<th>Expertise:</th>
<th>Knowledgeable</th>
<th>Expert</th>
<th>Skilled</th>
<th>Qualified</th>
<th>Experienced</th>
<th>Unknowledgeable</th>
<th>Not an Expert</th>
<th>Unskilled</th>
<th>Unqualified</th>
<th>Inexperienced</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Trustworthiness:</th>
<th>Reliable</th>
<th>Sincere</th>
<th>Trustworthy</th>
<th>Dependable</th>
<th>Honest</th>
<th>Unreliable</th>
<th>Insincere</th>
<th>Untrustworthy</th>
<th>Undependable</th>
<th>Dishonest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
3.b. **Semantik Farklılıklar Ölçeği:** Özellikle ürün, marka ve firma imajı çalışmalarında yaygın olarak kullanılan bu ölçekte, denekler için ürün veya markanın çeşitli özelliklerine ilişkin nitelendirmeler zıt kutuplara gelecek şekilde yedi noktalı bir doğru üzerinde yerleştirilmiştir. Deneklerden her bir özelliğe ilişkin doğru üzerinde kendi değerlendirmelerine uygun bir yere işaret koymaları istenmektedir.

**Örnek:** *Sizce otelimiz*
*Ucuz  I....I....I....I....I....I....I Pahalı*
Numerical Scale

• Is similar to the semantic differential scale, with the difference that numbers on a 5-points or 7-points scale are provided, as illustrated in the following example:

How pleased are you with your new job?

Extremely pleased 5 4 3 2 1 displeased
A 5-point or 7-point scale is provided for each item and the respondent states the appropriate number on the side of each item. This uses an Interval Scale.

Example 7(i)

Respond to each item using the scale below, and indicate your response number on the line by each item.

1                 2             3                4              5
Very unlikely  unlikely    neither       likely      very likely
unlikely nor likely

I will be changing my job in the near future.  -------
Itemized Rating Scale

• Note that the above is balanced rating with a neutral point.

• The unbalance rating scale which does not have a neutral point, will be presented in the following example.
### Itemized Rating Scale

- **Example 7(ii)**

  Circle the number that is closest to how you feel for the item below:

<table>
<thead>
<tr>
<th>Not at all interested</th>
<th>Somewhat interested</th>
<th>Moderately interested</th>
<th>Very much interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

How would you rate your interest in changing current organizational Policies?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
Fixed or Constant Sum Scale

- The respondents are asked to distribute a given number of points across various items.
- Example: In choosing a toilet soap, indicate the importance you attach to each of the following five aspects by allotting points for each to total 100 in all.

| Fragrance | ----- |
| Color     | ----- |
| Shape     | ----- |
| Size      | ----- |

Total points 100

This is more in the nature of an ordinal scale.
This scale simultaneously measures both the direction and intensity of the attitude toward the items under study. The characteristic of interest to the study is placed at the center and a numerical scale ranging, say from +3 to −3, on either side of the item as illustrated in the following example:

<table>
<thead>
<tr>
<th>Bartın ili</th>
<th>Stapel ölçeği</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+3</td>
</tr>
<tr>
<td></td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>+1</td>
</tr>
<tr>
<td>Pahalı</td>
<td>Temiz</td>
</tr>
<tr>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td></td>
<td>+3</td>
</tr>
<tr>
<td></td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>+1</td>
</tr>
<tr>
<td>Yeşil</td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>-3</td>
<td>-3</td>
</tr>
</tbody>
</table>
Example 8: Stapel Scale

- State how you would rate your supervisor’s abilities with respect to each of the characteristics mentioned below, by circling the appropriate number.

<table>
<thead>
<tr>
<th>Adopting modern Technology</th>
<th>Product Innovation</th>
<th>Interpersonal Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3</td>
<td>+3</td>
<td>+3</td>
</tr>
<tr>
<td>+2</td>
<td>+2</td>
<td>+2</td>
</tr>
<tr>
<td>+1</td>
<td>+1</td>
<td>+1</td>
</tr>
<tr>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>-3</td>
<td>-3</td>
<td>-3</td>
</tr>
</tbody>
</table>
Graphic Rating Scale

• A graphical representation helps the respondents to indicate on this scale their answers to a particular question by placing a mark at the appropriate point on the line, as in the following example:
Example 9

On a scale of 1 to 10, how would you rate your supervisor?
Ranking Scales

• Are used to tap preferences between two or among more objects or items (ordinal in nature). However, such ranking may not give definitive clues to some of the answers sought.
Example 10

There are 4 product lines, the manager seeks information that would help decide which product line should get the most attention.

Assume:
35% of respondents choose the 1st product.
25% of respondents choose the 2nd product.
20% of respondents choose the 3rd product.
20% of respondents choose the 4th product.
100%
Ranking Scales

- The manager cannot conclude that the first product is the most preferred. Why?
- Because 65% of respondents did not choose that product. We have to use alternative methods like Forced Choice, Paired Comparisons, and the Comparative Scale.
- We will describe the Forced Choice as an example.
Forced Choice

- The forced choice enables respondents to rank objects relative to one another, among the alternative provided. This is easier for the respondents, particularly if the number of choice to be ranked is limited in number.
Measurement Process

1. Define concepts to be measured
2. Define attributes of the concepts
3. Select scale of measurement (data type)
4. Generate Items/Questions
   – Wording
   – Response format
5. Layout and design questionnaire
6. Pretest and refine
Questionnaire Layout and Design

• Major Issues
  – What should be included?
    ▪ Comes from objectives, construct definitions, and associated attributes
  – How should questions be phrased?
  – In what sequence should questions be arranged?
  – What layout will best serve the research objectives?
Phrasing Issues

- Open-ended vs. Closed-ended
- Simple dichotomous vs. Multi-choice
  - A place for every respondent but only one place (Exhaustive and Mutually Exclusive)
  - Range of choices needs to be consistent with the sample (ex. income categories for students vs. professionals)
- How to handle “no opinion” or “not applicable” respondents?
- Do you need odd or even number of choices?
Phrasing Issues

- Use simple language that is consistent with your population
- Be as specific as possible
- Avoid leading and loaded questions
- Avoid double-barreled questions
  - Ex. How would you rate our company’s service, selection of products, and prices?
- Avoid questions that are too difficult to answer
1. Are you:  
   Female?  
   Male?  

2. What is your age?  
   Under 26  
   26–35  
   36–45  
   46–55  
   56–65  
   Over 65  

3. To which of these ethnic groups do you consider you belong?  
   (These categories were used in the 2001 Census and have been reproduced for ease of comparison.)  
   **White:**  
   British  
   Any other White background (please describe)  
   **Mixed:**  
   White and Black Caribbean  
   White and Black African  
   White and Asian  
   Any other Mixed background (please describe)  
   **Asian or Asian British:**  
   Indian  
   Pakistani  
   Bangladeshi  
   Any other Asian background (please describe)  
   **Black or Black British**  
   Caribbean  
   African  
   Any other Black background (please describe)  
   **Chinese or other Ethnic Group**  
   Chinese  
   Any other (please describe)  

Which of the following categories apply to you?  
(Please tick all that apply.)  
   Housewife/husband  
   Full-time student  
   Part-time student  
   Self-employed  
   Seeking paid employment  
   In part-time, paid employment  
   In full-time, paid employment  

Fig. 1. Personal profile form.
Questionnaire design checklist

- Make your questionnaire as short as possible.
- Make sure people will be able to answer your questions.
- Don’t assume knowledge or make it seem that you expect a certain level of knowledge by the way your questions are worded.
- Start with easy to answer questions. Keep complex questions for the end.
- Ask for personal information at the end.
- Use a mix of question formats.
- Don’t cause offence, frustration, sadness or anger.
- Avoid double-barrelled questions.
- Think about how you intend to distribute your questionnaire, e.g. by hand, through the post or via the internet.

- Construct the questionnaire adhering to the checklist produced above.

- Include a covering letter with information about who the research is for and what will happen to the results.

- Include instructions on how to complete the questionnaire.

- Include details about how the questionnaire is to be returned (making sure you enclose a pre-paid envelope if you need the respondent to return the form to you).

- Make sure you include a date by which time you would like the questionnaire returned.

- Pilot the questionnaire and instructions to check that all can be understood.

- Amend accordingly and re-pilot.

- Send out/administer questionnaire.

- Send out follow-up letters and questionnaires to non-responders.
CHAPTER 7

SAMPLING
Sampling

• Sampling: the process of selecting a sufficient number of elements from the population, so that results from analyzing the sample are generalizable to the population.

• Örneklemin (istatistik) özelliklerinin anakütleye (parametre) genellenebilmesi için, nüfustan yeterli sayıda elemanın seçilmesidir.
Sampling

• Population vs. sample
• Sampling is used for more than just survey research
  – All forms of research
• Probability vs. nonprobability sampling
• Quantitative research – probability
• Qualitative research – nonprobability
Relevant Terms - 1

- *Population* refers to the entire group of people, events, or things of interest that the researcher wishes to investigate.

- An *element* is a single member of the population. If 1000 blue-collar workers in a particular organization happen to be the population of interest to a researcher, each blue-collar worker therein is an element.

- A *sample* is a subset of the population. It comprises some members selected from it.
• The characteristics of the population such as \( \mu \) (the population mean), \( \sigma \) (the population standard deviation), and \( \sigma^2 \) (the population variance) are referred to as its *parameters*. The central tendencies, the dispersions, and other statistics in the sample of interest to the research are treated as approximations of the central tendencies, dispersions, and other parameters of the population.
• *Sampling unit*: the element or set of elements that is available for selection in some stage of the sampling process.

• A *subject* is a single member of the sample, just as an element is a single member of the population.
Statistics versus Parameters

Figure 10.1: The relationship between sample and population.
Advantages of Sampling

- Less costs
- Less errors due to less fatigue
- Less time
- Destruction of elements avoided

- Daha az maliyet (Tüm anakütleyi araştırmaktan daha ucuzdur.)
- Daha az zaman (Daha hızlı)
Sample size: guidelines

• In general: 30 < n < 500

• Categories: 30 per subcategory

• Multivariate: 10 x number of var’s

• Experiments: 15 to 20 per condition
### Table 10.3: Sample size for a given population size.

<table>
<thead>
<tr>
<th>N</th>
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### Table 10.3 (Continued)

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The Sampling Process

- Major steps in sampling:
  - Define the population.
  - Determine the sample frame
  - Determine the sampling design
  - Determine the appropriate sample size
  - Execute the sampling process
Sampling Techniques

• Probability versus nonprobability sampling

• Probability sampling: elements in the population have a known and non-zero chance of being chosen
Sampling Techniques

• Probability Sampling
  – Simple Random Sampling
  – Systematic Sampling
  – Stratified Random Sampling
  – Cluster Sampling

• Nonprobability Sampling
  – Convenience Sampling
  – Judgment Sampling
  – Quota Sampling
Alt Başlıkları

• TESADÜFİ ÖRNEKLEME YÖNTEMLERİ
  i. Basit Tesadüfi Örnekleme
  ii. Sistematik Örnekleme
  iii. Tabakalı Örnekleme
  iv. Küme Örneklemesi
Alt Başlıklar

• TESADÜFİ OLMAYAN ÖRNEKLEME YÖNTEMLERİ

  i. Kolayda Örnekleme
  ii. Yargısal Örnekleme
  iii. Kartopu Örnekleme
  iv. Kota Örneklemesi
• Probability sampling – representativeness is most important
• Does the sample represent the population as a whole?
• Techniques of probability sampling get at different ways of ensuring representativeness
• **Simple random sampling** – randomly pick individuals to include in the sample
  – All individuals must have an equal chance of being selected.
  – As sample size increases, sample becomes more and more representative of population.
  – Sampling is generally without replacement
  – Problem: can be very costly if population is large. Choices come from a list; who makes the list?
Systematic random sampling – samples according to a rule
- E.g., every fifth person is chosen
- Problems: same as simple random. Rule must not lead to bias.

Stratified sampling – break the sample into various subgroups or strata and sample from them.
- Must have good knowledge of strata

Cluster sampling - the subjects are selected in groups or clusters rather than randomly
- E.g., interviewing McDonald’s employees
- Clusters would be every employee at a particular store.
Cluster Sampling

• Procedure
  – Divide of population in clusters
  – Random selection of clusters
  – Include all elements from selected clusters

• Characteristics
  – Intercluster homogeneity
  – Intracluster heterogeneity
  – Easy and cost efficient
  – Low correspondence with reality
Stratified Sampling-Tabakalı (Katmanlı) Örneklem

**Procedure**
- Divide of population in strata
- Include all strata
- Random selection of elements from strata
  - Proportionate
  - Disproportionate

**Characteristics**
- Interstrata heterogeneity
- Intrastratum homogeneity
- Includes all relevant subpopulations
Stratified Sampling - \(\text{Tabakalı (Katmanlı) Örneklem}\)

**Basıt Rastlantılı Örnekleme**

- List of Clients
- Random Subsample

**Katmanlı Örnekleme**

- List of Clients
- Strata
- Random Subsamples of \(\frac{n}{N}\)

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<table>
<thead>
<tr>
<th>Sampling design</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Probability sampling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Simple random sampling</td>
<td>All elements in the population are considered and each element has an equal</td>
<td>High generalizability of findings.</td>
<td>Not as efficient as stratified sampling.</td>
</tr>
<tr>
<td></td>
<td>chance of being chosen as the subject.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Systematic sampling</td>
<td>Every $n$th element in the population is chosen starting from a random</td>
<td>Easy to use if sampling frame is available.</td>
<td>Systematic biases are possible.</td>
</tr>
<tr>
<td></td>
<td>point in the sampling frame.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Stratified random sampling</td>
<td>Population is first divided into meaningful segments; thereafter subjects</td>
<td>Most efficient among all probability designs.</td>
<td>Stratification must be meaningful.</td>
</tr>
<tr>
<td>(Str.R.S.)</td>
<td>are drawn in proportion to their original numbers in the population.</td>
<td>All groups are adequately sampled and comparisons among groups are possible.</td>
<td>More time-consuming than simple random sampling or systematic sampling.</td>
</tr>
<tr>
<td>Proportionate Str. R.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disproportionate Str. R.S.</td>
<td>Based on criteria other than their original population numbers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling design</td>
<td>Description</td>
<td>Advantages</td>
<td>Disadvantages</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
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</tr>
<tr>
<td>4. Cluster sampling</td>
<td>Groups that have heterogeneous members are first identified; then some are chosen at random; all the members in each of the randomly chosen groups are studied.</td>
<td>In geographic clusters, costs of data collection are low.</td>
<td>The least reliable and efficient among all probability sampling designs since subsets of clusters are more homogeneous than heterogeneous.</td>
</tr>
<tr>
<td>5. Area sampling</td>
<td>Cluster sampling within a particular area or locality.</td>
<td>Cost-effective. Useful for decisions relating to a particular location.</td>
<td>Takes time to collect data from an area.</td>
</tr>
<tr>
<td>6. Double sampling</td>
<td>The same sample or a subset of the sample is studied twice.</td>
<td>Offers more detailed information on the topic of study.</td>
<td>Original biases, if any, will be carried over. Individuals may not be happy responding a second time.</td>
</tr>
</tbody>
</table>
Nonprobability sampling

- Qualitative researchers are not as concerned about representativeness
  - Relevance to the research topic
  - Importance of context
- Sample size does not have to be determined in advance.
  - Selection of cases gradually over time
- Important: many statistics assume random sampling
Types of nonprobability sampling

Convenience sampling (haphazard, accidental) – sample whoever is available.

Used by both quantitative and qualitative researchers

Problems

- no representativeness
- It is haphazard, can be very biased
- Not random (avoid using word)
• **Quota sampling** - quotas for certain types of people or organizations are selected as the sample
  - Interviewers are required to find cases with particular characteristics
  - E.g., certain number of Hispanics, teenagers, etc.
  - Like nonrandom version of stratified

• **Pros** – better than convenience; introduce some diversity

• **Cons** –
  - Theoretical quotas must be accurate to be useful.
  - It is nonrandom sampling
**Purposive sampling** - Use judgment and deliberate effort to pick individuals who meet a specific criteria.

Especially good for exploratory or field research.

Appropriate for at least 3 situations.

1. select cases that are especially informative.
   - E.g., college coaches and championships

2. desired population for the study is rare or very difficult to locate.
   - E.g., prostitutes

3. case studies analysis – find important individuals and study them in depth.
• **Snowball sampling** – an individual or group of individuals are sampled. They provide other sources to be sampled.
  – Sampling snowballs into a large selection.
  – aka. Chain sampling
• Useful for hard to identify groups.
  – E.g., study of criminal organizations
• May lead to biased sample
• **Sociogram** – a map of individuals and their references.
Overview

• Overview
• Problem Statement
• Random Number Generators
• Quasi-Random Number Generation
• Uniform sampling of Disks, Triangles, Spheres
• Stratified Sampling
• Importance Sampling of General Functions